9th Annual Undergraduate Research Conference on Applied Computing

"ICT for Empowering Humanity"



URC 2017

April 26 – 27, 2017 | Zayed University | Dubai, United Arab Emirates

Book of Abstracts

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Message from
CONFERENCE CHAIRS

Welcome to the 9th Annual Undergraduate Research Conference on Applied Computing (URC 2017). The objective of this conference is to promote undergraduate research activity at educational institutions across the Arab world, by providing a forum for undergraduate students to present their research projects, share ideas and interact with other young researchers, faculty members, and technology leaders from the region.

Contained in this eBook, you'll find 167 abstracts representing undergraduate student research projects from many universities in the Arab world. The topics covered reflect the multidisciplinary character and wide spectrum of emerging technologies. The research projects will be presented, in live demos, lightning and poster presentation styles, by undergraduate students from 23 educational institutions in 8 countries, namely: Egypt, Jordan, Kuwait, Oman, Palestine, Qatar, Saudi Arabia, and the United Arab Emirates.

We would like to thank everyone involved in this conference. First and foremost, we thank the students and their faculty advisors for their submissions to this conference – without their research projects this conference wouldn't exist! We also thank the rest of our team, members of the organizing committee as well as the technical committee who reviewed student submissions and provided valuable feedback. We would also like to extend our special thanks to the keynote speakers, and members of the panel discussion, for taking the time out of their busy schedules to participate in this conference.

We are grateful to our sponsor, Zayed University's Office of Research, for their continued commitment and contributions that help make this conference a reality. Thank you!

This conference would not have been possible without the great efforts made by the local arrangements and registration teams who work tirelessly to ensure everything is running smoothly, and for this we extend a heart-felt thank you to Muna Bader, Izzeddin Asad, Dr. Huwida Said, Nagarajan Chandrashekaran, and Alia Sulaiman. We would also like to thank all the student volunteers from Zayed University.

Finally, we take this opportunity to thank Zayed University for hosting this conference.

We hope you will enjoy the conference and the lovely city of Dubai.



Dr. Andrew Marrington
Acting Dean, College of Tech Innovation
Zayed University, UAE



Dr. Qusay H. Mahmoud
Conference Co-Chair
Univ. of Ontario Institute of Tech, Canada



Dr. May AlTaei
Conference Co-Chair
Zayed University,UAE

9TH ANNUAL
UNDERGRADUATE
RESEARCH CONFERENCE
ON APPLIED
COMPUTING

URC 2017
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Hotel Smart Mirror

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Supervised by
Dr. Mohammed H. ElAbd

ABSTRACT

The transition towards smart hotels is becoming the new trend as smart technologies aim to provide the guests with a life experience that is easy, efficient, and enjoyable. These technologies utilize the evolution of connectivity to improve quality of hospitality; and thus, numerous opportunities emerge from the integration of technology into hotels. In particular, the concept of a "Smart Mirror" is in line with this transition.

The **Hotel Smart Mirror** is a smart mirror design that is specifically engineered for the use in hotels. The use of technology in a hotel allows for a more interactive environment, leading to a more exciting experience for guests. Having a smart mirror with features that change the way you plan your day, will allow a more efficient use of time, and more productivity.



Figure 1: Hotel Smart Mirror

The Hotel Smart Mirror intends on providing a more creative experience for guests through providing features that help guests use their time more wisely. Some basic functions of the mirror would be displaying the date, time and the weather. More specific features that ease the guest's stay would be maps, a city guide, reminders and VoIP calls. This allows the guest to plan their day while getting ready to start their day. Notifications of events and promotions will also be available on the mirror to keep the guests updated.

In interacting with the Hotel Smart Mirror, three forms exist: voice recognition, motion detection and touch. The voice recognition will allow the guest to speak to the mirror and ask it to access a specific feature. The motion detection will allow hand gestures to be detected, which provides convince when standing at a small distance from the Hotel Smart Mirror. Finally, interaction by touch allows the user to select a feature, zoom in on maps, or scroll when needed.

No smart mirror designed specifically for the hotels and hospitality industry exist in the Middle-East or other nearby regions; however, various smart mirror implementations exist; some are commercial and others are non-commercial. These previous implementations each serve a specific purpose, such as beauty, fashion, or health. Other implementations are prototypes that include the basic functionalities of time, date, weather and maps. In studying these various implementations, the suitable hardware components were carefully selected.

Implementing the Hotel Smart Mirror requires the following hardware: a controlling unit, a monitor, a motion detecting device, a microphone, a two-way reflecting surface, a touch surface and speakers. These hardware components are all integrated through the processing unit to allow the Hotel Smart Mirror to come to life. As for the software, an interface is implemented in a form of a custom designed desktop that specifically serves the requirements of the smart mirror. Using a specifically designed desktop will allow ease of future developments, updates and addition of new features.

An Investigation about User Preference in Smartphone Free Applications

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ABSTRACT

Smartphone applications have become highly popular among individuals and businesses, with millions of users communicating through applications downloaded on their devices to exchange data and information in different forms. Consequently, as the use of Smartphone applications is increasing, the core factor for the success of any Smartphone application is that it should follow the user's preferences and demands. However, few researches were found studying actual Smartphone applications and most of the researches were about future ones and their specifications concentrating on their outlook such as the colors, shapes and pictures to be used. The proposed research aims to fill that gap in which its purpose to investigate about the preference of Smartphone applications in the eyes of users. Therefore, the focus of this study is on the users' point of view on the reasons for preferring smartphone applications over calls/SMS, favorite application and common problems faced while using smartphone applications, with initial hypotheses related to privacy and security, easiness of use and functionality issues. Data was collected using quantitative and qualitative methods such as surveys, interviews and observation. Each data method was analyzed separately and then all analyses were merged to form the most trust-worthy results. Among 140 respondents, 113 (80.71%) were females while 27 (19.29%) were males. Also,40% respondents were in the age range of 20-24. After analyzing the collected data, statistics showed that 90.71% of mobile users prefer free application than paid calls/SMS. Also, 51.43% of the users thought that Smartphone applications are secure and private, while on the other hand 48.57% disagreed. Additionally, 59.29% of mobile users prefer applications because of the variety of features and only 20% prefer it due to less cost. As to the favorite application, 47.86% came to agreement that WhatsApp is their favorite, 35.71% preferred Snapchat and only 5% chose Instagram. Moreover, the most common issue that 37.14% of the users agreed on is weak Internet service. Lastly, users suggested additional features in some application for improvements (See figures 1 to 3). As for results, some findings supported the initial hypotheses while others did not. The findings indicate that users feel more satisfied with smartphone applications that provide variety of features and easiness of use. However, the privacy/security is not at the top of the priority asked by smartphone users. As for the most preferred application, WhatsApp took the lead followed by Snapchat. In addition, users contributed with significant suggestions to improve communication using free applications such as request and approval before allowing people to contact you for WhatsApp and audio tweets for Twitter.

Figure 1 TAM factors (Theodora et al., 2012)

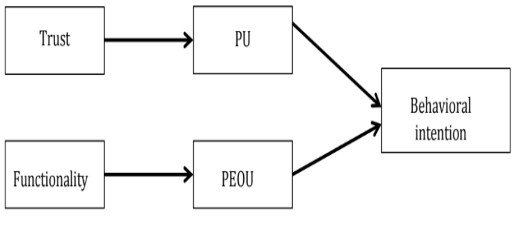
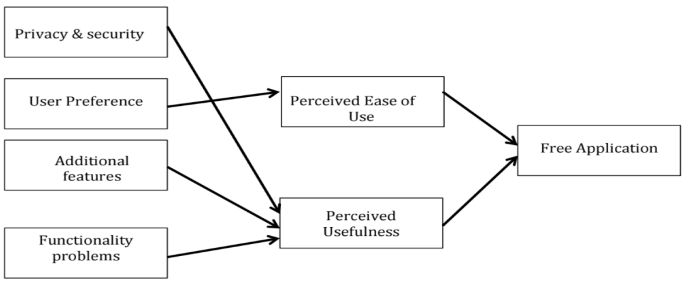


Figure 2 Research TAM factors



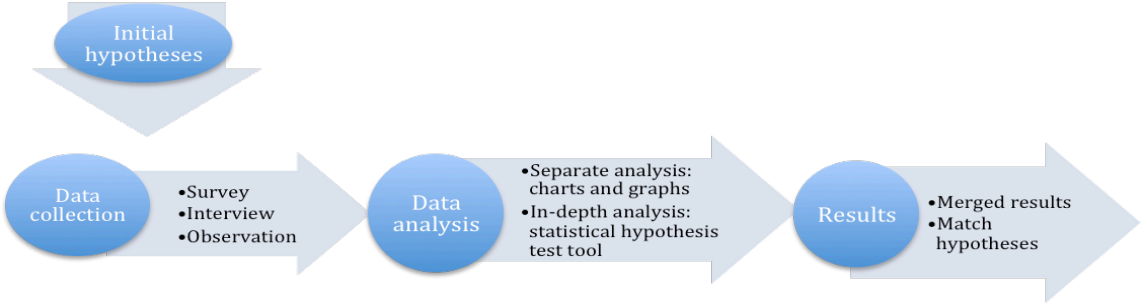


Fig 3 Research Methodology Framework

Phrase Finder: Finding Phrases within Audio Files

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Supervised by
Dr. Omaimah Bamasaq

ABSTRACT

With the fast development in technology in the past decades, the methods for learning and improving one's self has varied rapidly. One of them has been the evolution of digital audio records, where now we can find thousands of lectures and podcasts in all different areas in life, as well as the large amount of audio books available online. With the readiness and availability of these tools, people become more interested in improving their personal, academic, and social growth. The issue that rises in accessing audio files is the amount of time one might spend on searching for a specific part in an audio file that goes for hours by listening and moving back and forth in the recording.

In Phrase Finder, we aim to address this problem by making the search more efficient using speech recognition methods and search algorithms combined with the mechanism of media players to develop a reliable and convenient application for searching through English Audio files.

The application will start by asking the user to enter the audio file, then the speech recognition process will begin by transcribing the audio into text, and locating the positions of the words stream. After that, we will ask the user to enter the phrase as a text to start the search process within the transcribed text. Finally, after locating the phrase, the application will play the audio file at the pinned location. Figure 1 present a high-level block diagram of the application.

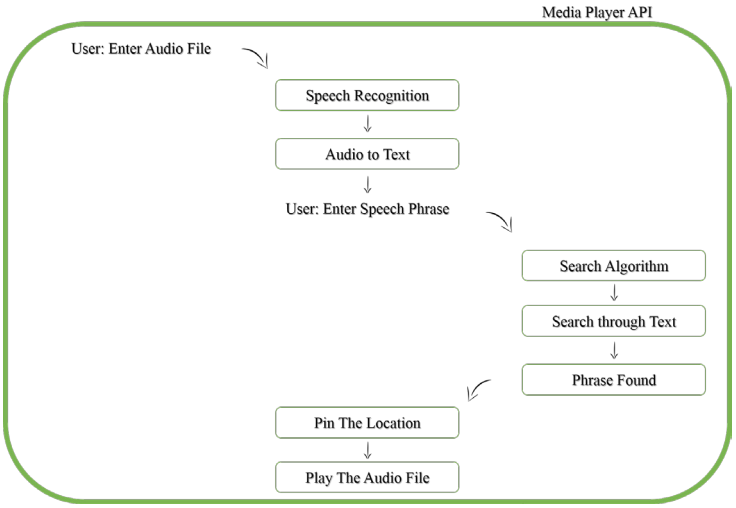


Figure 1: Phrase Finder block diagram

Some of the similar solutions need Internet connection to work, and some of them search the transcribed text word by word. While our solution will be an application for Windows desktops which does not need network connection and will search by phrases that the user entered.

By the end of this project, we aim to produce a desktop application to find specific phrases in audio files and start playing the audio file from the exact point of found phrase. This project is aimed to help and improve the listeners' experience in dealing with various English audio files such as (audio educational books, lectures, novels … etc.).

SMART SCOOTER

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Supervised by:
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ABSTRACT

Currently, over 6.8 million people use wheel chairs, 75% of them are estimated to be unable to easily perform their desired daily activities. Market research shows that currently there is no electric scooter that can be easily used by handicapped or elderly people. Most of the existing electric scooters need to be directed and controlled by the user's hands. Moreover, those commercial electric scooters cannot be folded in car trunks and cannot be easily stored. Hence, we decided to change the traditional wheel chair into a modern designed scooter in order to minimize the disabled people's dependence on others as well as to raise their self -confidence.

The main objective of this project is to facilitate the movement of the disabled or elderly people who are not able to use their hands easily. The scooter has two operations; manual and automatic. In the manual mode, the scooter is operated forward with variance speed as well as right /left with switches as figure (1) shows below.

In the automatic mode, the scooter is fully operated by voice commands. The proposed system will be governed by a unique word preceding movement commands, to ensure that the system will be activated only when this unique word is mentioned. It will be also secured by recognizing the user's voice and will not be activated by any other voice. Furthermore, the proposed scooter will be equipped with obstacle detection system and health monitoring systems such as heart pulse rate and temperature measurement. Finally, the scooter can be folded to fit in a car trunk.

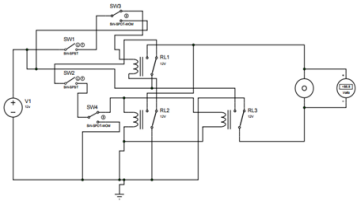


Fig. 1: schematic of right/left manual movement.

In general, the project consists of voice commands, processing unit, microcontroller unit, ultrasonic system, motor drive, scooter and motors. Fig. 1 shows schematic of the manual movement. Fig. 2 shows block diagram of the proposed system.

The software used in this project: Cortana (voice recognition), Arduino fermata protocol and C# language via visual studio environment.

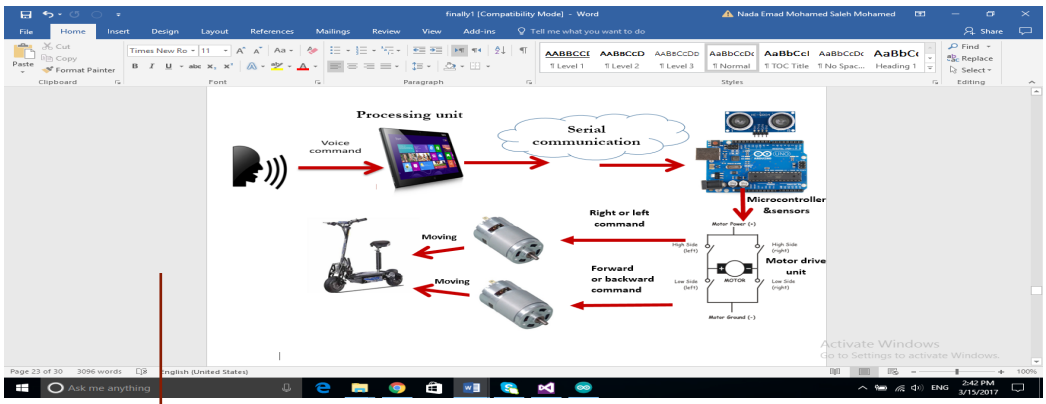


Fig. 2: The block diagram of the proposed system

Car Driver Alert System

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Supervised by:
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ABSTRACT

Driver tiredness is an important factor that causes a high ratio of vehicle accidents. As reported by RTA, the average working hours for Taxi drivers in United Arab Emirates is 12 hours per day which is a long period. Also, 42% of all accidents caused by sleepy drivers in UAE are occurring through the holy month Ramadan. Many automotive companies want to provide new technology to the drivers to avoid such accidents.

In this project, a car driver alert system is proposed. The system is based on tracking the driver's concentration and driver's eye movement in a smart way. In case of detecting the possibility of the car driver drowsiness, the system will activate the alert system that helps waking up the driver using seat vibrations and/or activate a sound system. The proposed system will provide safety to the drivers and will help prevent accidents. The proposed system is based on two techniques:

1. Electroencephalography (EEG) brain sensing headband placed underneath a suitable cap in such a way that driver will feel comfortable. The EEG headband is based on electrophysiological monitoring method to record electrical activity of the brain. The level of the driver attention and concentration will be measured.

2. Eye-Closure detection using a small camera that will be monitoring the driver's eye movement.

Signals from both two techniques will be processed by the computer and in case of detecting car driver drowsiness, the alert system will be activated. The flow-chart of the proposed system is shown below in Fig. 1.

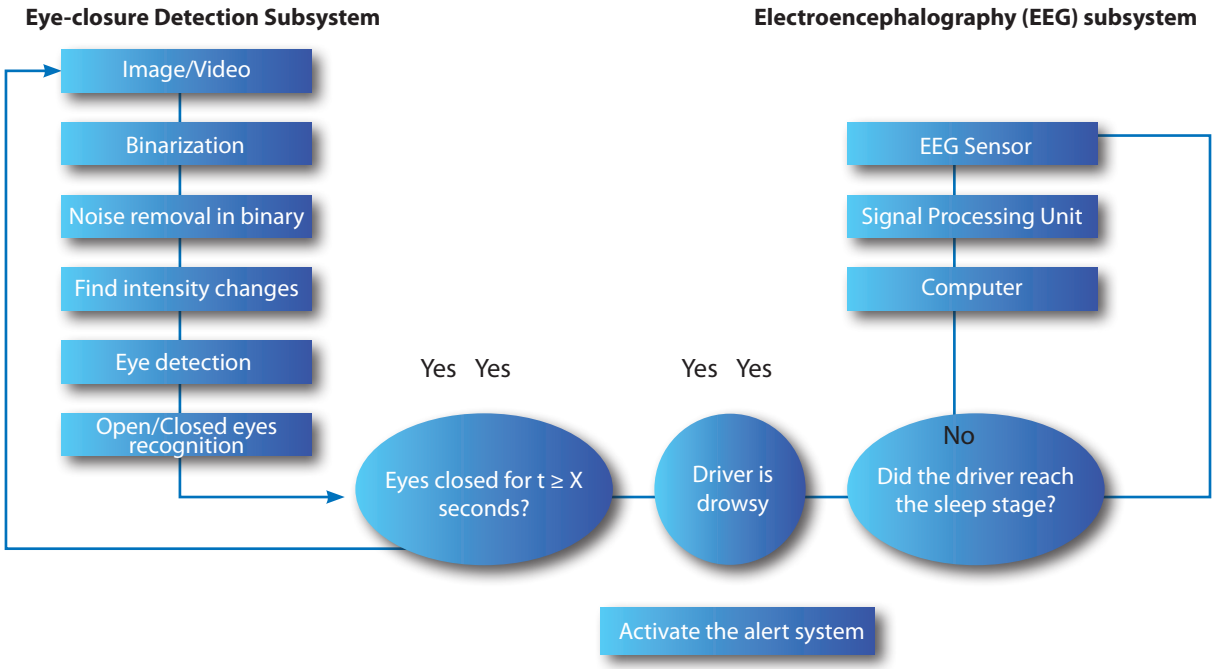


Fig. 1: The block diagram of the proposed system.

Cloud Computing in Higher Education

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Supervised by:
Mrs. Jalila Zouhair

ABSTRACT

In recent years the world has seen drastic improvements within the technology field, with great thanks to scientific studies and improvements, which helped in redefining and shaping how people view the modern world. The introduction of cloud computing has allowed for new ways of sharing information and communicating with one another. One of the main sectors of concern where this truly matters is the educational sector.

Cloud computing has five major characteristics that makes it a necessity in higher education, which are as follows: on-demand self-service, broad network access, resource pooling, rapid elasticity, and measured service. The on-demand self-service allows users to receive resources upon their request, while broad network access implies that users can access computing facilities from any place at any time over a network using any thin or thick clients such as iPhone. As for resource pooling, it is the ability to pool computing resources to satisfy customers' demand. In addition, rapid elasticity allows users to automatically request space in the cloud. The last characteristic is the measured service, which is the ability to provide scalable services that are charged on a meter based billing model.

Even though the cloud shift allows educational institutions to gain greater flexibility by transferring sensitive data into a global data center, it introduces many issues one of which is the security of data. The concern over data security and privacy are real because clouds are potential targets of attackers and hackers. If stolen, the bad actors can always use the data for different things, ranging from identity theft to requesting funds from victims. Accordingly, it is important to seek a vendor that gives a guarantee on the storage of personal information involving students, faculty, and any member of the institution.

One of the most powerful solutions is the implementation of the migrating strategy, since that it will not only reduce university storage and management costs, but also provides rich tools for boosting the quality of researches and improve information security.

An important asset to the migration strategy is setting a timeline. Setting a cloud migration timeline depends largely on the maturity of current IT operations in the institution. And institutions with a mature in-house IT department usually wait until IT infrastructure is due for updating as the trigger to engage in a large cloud migration projects. However, smaller institutions without complex on-premises IT infrastructure could benefit from a more immediate migration.

Another helpful asset is setting up a checklist, to develop a cloud strategy that is aligned to the institution's specific needs, by checking newer software applications, ensuring to have sufficient bandwidth in place to run off from, shaping a plan for reconfiguration to the infrastructure services, data storage requirements, ensuring data encryption to sensitive information, selecting a managed cloud provider to protect the institution against data loss.

With a strong understanding of which cloud environment is best aligned to the institution needs and an effective cloud migration strategy in place, you will be well placed to take advantage of the many benefits of cloud computing.

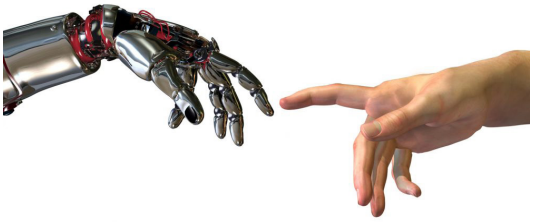
The aim of this paper is to propose a well-advised cloud strategy that works to the advantage of the institution. Our study in this field of usage and continuous improvement showed that the technology will continue gaining popularity due to changes in economics and political atmosphere in different parts of the world.

Bionic Limbs: Features, Challenges, and Opportunities

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ABSTRACT



Will advanced technology save humanity in the future? It seems that we are closer to answer this question with a "yes". The technology revolution is leading the world with new inventions and technologies that are turning science fiction into science facts, and definitely will save humans' lives. Examples of such technologies include artificial intelligence and robots. This research demonstrates the features, challenges, and opportunities of bionic (robotic) limbs.

Bionic limbs are invention that combines artificial intelligence, and robots to create smart limbs for those who lost their limbs due to an accident or a particular disease. Although the existence of the artificial limbs is not new where military soldiers who lost their arms or legs used them. But with magnificent technology that has grown up tenfold in the present time, these limbs have evolved so much as well.

Bionic limbs are highly advanced prostheses that replace arms or legs, and they are controlled totally by brain signals. They can interact and respond to commands from the central nervous system to provide amputees with a new level of control and independence. The bionic limbs are connected by wires from the user's motor cortex that controls the muscles movement, to the sensory cortex that identifies tactile sensations.

Researchers and inventors' first reason to develop these limbs is the public consciousness to give amputees the right to live independent and equally to others. Not only that, but bionic limbs are developed to function and do things that the normal limbs can't even do since they are made from a strong and durable material, such as carbon fiber, metal, and plastic, so the user can't feel the tiredness and the pain. By using bionic limbs, amputees can apply for jobs that depend on the use of hands or legs without feeling frustrated, and unable to achieve something.

Researchers argue that the only disadvantage of this technology is the high price, which could reach up to $100,000, and that what makes it not widely available. But there is a solution for every problem, therefore there is a company called (Open Bionics) and they are specialized in 3D printing and bionic hands. Basically, they make robotic limbs by using 3D printing and that costs less than $3000. These low-cost robotic prostheses can perform the same tasks as the expensive ones. In addition to that, it is more affordable for many amputees around the world.

We can see that this is the first step in the technology world to develop robotic parts of human body, and this, in turn will solve a lot of the chronic problems that some people are facing and will help them to live a normal life unlike before. Also by doing this research, we shed light on this brilliant invention to realize how important this is. And how it will solve amputees' difficulty if organizations and governments, for example, embraced this great invention, and improve it even more.

Investigating the Key Success Factors of Knowledge Management Systems in Dubai Electricity and Water Authority

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ABSTRACT

In the digital era, modern organizations need to use Knowledge Management Systems (KMS) to achieve their strategic goals. The successful implementation of KMS requires the identification of key success factors and lessons learned. Knowledge Management Systems in Dubai Electricity and Water Authority (DEWA) has been selected as a case study.

Over the last few years, the UAE has been witnessing a remarkable movement towards a knowledge-based economy. Building a competitive knowledge-based economy is one of the most fundamental goals outlined in the UAE vision 2021. DEWA is a public sector company provides electricity and water services to its customers across Dubai. DEWA incorporated KMS into its practices in 2009, aiming at becoming a sustainable learning organization. It has realized the great benefits of implementing knowledge management as it has served as an effective enabler for knowledge identification, storing, sharing, capturing and utilization throughout the organization.

The study concentrated on essential success factors behind effective KMS practices. Questionnaire was used for data collection. The results of analyzing collected data indicated that KMS in DEWA are successful because of internal and external factors. Internal success factors are: leadership and top management support, effective Information and Communication Technology (ICT), employees, culture, organizational structure and processes. The main external environment success factor is the government support for smart government projects; smart city projects; Knowledge Economy pillars such as ICT, education and training, Economic Incentive & Institutional Regime, and Innovation Systems. Figure 1 depicts these internal and external success factors. It is recommended to provide more training, awareness, innovative projects and research to sustain the progress and development in DEWA.

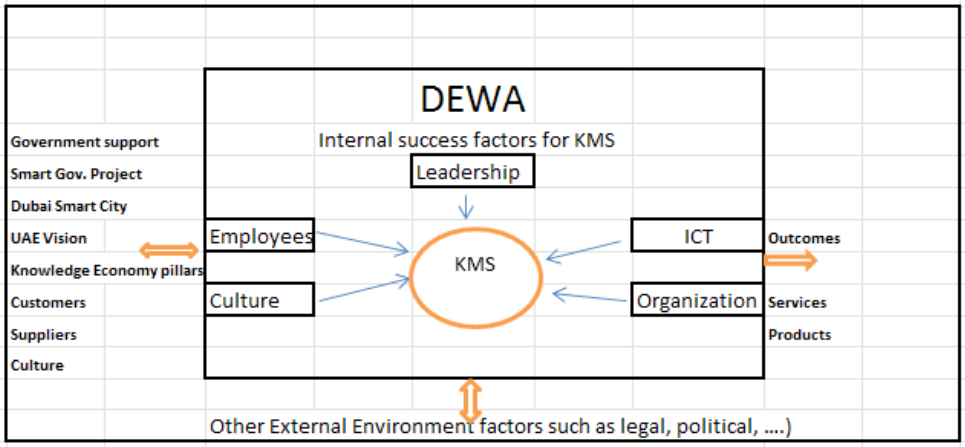


Figure 1: Critical success Factors for KMS in DEWA

ABDR: A Luggage Check-In Application

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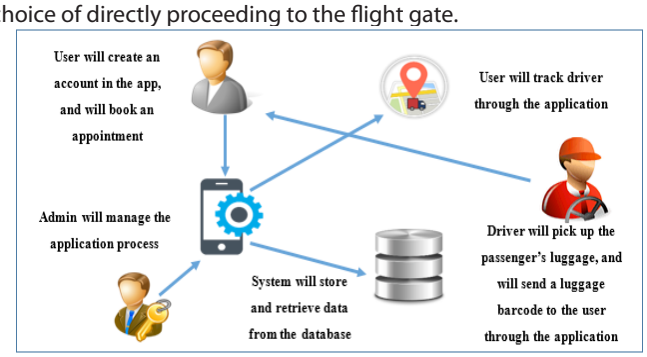
ABSTRACT

Nowadays, traveling become a necessity to every individual to fulfill their needs. The more trips an individual has, the more problems one might face.

The main problem is that standing for a long time in the queue of the luggage check-in counter at the airport, and then, waiting until boarding time; time-consuming, and stress are definitely the consequences of that.

Basically, we would like to assist in serving the community, and try to come up with technical solutions for an easygoing life. For that, we thought of merging the idea of online luggage check-in, and tracking technology together into a simple, compatible, and consistent application.

In this project research, we are seeking to provide a check-in service for luggage through a mobile application called: Abdr. This service allows a passenger to make an appointment before the flight's take off time by about three to five hours, by requesting a trusted driver to pick up the passenger's luggage from the selected location to the airport. In purpose of giving the passenger the choice of directly proceeding to the flight gate.



Upon the suggested solution, the passenger should enter personal, and flight information, and boarding number into the user's platform. Then, he/she shall enter their luggage information. Once the verification has run successfully, the passenger can now choose the time for their luggage to be picked up. After that, the driver picks up the luggage to the airport while the passenger tracks him until he arrives to the airport. The boarding barcode is enough for domestic flights. The luggage check-in process must be done successfully and safely, and the passenger will receive a unique number or barcode for the luggage.

The application is going to be developed for all passengers of domestic flights in Saudi Arabia. Especially for people that get tired easily such as: elderly people, pregnant women, families with heavy luggage, or individuals who are always busy. We really hope to expand the application to be for all Gulf Cooperation Council airports and airlines.
The application is going to be created for Android platform operating system, and developed in Java programming language using the Android development kit (SDK).

We believe that considering the user's functional and non-functional requirements would affect the success of the application, and might increase the demand in the future. Upon that, we ran an online questionnaire. As a result, we got more than a thousand responses that were supporting the idea; some of them were requesting more things to add to make the application as useful as possible.

We have a cognition that Security is the main concern while using the application, but if it was sponsored and adopted by a well-known company, and they provided trusted employees, it will not be a big issue.

VR-based Crises Training System

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Supervised by
Prof. Mustahsan Mir

ABSTRACT

Natural disasters and crises such as earthquakes, gas leaks, accidental fires, electrical shorts or sudden exposure to chemicals can result in severe injuries or loss of life. The impact of such disasters and crisis situations can be minimized by providing periodic training about safety procedures and preparing people of all ages, especially young children, as to how to respond to various crisis situations. The common approaches adopted for imparting such training is through seminars, workshops, videos, and computer simulations. While these approaches are beneficial to a certain extent, a better approach would be to provide the trainees a virtual experience of each type of natural disaster or crisis and let them respond and learn while the disaster or crisis takes place in virtual reality. This will effectively prepare them about actions they need to take do before, during, and after the crisis or disaster.

The Crises Training System presented in this paper utilizes Virtual Reality (VR) and it is developed for training people to adequately respond to emergency situations, natural disasters, accidental fires, gas leaking, electricity faults and other dangerous or life-threatening situations. By using VR technology, game engines and different sensors, the trainees are provided a virtual reality experience and their response to different crises and disasters is tested and evaluated. Repeated training sessions with the help of relevant tutorials will enable the trainees to learn and master appropriate safety procedures for different situations.

The system consists of hardware components such as HTC Vive, Vive Controllers, Treadmill, Trackers and software programs including Unreal Engine 4, Mixamo, Fuse and 3Ds Max. HTC Vive is the headset used to display and track the head's movements and rotations. Vive Controllers are hand motion detectors used to detect the hands movements. They allow the users to interface with the virtual world enabling them to grab and release any movable components. Furthermore, the addition of the trackers, currently under process, shall enable the whole body to be captured and inserted into the scene instantly.

Unreal Engine 4 is used to design and program various scenarios. The engine also interfaces and integrates with the hardware components. For example, the Vive Controllers interfaced to detect hand gestures are shown in Figure 1. Programs Mixamo and Fuse are used to design the skeleton and animation that are related to the characters used in various scenarios. Similarly, 3Ds Max is used to design and edit the objects that are used inside the scenes. Various scenarios for earthquakes and electricity faults have been created and tested. A scenario for virtual fire to be extinguished by the trainee is shown in Figure 2.The system has been successfully tested by users of different age groups.



Figure 1: Vive Controllers for detection of gestures



Figure 2: Virtual fire to be extinguished by trainee

Nabdh Blood Donation Application

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Supervised by:
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ABSTRACT

New era technologies are being used in all aspects of human's daily life to bring comfort and ease together. Governments and private sectors are paying attention to enhance health facilities by providing all necessary resources, hospitals, medical equipment, and doctors to help protect health issues. As a matter of fact, besides all available mentioned facilities, the society is still striving hard at the point of blood transfusion, which eventually puts the lives of people at high risk.

The massive need of blood donations has been highly increased in the past few years, due to the fact that several people are losing their lives daily in road accidents and in emergency situations such as, surgeries, and massive blood loss may need multiple transfusion, the society is suffering from the lack of blood in blood banks while there is great number of people willing to donate. However, the main issue resides in the waiting time that the blood donors encounter in hospitals to donate blood, which wastes plenty of time, leaving the blood donors frustrated.

As the group team members are a part of the society realizing the need and want for an application that serves blood donors in Riyadh was their concern, also, the need to link various hospitals together, through one application for blood donation. The proposed application is considered as one of its kind in the region. The aim of this project is to develop a mobile application that will positively contribute to the society by serving community and reducing the time blood donors spend waiting for their turn. This application serves as the intermediate between hospitals and blood donors all around the capital city of Saudi Arabia, Riyadh. Moreover, it will help the blood donors and hospitals to find each other easily, to accomplish and exchange needs in a short time which would help in saving the patient life. The name of the application Nabdh *(Arabic:* نبض*)* was chosen, as it means the heart beats in arabic, and how this application can help in saving humans lives by the increasing rate of blood donations.

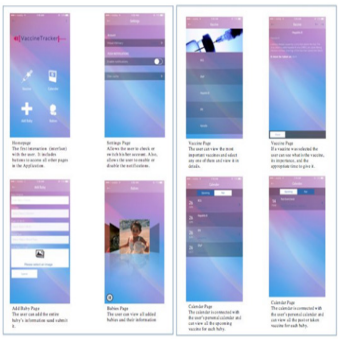
Similar application to what is proposed in this project, was found, "iGive Blood" is an application that serves blood donors in the United States, nevertheless, there are some remarkable differences regarding, the concept of the application in general, and the user interface in particular as well as the user interface for the proposed blood donation application.

To ensure the need of the application, a survey of five questions was distributed to 30 patients and the correct responds conducted from 21 patients in Riyadh from different ages and gender. The proposed application development life cycle started with planning phase that included mind map to identify the application elements, followed by data flow diagram to identify the process. This mind map designed to help identify and clear the understanding of the application elements created by using an online tool called Bubble. This whole process was completed with multiple tools for designing and developing the interface. Our proposed system will increase the efficiency of blood donation system and it will also become source to maintain blood banks reserves to be used in case of emergency.

Vaccine Tracker Application

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ABSTRACT



Young children are more vulnerable to the effects of many serious diseases. Their immune systems are not yet fully mature that is why specific vaccines are recommended to be taken at a young age. Different vaccines are taken during the child's life such as hepatitis A and B, pneumonia and polio vaccines. Each vaccine is given for a specific reason and in a specific age with different doses. Generally, vaccines are an important step toward protecting the child's health, and getting it on time helps to prevent the child from many diseases, including hepatitis and measles. Most of the countries in the world recommend the same vaccines for citizens. Vaccination prevents between two and three million deaths worldwide every year. Vaccines work best when they are taken on time, and some vaccines need be taken more than once. Therefore, a vaccination schedule is essential to prevent caregivers from losing track of all different vaccines and the number of doses. In order to help keeping track of all the vaccines, and to keep the child's immune system protected this application aims to have the full vaccination schedule, and will notify the caregiver of the vaccine's time and dose. In addition, the application will provide information related to each vaccine, which will fulfill the caregivers' knowledge, and would help caregivers to be aware about the consequences of missing any vaccine. To identify the current status of children vaccine tracking applications, the developers conducted a comparison with a similar mobile application from the Apple App Store entitled "Vaccination Reminder". The proposed application is a cross-platform that has been developed using AppMachine tool, which is a free tool that has built-in functions. The tool has been chosen because it allows the developers to customize the functions and designs based on their preferences. In addition, AppMachine allows synchronous collaboration. Since the application will consider the Saudi vaccines program as its main reference, therefore it targets Saudi mothers and more specifically new mothers, since they are struggling with remembering the due date of the required vaccine. The main goal and feature of the vaccination application is to manage children vaccination by providing notification that will help caregivers to keep track of the due vaccinations. In this project a quantitative research method has been conducting using questionnaires. The questionnaire is designed to provide the maximum amount of information needed to help building and designing the application. First of all, the caregiver will have to sign up and create a profile by entering his/her information. After that, caregiver can log in and add his\her child's information such as name, gender, date of birth, blood type and an image. The application will be able to keep track of up to 50 children. In addition, the application will have a page that includes a brief description of the main important vaccines. Finally, the application will calculate the time of each vaccine based on the child's age and send phone notification or an email to the caregiver based on his/her choice.
To identify the current status of children vaccine tracking applications a comparison with a similar mobile application was chosen from the Apple App Store entitled "Vaccination Reminder " as shown in the table below.

Table: Mobile Application Features Comparison

Features	Vaccination Reminder	The proposed application
Registration	Yes	Yes
Verification/confirmation code	No	Yes
Usability	No	Yes
Performance	Somehow (There are some errors)	Good

Physiotherapy Interactive Game

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Supervised by:
Dr. Lamiaa Elrefaei

ABSTRACT

Children in general like to discover new things and they love adventures. While they are playing, they may fall and the natural reflex for them to throw their hands out attempt to stop the fall. So, they at risk for getting a fracture in their arm especially in their elbow which is the most likely to fracture. In some situation, after surgery or opening the splint, the physiotherapist gives extra exercises at home, but children feel boring and barely do the exercises. Therefore, they take a long duration to rehab. To help fixing the duration of the children's physical therapy rehabilitation program, motivate patient and make the home treatment exercises enjoyable and exciting; a 3D interactive game is designed for children in age from six to twelve who have elbow fracture.

The project applies a Game Development Life Cycle as a methodology to achieve a high-quality game product. It is consisting of six development phases initiation, preproduction, production, testing, Beta, and Release. The project implements the gesture algorithms for elbow flexion-extension exercise which is an Active Range of Motion exercise for both right and left hand, using Xbox360 Kinect as a motion capture camera to capture gesture and track child. The Kinect extracts the skeleton data from depth image which provides detailed information about the position of twenty joints of the user's body.



Figure1: Block Diagram

By using the high features that the Kinect provides via Kinect for Windows SDK v1 – which detects the user and extracts the Skeleton data or the human body joint, and tracks the user to provide the skeleton data in each frame – and write a production rules that define the correct exercise gesture and use this rules in the game to recognize the gesture.



Figure3: JCave Prototype

JCave is a 3D video game with a single player, finite and multilevel. The player role is to collect the jewelry from the cave to increase his score by doing elbow flexion/extension exercise. The game will be implemented by using Unity3D program that supports 3D games and multiplatform. The project runs on PC with windows 8 or later, 64-bit processor and at least 4GB memory.

Mobile Application for Assisting People With Short-Term Memory Loss

Maiys M. Al Doghan Manahel M. Al Dossari Duha A. Al Mulhim

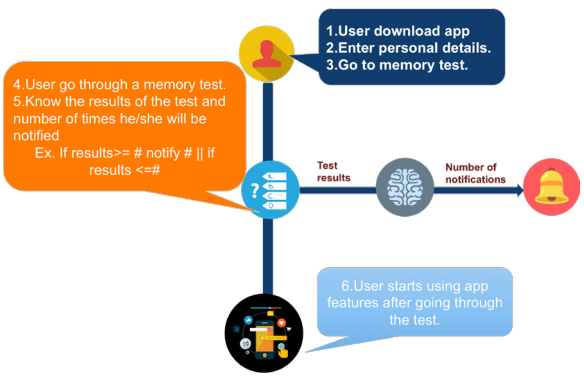
Supervisor:
Dr. Abdul Raouf Khan
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ABSTRACT

Whether you are twenty or eighty years old it happens that you've written a note and forgotten where you placed it, forgot to take your medication, or misplaced your eyeglasses at least few times. Forgetting is when a memory cannot be retrieved, and it is a natural phenomenon that affects our memory remembering functions. Occasional forgetfulness or short-term memory loss is a normal part of our lives that becomes more common as we grow older. Many people suffer from short-term loss of memory, due to numerous causes varying from sleep deprivation, smoking, stress to some medications. Our goal is to have a paperless, minimal, and time effective documenting technique that will be reminding the user of itself and taking the role of an assistant, which will gradually help in the development of performance to user's everyday tasks. This goal will be achieved by developing a mobile application. The application will detect and determine the severity of the users' short-term memory loss, after applying some gaming algorithm that is based on a scientifically approved methodology. This action will be performed once only for each user. Following the severity test, the application will specify how often the user should be alarmed to check a certain category. The application will be categorized into several categories and each category will be specialized into a specific type of data that will be inputted by the user himself /herself.

The major objectives of this application are:

- To help users with short-term memory loss.
- To act as an assistant to users who are normal.
- To replace all old inefficient techniques, using pen and paper.
- To help users to be more organized and on track with their appointments, tasks, interests, passwords, locations and shopping list.
- To help increase the capacity of user's memory by using prioritization, flagging, colors and the chunking techniques.
- **The application has limitations, which include:**
- It is not useful for users with long-term memory loss e.g. Alzheimer.
- It is not a remedy but an assistant tool only with certain capabilities.
- It is not optimal due to technical limitations such as when the mobile is off / lost/ damaged



Keywords: Short-Term Memory Loss, Assistant, Reminder, Mobile Application

Figure 1:Simplified demo of the proposed solution.

Last Stand: Virtual Reality Game

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Supervised by:
Dr. Marwa Sharawi

ABSTRACT

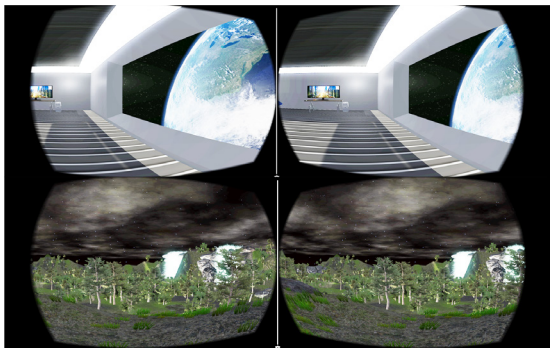
Last Stand is a first-person VR game builds for android platform, which aims to utilize the technology of Google Virtual Reality (VR) with storytelling. It would allow user to experience the wild life of the game environment using CardBoard and DPad. Last Stand aims to target the new market of VR android platforms games.

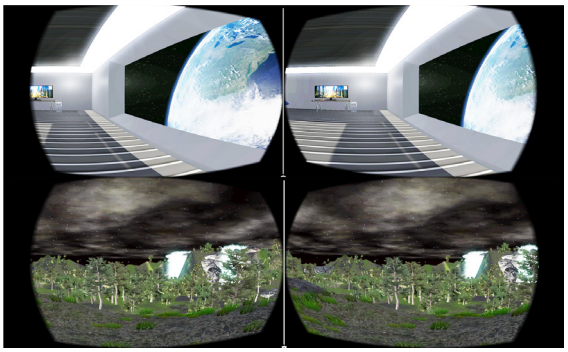
The story from the point of view of a man who survived World War III that led to nuclear war that ended the life of most humans, as this man was on a mission to maintenance a space station, where he witnesses the war from the space station and the communication with his work station on earth have been lost.

The contribution of this project focuses on implementing the booming technology of VR on android platform of mobile devices. The extent utilization of VR is always elaborated in its best through gaming. This enables the users to experience the technology through a 3D environment, 3D sounds and free roaming around the environment. Last Stand is a free first-person advancer VR-Game designed and developed to mimic the reality of the game using VR technology, to improve gaming experience for users and it will be more advanced than other virtual reality android games counterpart with graphic quality, storytelling, real environment and the motion of Characters. It allows the user to live in game story and play through it, as user would be able to discover the world around them and enjoy the graphical environment as he would learn how use primal tools along the story line of game.

The development of Last Stand is divided into several phases. It starts with building and creating environment for both scenes space and earth. Then building and modeling the characters; environmental characters and players' character. For the environmental characters, each character has its own AI script that controls them around the environment without interaction from player while they could respond to player character presence or actions around them. However, players' characters have its own script that allows the user to control it. Integration between the game environment and characters implemented by C# scripts to control the environment elements in each scene since both scenes got different environment. The VR camera connected to the main character to render the environment around it in 3D-VR technology allowing the view to turn into Side-by-Side view. The UI of the game includes a main-menu; where user able to choose the quality of graphics and the sound volume; and HUD (head-up display).

Last Stand enriches the classical mobile games by envisaging the production of interactive 3D-Virtual Reality scenarios to demonstrate and address the key internal and external attitudinal barriers in most interactive real way.





Let's Code: A Mobile Game as a Learning Tool for Object Oriented Programming

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Supervised by:
Dr. Eman Daraghmi

ABSTRACT

This project introduces a mobile game namely "Let'sCode" as a learning tool for Object Oriented Programming (OOP) concepts. Let'sCode is an edutainment game that designed for students aged 9 to 12 years old to guide them learning OOP concepts like encapsulation, inheritance and polymorphism in an easy and relaxing environment. Let'sCode is more like a game in which players will go on with the flow of the game step by step and they will learn to grow their characters. To enhance the learning process, this game must have an attractive storyline, pleasant game environment, nice and suitable sound effects, elegant character design as well as great animations. As the users are having fun with the game, they are actually learning the invaluable OOP knowledge. When the game starts, the kid can select his/her preferred character. During the game, the game character visits several places. In order to pass a level, the player should go through two parts or sublevel. In the first part of the level, a character navigates inside the visited place to find a number of hidden keys. When the player tries to find the hidden keys, he/she needs to open some boxes. Some boxes hide a key and some boxes hide a lesson about one concept of OOP and related to the visited place. Thus, during the navigation, the player will be given a lesson about one concept of OOP. The purpose of having the gaming part is just to increase and foster the interest of users to learn the knowledge. The first part of the level will be finished when the player finds all the keys scattered among the current visiting place. In addition, upon finishing the first part, the player will earn a great deal of rewards. These rewards can be used later as a helping tool in the second part of the level to pass the assigned quests. All quests are applied with basic programming knowledge through five levels in the game. First, we will introduce the basic knowledge of OOP approach to our players. They should pass through their first level when they have gone through the Objects and Classes test. In level two, the game will guide the players to learn about the control statement as well as the structure of method declaration. On the third level, the game will guide the players to learn about the array and also the three types of looping statements. On the forth level, players start to learn about the main principle of object-oriented. They will be taught about the concept of encapsulation and inheritance. At last, the game will guide the players to learn about the polymorphism principle. Quests will be assigned to the players to ensure that they truly understand the concept behind the knowledge. By completing the quest, players can continue to the next level. The game ends when the player finds all the keys and passes all the assigned quests.



DaaD: A Mobile Game as an Educational Tool for Learning Arabic Language

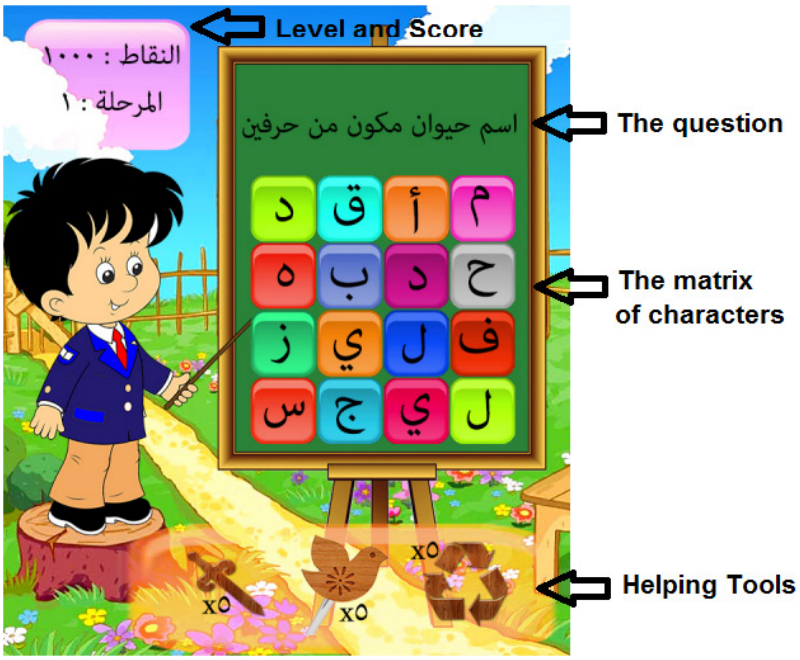
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ABSTRACT

This project introduces a mobile game "DaaD" as a tool for learning Arabic language characters. Daad is a match game, where the core gameplay is based on swapping two adjacent characters among several on the game board to make a row or column of at least 2 characters that form a word. To enhance the learning process, this game must have an attractive storyline, pleasant game environment, nice and suitable sound effects, elegant character design as well as great animations. When the game starts, the kid can select his preferred character. Daad game consists of several levels. Each level has 1) a matrix of characters, 2) a question (e.g. For example, find a word of 4 letters that is an animal whose name starts with d), and 3) helping tools. There are three helping tools, the *shuffle tool* that allow a player to shuffle the characters in the matrix. The *bird pin* allows the player to blow or remove a character in the matrix and the character above the removed one fall into the empty space, and *a spear* that allows a player to blow a row of characters and characters above the removed row falls into the empty spaces.

In each level a number of questions will be appeared to the player that should swap the characters scattered around the matrix to form the word that answer the question. When forming a word, the word characters are removed from the board, and characters or letters above them fall into the empty spaces, with new question and new characters appearing from the top of the board. This may create a new matched set of characters, which is automatically cleared in the same manner. The game is split among many levels, which must be completed in sequence. Each level poses a different challenge to the player, such as forming a word in a fixed number of moves. Boards have a number of different configurations and may include special spaces that have their own unique rules, such as spaces covered with Latin character that must be cleared by making a match on that space. If the player meets the level's goal, they will be given from one to three stars based on their score and can proceed onto the next level. Otherwise, they will lose one life and must try again. If the player runs out of lives, they have to wait for some period of real-world time while their lives regeneration before attempting the level again. Completed levels can be replayed if desired. The first level display 4 by 4 matrix and 5 questions. The dimension of the matrix increases in each level to increase the difficulty of the game. In addition, upon finishing each level, the player will earn a great deal of rewards. These rewards can be used later to pay helping tools. All questions are applied with Arabic Language knowledge through several levels in the game.



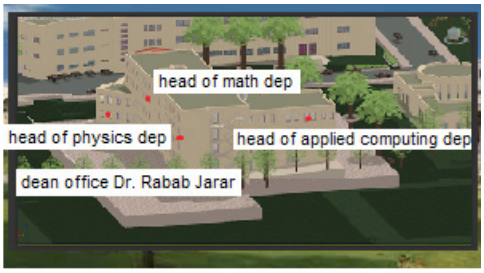
MASA: Context Aware Visual Indoor & Outdoor Augmented Reality for a University Campus

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Supervised by:
Dr. Eman Daraghmi

ABSTRACT





This project introduces a mobile software system for indoor and outdoor environments called "MASA". Our proposed system provides indoor and outdoor location detection and tracking based on a combination of image marker recognition and inertial measurements. This localization service is core to deliver a context-aware information system provided via augmented reality. Augmented Reality (AR) is a live, direct or indirect, view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. Our proposed system meets the highest standards and provides the most rewarding environments for users seeking illustrative information upon sightseeing and visiting new places. MASA provides important functionalities in order to answer two main questions, where am I and what information can I know about this place. Our project was tested in the faculty of Science and Arts at Palestine Technical University – Kadoori. Our proposed system consists of three main component: Vuforia SDK, location manager, and communication module. The user localization process starts with the video capture from the smartphone camera. The video frames are analyzed in real-time to detect and track well-known markers. These markers must correspond to high-contrast planar objects that are part of the landscape, and are thus assumed to be static. The image detection process is accomplished with Vuforia SDK, which delivers the distance and 3D orientation of the image marker. The target orientation and posture are further used by the AR layer to overlay 3D virtual objects that merge seamlessly with the scene in the video capture. Simultaneously, the location manager fetches from the local database the information related to the detected marker, such as its location, hence implicitly obtaining the current location of the student using the service. Indispensable in this process is the communication module, which connects to the service server via a TCP socket, so insuring that the local database is up to date. Our proposed system provides two main localization services: 1) The Indoor Localization, and 2) the Outdoor Localization function. The indoor localization function starts when a student put his/her smartphone in front of any object inside a building, such as a wall, aisle, or a door. The function detects markers and provides information regarding the view being recognized. For example, if the detected object was a class room, the function provides information such as, the current lecture running in a class, information about the lecture, the subject that is being taught inside the class, the teacher who gives the lecture, and the lectures that will be given during the day. If the detected object was an office room, the function shows information about the professor set inside that office, his/her office hours, the courses taught by him, his research interest, and his contact information. The outdoor localization function was implemented as an overlay on the outside building. The student puts his/her mobile in front of a building and the application shows the main offices resides inside that building.

CeLaVie: A Personalized Restaurant Recommender System

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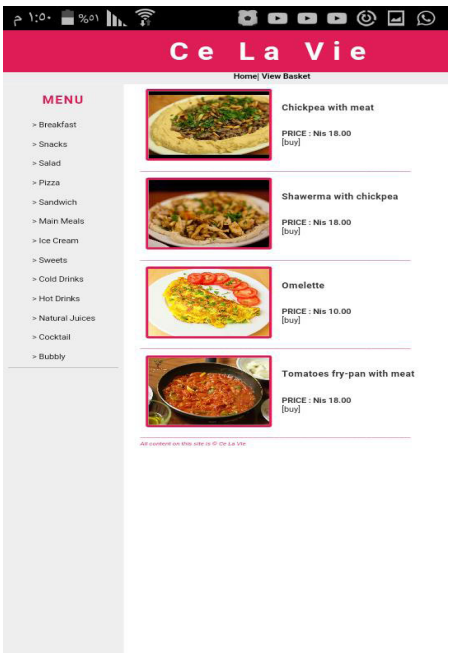
Supervised by
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ABSTRACT

This project introduces a personalized restaurant mobile recommender system called CeLaVie. CeLaVie aims at recommending the best restaurant for users according to their personal preferences at their physical locations. To achieve these goals, we implement an agent in which resides in the users' smart phone and uses the smart phone Global Positioning System (GPS) to determine the current position of the user. Two kinds of agents were implemented. The Context-Aware Personalized Agent (CAPA) which resides in users' smartphones to interact with the user and the RDSA (the second kind of agents). CAPA is capable of getting user's preferences for selecting restaurants. For the mobile user, CAPA can explore the user's time and spatial context by the built-in sensor capabilities, and the restaurant directory service agent (RDSA). The RDSA is running on a server. Its main goal is to maintain a restaurant directory. A new restaurant must register in the restaurant directory with RDSA before it can be recommended to the user. The entry contains information about the restaurant. Also, the RDSA has the ability of searching restaurants given preference constraints. If the RDSA could not find anything according to these preference constraints, it will propose some modifications to the constraints. And it also has the ability of recommending a restaurant out of many matched ones.

To recommend a restaurant for the user, CAPA first acquires the user preferences and establishes user contexts. Then RDSA searches for suitable information, and resolves constraint violations in order to do the recommendation.

CeLaVie application works. Amena is a Muslim user. She is visiting Paris Main Following scenario illustrates how our proposed Station. The time is 2:00 P.M, and Amena wants to find a restaurant. She inputs her personal preferences: (1) the meal budget should be below 30 dollars; (2) the restaurant serves Halal meals; (3) non-smoking restaurant. The RDSA finds out that there is nothing matches the preference around Paris Main Station and will relax the constraints and generate some proposal according to previous interaction history. The agent finds out that there are some restaurants serve vegetarian meals and Amena used to choose vegetarian more than other categories in previous interactions. So it will add the proposal of "Change <Category> to vegetarian". And the agent also finds out that the user used to spend 50 to 100 dollars for her lunch and if it relaxes the budget constraint to 80 and finds some restaurant matched. So it adds the proposal of "Increase <Price> to 80$". And then, the agent presents the proposals to the user. Finally, Amena decides to choose the first proposal (change <category> to vegetarian) and she gets the final recommendation. The recommending service is not limited to restaurant information only it can be extended to others such as hotels, cinemas, bus stops, etc.



Autistic Meltdown Detector

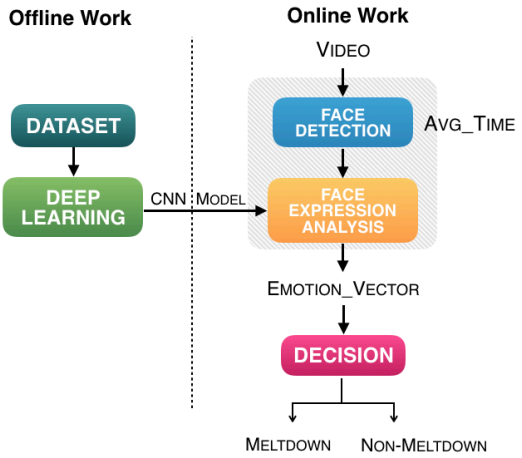
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Supervised by:
Dr. Salma Kammoun

ABSTRACT

Our goal in the computer Science field is to solve problems and to make things simpler. One of the neglected disabilities in our society is autism which makes up 8% when compared with other impairments and disabilities. While autism might not be the most attention-drawing category, there is no doubt that autistic people are an increasing part of our society and have their needs. our goal is to Aid the parents, facilities, and companions to help the autistic patient.

Beginners to the world of autism often get confused between tantrums and meltdowns or may think that they are two terms referring to the same thing. As both tantrums and meltdowns are about aggressiveness in the behavior, children who go through a meltdown have no control over their actions, they can hurt themselves or others even if they don't want to, this loss of control can be expressed verbally (e.g shouting, screaming, crying), physically (e.g kicking, lashing out, biting) or in both ways.



Continues monitoring is one of the major issues for autistic patients and their caregivers. From the previous definition of a meltdown, caregivers should always keep an eye on the autistic patient, finding a person to be available in the same place at the same time as the autistic child his/her whole life is very difficult. With the improvement of the technology, they have not provided a system that helps the autistic patients. In fact, having a monitor in the patient's home or premises and alerting the caregiver under specific situations would be of much help to the autistic person.

Based on the survey we have made with parents and facilities, we will focus in this paper on facial expressions analysis.
Therefore, we propose a system that monitors the Autistic patient and alerts the caregiver. We followed the classical steps of video analysis, which starts by detecting the child's face, then we analyze face expression, then decide if we alert the caregiver or not. We have broken the system into three parts; face detection, face expressions analysis, finally alerting the caregiver.

There are several challenges for each part of the system, but our main focus in this system is face detection and face expression analysis; the challenges for face detection are (illumination, face position, and the environment), as for face expression analysis the challenges are (level of description, image resolution, individual difference in expressions, head orientation and scene complexity).

When the autistic child suffers from a meltdown they may harm themselves. By monitoring them and detecting the meltdown when it occurs, we may help them avoid harming themselves or reaching such state.

Smart Access Control

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ABSTRACT

The smart home appears to be one of the most growing scientific applications in terms of technology. The provision of security and safety for the building's owner is a significant service offered in smart home and many ongoing research in that field focus in these issues. There is no doubt that controlling the access of buildings such as houses, companies and ministries is critical issue for the owners because they do not wish to give an access for unauthorized people. In the real life, people cannot enter the building unless they have the key or they get the permission to enter the building by the owners. In addition, disabled people are more likely to face difficulties in using keys to enter the buildings. Therefore, the need to have a system facilitating the access control of the building is highly necessary.

To tackle this issue, we present a Smart Access Control system which provides an online access control. The proposed project enables the building's owner to control the entry via a mobile application. The owner can create a list of authorized people in the database that allows them to enter the building without having a key. In addition, the owner can open the door instantly using the mobile application which has not been used in any common solutions to this issue.

There are several related solutions to that issue such as August Smart Lock, Yale Real and Danalock. The most similar solution to our project is August Smart Lock since it provides common features such as mobile application, access log, and gives access for guests. However, the related proposed projects appear to have some drawbacks that make them insufficient in different aspects. In fact, the August Smart Lock requires a mobile application installed in the guest's phone to get access to the building which seems to be inconvenient for the old people who do not use smart phones. Therefore, we include the face recognition feature in our system to make the access for the guest easier.

The system consists of four main elements: face recognition algorithm, mobile application, database, and the Raspberry pi. The Smart Access Control can interact with the client instantly by sending and receiving requests via the Internet. The system mobile application is connected with an online server containing a list of face images for the authorized people created by the user. The online server is linked to the embedded system (Raspberry Pi) which has a software controls the access and the communication with the external components. There are three external components are involved in the system Camera, control button and electric door lock. Figure 1 demonstrates the design scenario of the system.

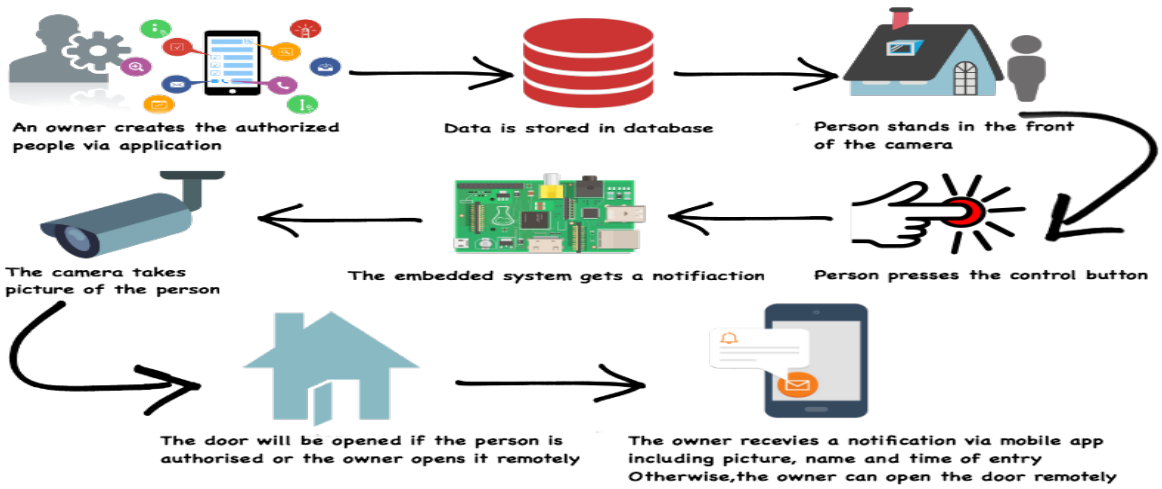


Figure 1: System Architecture

Hear Me: An EEG-based Non-Verbal Communication System

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Noura Alqahtani, Rawan Alfalah
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ABSTRACT

Communication plays a vital role in human interaction. It is the foundation of relationships wherein people express their ideas, opinions and feelings. Although for some, verbal communication is not a hurdle to form relationships or express emotions, there are certain people for whom verbal communication is a challenge. Many individuals suffer from mobility and speaking disabilities caused by diseases such as Amyotrophic Lateral Sclerosis (ALS) and Primary Lateral Sclerosis (PLS) among many others. Brain Computer Interface (BCI) research has shown tremendous potential in using brainwaves to control electronics and computers. In this research work, we develop an assistive application that will enable patients with speech & motor disabilities to communicate easily with their caretakers. Existing research and applications in this domain target only active communication where patients use a menu-based system. In this project, we allow three forms of communication: Active, Reactive and Passive. Reactive communication allows patients to answer caretaker queries with ease and passive communication allows the caretakers to monitor the mental states of the patient. The design of the user-interface for reactive and active communication is based on evaluation of patient needs as communicated by caretakers. The system also includes a notification system that notifies the caretaker when an action is initiated. The menu-based system also allows for triaging the request based on the urgency of it. The system is developed using an Emotiv EPOC+ headset to capture brainwave signals. EPOC+ is a 14-channel EEG headset that can recognize facial expressions, mental commands, and provide data from its 9-axis inertial motion sensor and data from its frequency bands. The software app developed for the system runs on Android handheld devices and has two main interfaces: one for the patient's terminal and one for the caretaker's device. The app setup on the patient's terminal receives the EEG signal from the EPOC+ headset and allows them to communicate actively, passively and reactively. The app setup on the caretaker's device allows them to receive notifications and accept/reject notifications. A rejected notification or non-response within a specific time (based on the triage level) is forwarded to the next caretaker. The system also includes a central web-based dashboard that mirrors the communication between the caretakers and the patients.

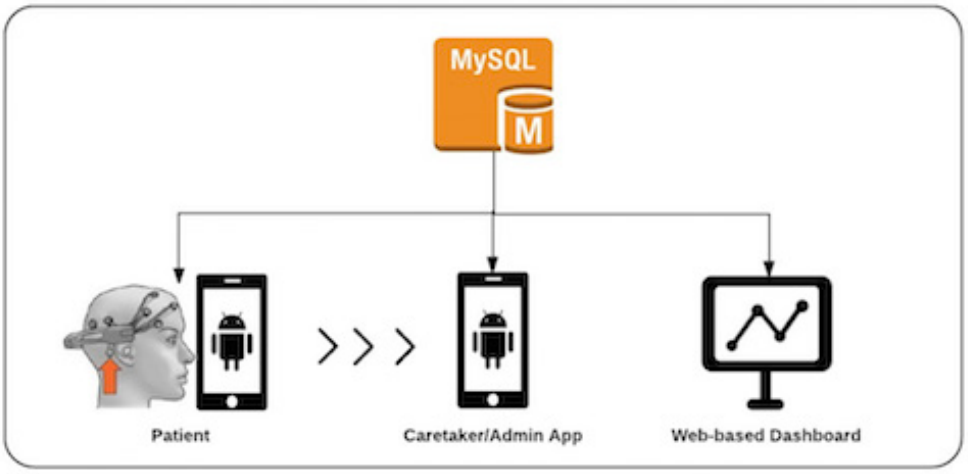


Figure 1: System components

AlHaram Smart Guide Application

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Supervised By
Dr. Nadine Akkari

ABSTRACT

Umrah is one of the most important Islamic rituals performed by millions of people coming from many countries, without enough knowledge of Al Haram places or how to do Umrah. In this project, we will develop a smartphone android application named "Al-Haram smart guide" that will provide the users with an efficient and smart way to perform their religious tasks.

Our application, it will help the pilgrims doing Umrah by directing them, step by step, through recommending the best floor for Tawaf and Saa'i, based on the other visitors' experience by using the recommendation algorithm *Collaborative approached*. The application will also provide information about the next step to be performed as per the current visitor status. This is implemented by calculating expected time to finish and the number of rounds of Tawaf and Saa'i using GPS and tracking the current user's activities and location. Another feature provided by the application is that it will remind the visitors of what du'aa to say and when as per their current status.

In addition, the application will also implement another safety feature, which is calling an emergency number that the pilgrim can activate if needed.

On the other hand, we were interested in social network and groups as they would be very effective and helpful for the users inside and outside AlHaram. For the inside users, the system will provide an online recommendation using the recommendation *algorithm Content-based approached* to recommend friends for users based on their countries, language, gender... etc. and allowing the users to create a group of his friends to know their location inside AlHaram and in which step of Umrah they are right now. For the outside users, they can get feedback about Al-Haram status and degree of congestion before they came to AlHaram.

Since saving time is very important in our lives, the system will help the visitors of Al-Haram to find the services and utilities as bathrooms, Black Stone, Safa & Marwa, Doors, Elevators and stairs...etc. they need in a fast way by locate all the locations that store in Al-haram database inside Al-Haram so the user can search efficiently for it and request to be direct to it using Google Map.

Many applications exist in the field as our application, but it doesn't have dynamic direction step by step through Umrah, give the users dynamic information depending on their location and doesn't have a social side especially the groups.

In to achieve the objective of the project, the application will follow Waterfall methodology and will programmed implemented using Java language through Android Studio IDE. The application data stored and retrieved from MySQL database via Wamp server which is connected with the application. In addition, this project uses other efficiently tools such as GPS that used to deal with the user current location, Google Map for direction and Firebase Cloud Messaging for Notifications. Using this application, Umrah could be done effectively with all the services provided by our application so all users can stay in touch, receive notifications and share their experience through this application.

Web Goat

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ABSTRACT

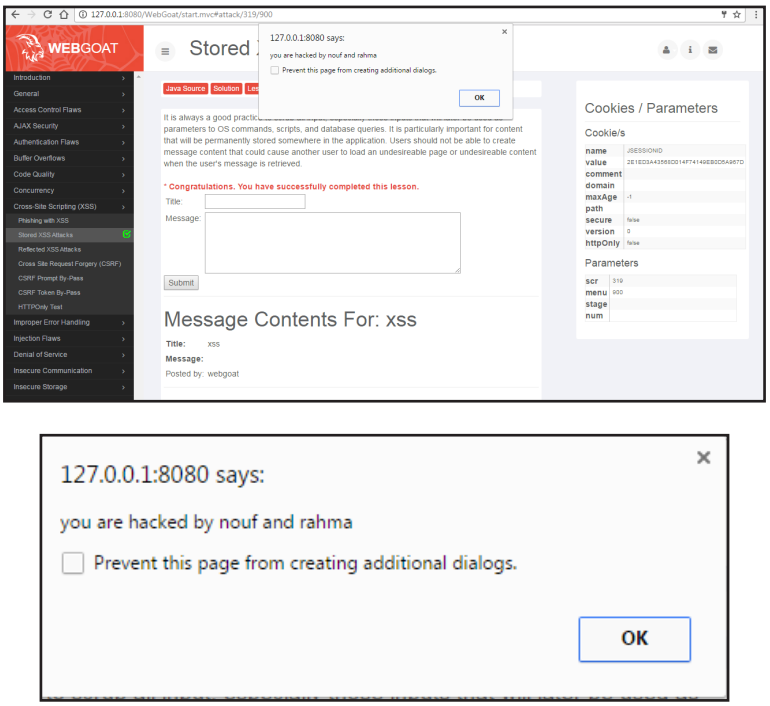
Web Goat is a deliberately insecure web application maintained by OWASP. In each lesson, users must demonstrate their understanding of a security issue by exploiting a real vulnerability. This application aims to provide a realistic teaching environment, providing users with hints and code to further explain the lesson. To download Web goat, you should download Java and Tomcat, then download Web goat 7.0.1 jar file. Then you have to run java and web goat by using command window.

There are many lessons in the Web Goat, you can practice and learn. In one of the lessons, user must use SQL injection to steal fake credit card numbers.

Stored XSS Attacks is a type of attack can be very dangerous because it is easier to get someone to run the malicious code. This attacks works by injecting attacker's code into a random website using a vulnerable form. Any user visits that website; the malicious code will be executed automatically.

In Password Strength exercise you will test several passwords on http://howsecurityismypassword.net. This web site will help you to know how safe is your password and how long it will take to crack the passwords.

Exploit hidden fields practice aims to demonstrate how to exploit a hidden field so as to alter the price of a virtual cart. It is adequate to note in the source code that the unit price of the item is actually stored in a hidden field of the page. We exploit a hidden field in the source code to change the price.



The figure above shows an example for Stored XSS Attacks

RoadEye: Intelligent Transportation System

Mennatallah Ibrahim and Mark Riad
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American University of Kuwait Salmiya, Kuwait

Supervised by:
Dr. Mohammed El-Abd

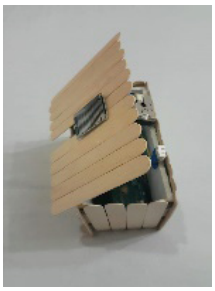
ABSTRACT

In a fast-moving world that is becoming more dependable on technology, we are determined to revolutionize the daily lifestyle. RoadEye is an Intelligent Transportation System project that will solve many traffic problems and make traffic safer. Nowadays, we hear a lot of horrific stories about traffic accidents that occur due to idle drivers, and/or poor traffic facilities. For instance, a pedestrian got hit in an intersection, a vehicle crash due to crossing the traffic light, accidents that result from poor vision due to weather conditions and other incidents that violate the basic road rules. The shocking news about accidents that we hear every day brought up a controversial subject about what if there was an entity that could prevent passengers from violating the rules.

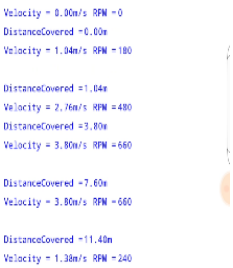
This uprising issue motivated us to work on the solutions that would help to bring this traffic chaos to an end. Our project, RoadEye, is an Intelligent Transportation System that will solve many traffic problems by monitoring roads and sending warnings to drivers. RoadEye is an intelligent traffic system that has both vehicle-to-vehicle communication (V2V) and vehicle-to-infrastructure communication (V2I), hence will fall under the vehicle-to-vehicle-to-infrastructure communication (V2V2I). V2V2I is mainly a wireless transmission between vehicles and infrastructures; vehicle onboard equipment, roadside units and safe communication channels. The goal of V2V2I is to prevent accidents by allowing transit vehicles to send and receive data from one another over an ad hoc network. RoadEye is focusing on implementing vehicle platooning as an application that falls under V2V communication. Moreover, RoadEye is a project prototype that demonstrates V2V2I that is made up of vehicles communicating over the same network along with two infrastructures; a weather station that will send warnings to vehicles about weather conditions and a traffic light system that will send approaching vehicles an alert specifying the time lift for the traffic light to turn red.

The communication between vehicles and infrastructure is established using different wireless technologies. As wireless communication is in constant evolution and with the coming new generation, such systems should be easier to implement. For receiving and transmitting data, the Xbee series 1 is used. Various sensors such as ultrasonic, hall effect, humidity and temperature sensor, dust and rain module iss used to collect and send data over V2V and V2I applications. The master vehicle's velocity is detected using Hall Effect sensor; the result is integrated and differentiated to get the position and acceleration respectively. In car platooning, the master vehicle will send velocity, position and acceleration data to the slave vehicle along with the readings from the ultrasonic sensor to maintain string platooning between vehicles. Pictures of the master vehicle, master vehicle's velocity and distance readings and the weather station that acts as the first infrastructure, shown on the right, illustrate the implemented part of the prototype so far.

In conclusion, RoadEye aims to reduce traffic incidents; it will primarily focus on implementing an intelligent transportation system in the Gulf region. Consequently, RoadEye promises a safe and intelligent transportation system that will help reduce traffic problems.







Medical Drones System for Amusement Parks

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Supervised by:
Dr. Mohammed El-Abd

ABSTRACT

In this abstract, we propose the implementation of a Medical Drones Systems (MDS). MDS is a system that can be implemented in such areas like skiing resorts and amusement parks. These areas are usually filled with tourists who are scattered everywhere enjoying their time. However, in case of emergencies, it will be very difficult to quickly reach the patient or injured person. Not only you need time for locating the injured person, but there might be also a long distance you have to need to cover in order to reach that person. This process is time consuming and endangers peoples' lives. As a result, this system is designed to do this task more effectively without the human error, which will save a lot of time, effort, and successfully rescue injured people.

To reach our goal, we utilize drones technology using autonomous flying systems and a mobile application to enhance the medical performance and aid in large places like parks and skiing areas. The drone will assist people by providing a medical service, which is quickly delivering medical supplies, to a specific location.

The MDS will help people in cases of physical accidents or critical health conditions. If a person needs help, he/she can use the mobile application to request help. In case of the situation developing so fast and the patient is too sick or weak to call for an emergency. People around the person would ask for help using the same mobile application. Different accidents can happen like fainting due to diabetes and bleeding injuries. Therefore, the idea about implementing system of medical drones will do the job more effectively. Once an emergency has occurred, a person will send it to the mobile application so that MDS would be alerted, and it will locate the place of the emergency using GPS. Drones are faster than humans, so they will reach the required destination faster and assist the situation by dropping essential medical supplies so other people around the injured person use those supplies to help him. The MDS will be provided with a camera to be able to see and interact with the situation.

Moreover, MDS will be equipped with a voice feature that is used to give some instructions to the person who is asking for help. As a result, system of medical drones will benefit the society members by quickly assisting in emergencies, which will reduce complications that might occur due to delayed responses.

In our prototype, two drones are used, shown in the figure below, which can carry different medical supplies of varying weights for different types of emergencies.



Figure 1. Drones of MDS.

Archival and Retrieval of Lost Objects

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Supervised by:
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ABSTRACT

Lost and found management is one of the important departments in every organization. The management method varies from organization to another. But what it does not differ by everyone that it needs time and effort. In the other side, people may lose their items and they don't know where to find it, and people may find lost items and they don't know what to do with it or how to find its owner. So we proposed to develop a mobile application that facilitates the procedure of reporting and retrieve lost items. The application provides for users an easy way for the reporting, it supports functions such as selecting description from drop-down lists to avoid the ambiguity, the user can view the history, it provides fast feedback, it is authorized under lost property office (LPO) and it allows users to attach an image with the report. So it provides image retrieval approach. Image retrieval system is a computer vision technique for browsing, searching and retrieving images from a large database of digital images. Once a report is uploaded, the application will apply this technique of search, first if the function is "lost" then it will search in the database of the found items if it matches with another image then send a notification, else save the image in the database of the lost items. Second, if the function is "found" then it will search in the database of the lost items if it matches with another image then send notification to the lost item owner, else save the image in the database of the found items. Two types of search are applied, the first one is query search where it matches the descriptions of both lost and found reports, and the second one is the image retrieval. The image retrieval goes through two stages. The first stage is capturing the image then extracting the features. The second stage is the image matching where we will use a matching algorithm on the server side to identify the existence of lost item among the found items in the database. The algorithm matches the feature vectors between different images. When two images matched, the application immediately sends a notification to the lost item owner telling his/her about the matched found item. The proposed application is being developed to run on a device with android operating systems. The tools used to build and implement the functions of lost/found reporting are the android studio that connected to MySQL database, Matlab, and OpenCV for image processing. Figure 1 shows the global framework of the system. It shows the lost/found user functions, lost property office functions, system functions and the interactions between them. Figure 2 shows the interfaces of lost report function.

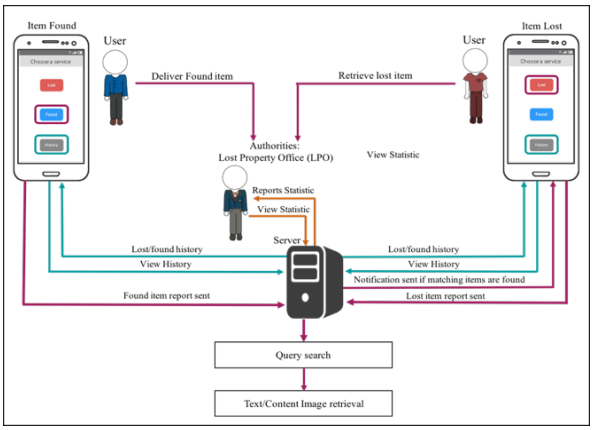


Figure 1: System global framework

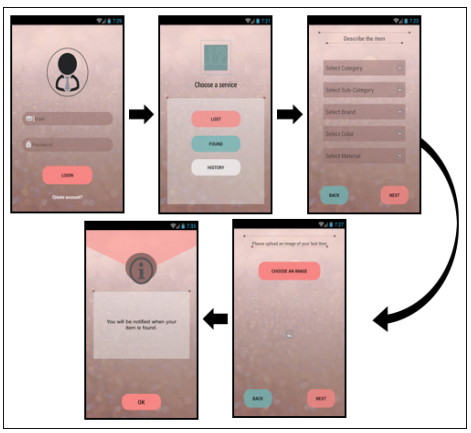


Figure2: Lost report function

EEG Controlled Home: A Modification of Existing Smart Homes

Nour Ibrahim and Yogesh Manglani
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ABSTRACT

A smart home is a home that is equipped with lighting, heating/cooling, and various electronic devices that can be controlled through a smartphone or a computer. EEG Controlled Home is a modification of the Smart Homes currently existing in the market. Instead of using a mobile application, or a computer to control the house, an Electroencephalogram (EEG) Headset will be used. This headset detects, records, and interprets electrical activities in the brain, which will provide further accessibility for physically disabled people, allowing them to control their everyday household applications. The project will be implemented and tested on one of the rooms in the University.

The EEG headset can be accessed by anyone, but our focus is to improvise the lives of physically disabled people. The percentage of disabled people worldwide is 10 percent of the population, which is roughly 650 million people.

The way this project is expected to be implemented is via interconnections of three main devices, which are: BlueSMIRF Gold Bluetooth Modem, Arduino Mega2560, and the Neurosky Mind wave EEG Headset. The EEG Headset is powered up via a single AAA battery that has a power supply of 9 volts. This headset is connected to the Arduino via Bluetooth.

The EEG Controlled Home will feature the following:

1. Lights - The lights will turn on and off using the EEG headset.
2. Smart Door Lock – Locking/Unlocking the door by installing an electronic door lock that will be programmed and controlled via the EEG headset.
3. Emergency Contact System – Physically Disabled people will call for someone's assistance in case of an emergency via the EEG headset.
4. Projector – Turning the projector on/ off via the EEG headset.



The **attention level** will be used to **activate / deactivate** the four features of the EEG controlled home, and the **meditation level** will be used to **switch between the four devices.** The attention and meditation level ranges from 0 to 100. For example, to turn the lights on, the person needs to meditate for 5 seconds so that the mediation level reaches above 60. As soon the meditation level reaches 60, the device will be selected. Next, to activate the device, the person will concentrate for another 5 seconds so that the attention level reaches above 60. To deactivate the selected device, the person needs to meditate and concentrate again as explained.

The time it takes to activate/ deactivate the controlled devices is 10-25 seconds depending on the device location. For example, it takes 10 seconds to activate/ deactivate the first device. It takes 15 seconds to activate/ deactivate the second device. It takes 20 seconds to activate/ deactivate the third device. It takes 25 seconds to activate/ deactivate the forth device.

The reason why we chose to work with Arduino instead of any other microcontroller is because it is cheaper in comparison to other microcontrollers, it is programed via C programming language, and the hardware and software are open source, and finally it is user friendly.

In conclusion, the EEG Controlled Home uses and explores the Neurosky Mindwave EEG headset mainly to assist physically disabled people by providing them further accessibility to control their house. The EEG Headset will add an extra touch of "magic" to smart homes. In terms of the safety standards, this headset is completely safe to use since it does not send electricity into the brain or through the body.

Demonstrating Mobile Application Vulnerabilities

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Supervised by:
Dr. Monther Aldwairi

ABSTRACT

In 2015 over 167 billion free mobile apps has been downloaded form Google play app store. Most of the users download random applications from untrusted sources and some of those applications might include vulnerabilities, which allow the attacker to exploit them to steal personal data. Vulnerability is a weakness in the system that causes damage in devices or data.

The issue we tried to explore is to present a simple but accurate method how to discover vulnerabilities in Android mobile applications such as, allowing the creation of weak password, and transmitting user's information in unencrypted format. We use Android tamer, which is a virtual application that enables the user to perform android security procedures such as, vulnerability testing, malware analysis and detection, reverse engineering, penetration testing and exploring breaches.

Furthermore, after examining the codes of several android mobile applications, we found out that there is a line in the code, which enables debugable feature (android:debuggable=True"). You can simply check if debugging is enabled, by running the command: "Apktool d vulnerable.apk (app name)". This feature enables other users to edit the source code. Consequently, attackers will be able to exploit this vulnerability by injecting malware into the code, which might result into stealing user's information. Next we check the available ports that enable us to debug the application by using "adb jdwp" debugger. We then connected to the available TCP port as follows "adb forward tcp: 54321 jdwp: 1366 (Available port)". Now we are able to edit and change the behavior of the application at runtime. For example, to know what classes and methods are used in application use the command: "classes". The debugger allows you to view all variables and step into methods. We edited the application to display a hacked message.



Fig.1. Debuggable option

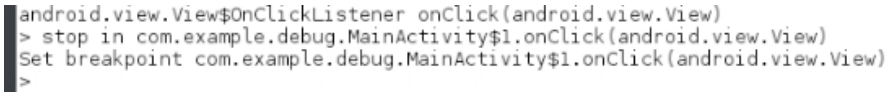


Fig.2. Editing as method

Finding vulnerabilities in android apps was a challenging task because we had to check app's code, and because developers will not disclose the code of his application. Consequently, we found an alternative method to hack the code if the developer left debuggable option enabled. Therefore, we are able to modify the code during runtime to do whatever we like. In conclusion, users should download the application from the trusted sites only. We also recommend developers to secure their code by turning off the android debuggable option.

An Intelligent Bio-Inspired Algorithm for the Faculty Scheduling Problem

Hawazen Albrahim, Fai Alnuhait, Maha Alrajhi, Sarah Al-Mogherah, Sarah Alnegheimish
King Saud University, Riyadh, Saudi Arabia

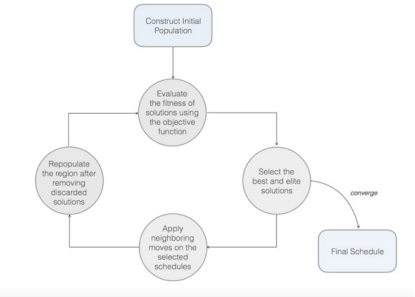
Supervised by:
Dr. Manar Hosny

ABSTRACT

Faculty scheduling is an NP-hard problem that almost every university in the world has to solve each semester. Although it may seem as a simple problem, since it can be described in just few lines, generating an optimal (or near optimal) solution is not, especially if done manually. The reason behind this is that when generating a solution for this problem, there are many difficult constraints that should be taken into consideration, such as the clash of times between courses, the maximum and minimum number of workload hours for each faculty, and many more requirements that can affect the quality of the solution. In such difficult problem, the available variables and constraints play a significant role in choosing the method that will solve the problem.

Over the past few years, different methods have been proposed to solve this problem, some of them are more efficient than others. Meta-heuristic optimization algorithms are among the most effective methods for this type of problem, because they keep improving the proposed solution until it reaches a certain satisfactory quality, although not necessarily the optimum.

Therefore, in our research we presented a new intelligent bio-inspired meta-heuristic algorithm for solving the faculty scheduling problem. More specifically we adopted the Bees algorithm (BA), an algorithm that is inspired from the foraging behavior of honey bees while searching for food in designing our algorithm. The main reason is that the Bees algorithm provides a variety of solutions as it starts with a population of solutions called the initial population. In addition, it combines both random search and neighborhood search. This approach is needed to explore the search space more, thus giving a higher probability of finding a near optimal solution.



Another reason for choosing the BA specifically is that it showed great results in other similar timetabling problems, when compared to famous meta-heuristics like the genetic algorithm. However, to our knowledge, it has never been tried for this specific problem. Moreover, the BA has a good potential of hybridization with other techniques during the improvement phase (e.g. local search), giving it a chance to produce even better quality solutions.

Schedule	KSU Schedule	Algorithm Schedule
Result	0.190455888	0.151254321

The basic idea of our algorithm involves generating multiple initial solutions using a problem-specific randomized heuristic. Then, after applying a specifically designed objective function to evaluate the cost of each solution, we focus on the best and elite (best of the best) solutions. In the next phase, we perform modifications on the selected solutions using certain neighborhood moves to increase the chances of finding the near optimal solution in the following iterations. The figure shows an abstract representation of the algorithm.

The algorithm showed great results when the produced schedule was compared to the actual schedule used in King Saud University. To analyze the schedules, we used an objective function which is shown in the table. Our algorithm provided a feasible solution whilst still preforming better than the manually allocated schedule.

Self-Learning, Multi-Lingual Optical Character Recognizer

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Supervised by:
Dr. Mulhim Al-Doori

ABSTRACT

Optical character recognition is the process of recognizing text from a file (usually an image or a PDF file) and converting it into digital editable text. It is typically done on handwritten, typed, or printed text. Some of the purposes of optical character recognition are to allow documents (i.e. passports, business cards, or application forms) to be conveniently converted to text and saved into a database, in addition to allowing the text to be edited, copied, searched-for, or translated.

The optical character recognition techniques for non-cursive languages (e.g. English or French) involve breaking a word into characters and analyzing each character separately. However, the techniques for cursive languages, such as Arabic, are much more challenging. They are typically done by either attempting to segment the words into characters, or by attempting to analyze whole-words using a database of words.

The purpose of this project is to create an intelligent self-learning, multi-lingual optical character recognizer using Microsoft Visual Studio (C# language). The program has two sections: A non-cursive language recognizer, and a cursive language recognizer. The non-cursive language recognizer takes an image as an input, runs the analysis algorithm, and outputs detected text to the user. The program already has several databases for different English fonts, and it can have an unlimited number of databases (one for each language or each font, for instance), allowing the users to choose the database to use for each analysis. It also allows them to create new databases, whether databases of a specific font (by simply inputting the font name), or handwritten font (by using the embedded on-screen handwriting tool). The program learns from its wrong identification of characters by allowing the user to override the error message and generate a new rule to identify the selected character correctly. The user can simply click on the incorrectly detected character, input the correct character, and click a 'teach' button, allowing the program to update the database, and thus improve the recognition process. The results achieved with detecting English text (typed or digitally handwritten) had a very good accuracy, given that a suitable database has been selected.

Finally, the program also has a cursive-language optical character recognizing section, currently limited to the typed Arabic language. It performs a different analysis algorithm in order to recognize the cursive text without the need of segmenting the words into characters. The cursive section currently takes an image of a single word as an input, some simple calibration by the user (choosing the level of filtering and accuracy percentage), and outputs the result. The accuracy achieved, given that a good calibration has been done, is very promising and allows for further development of this project. Developments of this project are currently still ongoing.

Demonstrating Anonymizers to Access the Deep Web

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Supervised by:
Dr. Monther Aldwairi

ABSTRACT

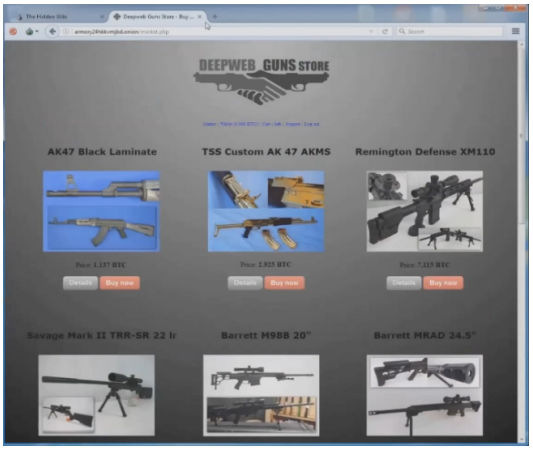
The purpose of my project submission is to raise awareness and provide the public with information about the deep web. What it is, how it is accessible, and what can be found there.

Only 4% of the Internet is visible to the general public; that is known as The Clear Web. The remaining 96% is made up of the Deep Web. The Deep Web is a part of the Internet that cannot be found by the regular search engines. It includes webpages that are of companies and organizations that are used internally: their files, records, databases, and other information. The majority of The Deep Web does not have anything illegal on it. The Dark Web is a sub-set of The Deep Web and it contains all sorts of websites, both legal and illegal. Websites of black markets that sell drugs, counterfeit documents, and weapons are among the illegal ones. In addition, there are hacking sites, illegal pornography (child pornography), live streams of people's webcams, and even websites to hire hit men. When accessing The Deep Web the most important thing is to remain anonymous; here is where the job of the anonymizer comes in.

The anonymizer I used in this project "Tor: The Onion Router" designed to fight network traffic analysis. It is an Internet networking protocol designed to fight traffic analysis by advertisers and law enforcement. It encapsulates communications in layers of encryption and data is transmitted through a series of "nodes". Those nodes are computer connected to the Tor network, each of which removes a single layer of encryption, revealing the data's next destination. When the last layer is decrypted, the data arrives at the destination.

Basic Steps to Access the Deep/Dark Web include Register and install your VPN of choice into your device. Run your VPN software and then download the Tor browser form the official website. Follow the right steps and install the Tor browser properly. Run the Tor browser and immediately disable the JavaScript on the by clicking "forbid script globally". It is also recommended to tape out the camera and disable you microphone. Now you can easily access the Deep Web websites with ".onion" extension domains. A reliable webpage that displays Deep Web links and their status: https://darkwebnews.com/deep-web-links/. It is recommended not to use real names, share personal information or engage in purchases or e-commerce transactions while on the Dark Web.





The goal and purpose of my project was to create some sort of awareness about Dark and Deep webs. This is a major issue that needs to be addressed especially with ease of access to all these unlawful substances.

PROGATAR: Learning Programming via an Avatar for Hearing Impaired Students

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Supervised by:
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ABSTRACT

A long time ago, people with hearing impairment problems were unintentionally treated in an unusual manner by the public. Although they cannot hear, they can study, comprehend, and succeed academically. In Saudi society, there is a lack of applied sciences courses addressed to hearing impaired students in high education. Recently, Saudi universities, are more keen to merge hearing impaired students among their educational society. Meanwhile, few educational applications teach applied science majors such as math, chemistry and others for hearing impaired students. However, currently, none of these available applications are aiming to teach programming.

Accordingly, the purpose of the proposed project is to enhance the hearing impaired students learning aspect in programming field using images and a 3D Avatar. This project will be implemented by creating an E-learning system with an Avatar using Arab Sign Language (ArSL) to help them understand the basic concepts of programming. Such as: type of variables and programming identifiers, etc. The students will choose the topic they want to view then the avatar will present this topic using ArSL, based on provided topics slides. In addition, a visual scene will be presented to support the component. After each topic representation, students are able to solve a checkpoint to ensure their understanding. Moreover, the proposed project enables an instructor to upload topics and related images following a specific guideline.

In order to create a hearing impaired friendly user interface, a survey was distributed to the concerned students studying in the girls' deaf high school in Jeddah city. As a result, the prototype will be designed to enhance the learning ability in computer programming. The proposed system will link between the components of the learning environment, the slide board, the avatar and the visualization board.

Basma: An Interactive Doll System for Arabic Speaking Children

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ABSTRACT

A toy is an item mainly intended for children to play with. However, due to its important role in child development, it has evolved to encompass sophisticated educational and learning characteristics. Toy industry has evolved to provide these needs as digital interactive smart toys. Smart toys combine traditional stuffed toys with additional computing capabilities using software and hardware components. Despite the huge market in this field, there is still a need to provide Muslim children with informative and interactive toys that would serve the Islamic values.

The goal of this project is to engage our Muslim children in the new technological era, and offer a new and innovative system for their education and development. This can be achieved by teaching them our core Muslim values and Arabic language, by employing edutainment and smarty toys.

This project aims to develop a smart toy named "Basma/بسمة" that the child can interact with in a fun way, and most importantly, in the child's native language i.e. Arabic language. The solution consists of two parts (as shown in Figure 1): the first one is a plush toy with hardware component; this component will be implemented using a low cost IoT (Internet of things) kit (Arduino). The hardware part will leverage the interaction between the child and the toy, allowing the toy to respond, talk and make sounds to the child. The second part of the project is a mobile application connected to the toy via Bluetooth, used by the child and the parent. It allows parents to customize the toy and provides stories to the child. The project will also deliver pre-tagged NFC objects to provide a new educational experience for children in playing and interacting with physical and tangible objects. Basma toy will focus on enriching the child's Islamic values and Arabic culture by embedding them in stories, providing the child with an enjoyable learning experience.

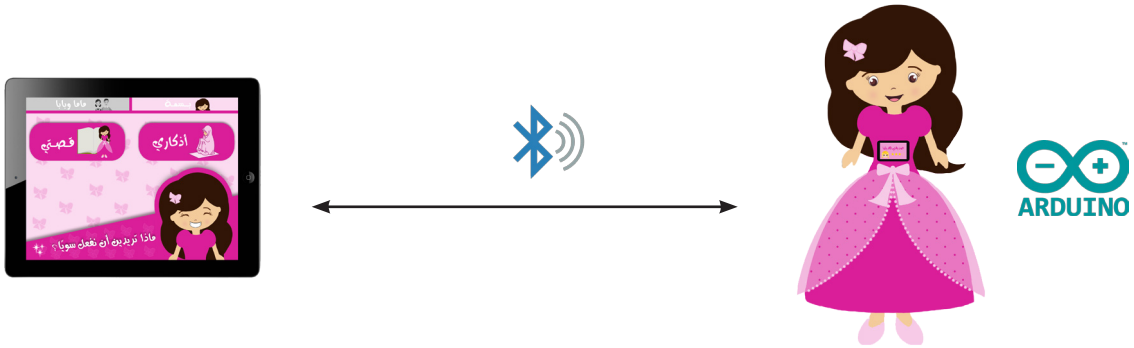


Figure 1: Overview of Basma Toy System

Non-Invasive Vitamin D Detector

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Supervised by:
Dr. Mohamed Nasor and Engr. Mujeeb Rahman

ABSTRACT

Nowadays people from all around the world are subjected to the risk of having a Vitamin D Deficiency. According to Harvard University, an estimate of about 1 billion people are low in vitamin D, therefore it is becoming the disease of the century. Regardless to the fact that the awareness about it is increasing rapidly, the only available method to test vitamin D levels is the traditional laboratory test, which consumes a lot of time and money.

Hence, the idea of our project was born, in which we aim to design a non-invasive ergonomic device that will turn the tiring old traditional way of testing vitamin D into a regular daily check up that can be performed comfortably anytime and anywhere. Creating such a device that will be designed considering factors such as safety, ease of use and effectiveness, will help to assist people`s life with the latest technology techniques and make it easy to keep up with tracking their health status.

"Transmittance-Reflection of light", is the operation principle of our project. A transmitted light (LED)[1] with a specific wavelength will penetrate through the human tissue and interact only with substances that are having the same wavelength, which in our case is the vitamin D wavelength. The reflected light received by a UV[2] photodiode will have specific characteristic features of vitamin D. Block diagram given in figure (1) describe the various stages of the proposed project. Proposed system will have the following features: low cost, easy to use, and fast response etc.



Figure (1) Block diagram

1. LED-Light Emitting Diode
2. UV: Ultra-Violet
3. LCD: Liquid Crystal Displays

Smart Wheelchair

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ABSTRACT

As we encountered each day thousands of accidents happens and the number of disabled people starts to grow more and more. They became destitute of using their hands, legs or sometimes both. As a result, robots were invented as solutions to complements the deficiencies that the disabled have, and play a role in all people lives and especially in the disabled people. Hence, robotics during the last decades has been rapidly a growing sector due to technology advancement and improvement. Many robots nowadays perform jobs that are typically dangerous for human being, in other words taking risky jobs. As a result, disabled people including toddlers need to feel normal and contribute in the society as we do. According to a statistics carried by the United Nation in 2013, approximately 15% of the world population is disabled. Therefore, we should think of developing new technologies that will help them to feel more comfortable with people as they face physical, social, economic and attitudinal barriers that exclude them from participating fully and effectively as equal members in the society. They are unfairly represented between the world's poorest, and lack equal access to basic resources. One solution of the robots that will help disabled people is the wheelchair. People with disability cannot perform their daily activities without the help from others. According to the level of disability, a person can get his ability of movement by using a wheelchair. Most disabled people especially toddlers who use the wheelchair have problems with the movement of their legs. They need to push themselves or by others to move around and some may feel as they are burden on others, as they need help to move around.

Despite the different types of the wheelchairs that are available in the market, the team members came up with an idea to develop a wheelchair that its user which is a child can control it by head movement at first. The head movement is a choice since the children usually used their head movement when they want to ask something, try to point on things or need help, also since he/she a handicapped, head movement is a better and ultimate. The child will wear a helmet that designed to interact via Bluetooth technology to move the smart wheelchair according to the preferred direction. He/she can move in three directions that are forward, left and right. We neglect backward due its riskiness as he/she cannot see any obstacles behind him/her. Then after looking at more than one solution on how to make it easy for the child to move the wheelchair, the group member decided to implement a wheelchair and develop it by using head movement, by a mobile application, by a joystick and by voice recognition. We choose both joystick and voice recognition as alternative to their needs. For joystick it's simple for them to use and it is familiar to the children as they used it in their games. The voice recognition was chosen to make it easier for him/her to talk only in case he/she cannot move their head for any circumstances. The control all of four movements is by the mobile; it done by the Bluetooth technology as then the user will choose the preferred movement. This will help the user to move around easily and without the help of others; in case of any harm or obstacle that may face him a guardian or parents can act fast to take the control via mobile application. It will bring satisfaction to both the user and the guardian and can lead to more contribution in the society as they can move without the help of others.



Figure 1: The smart wheelchair

Wassilni: Mobile Transportation System

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ABSTRACT

In this project, we focus on transportation in our cities. We deal with the problematic question of choosing between public and private transportation. Regarding private transportation, we believe that the car is the most widespread type of vehicle. In fact, cars provide autonomy and they are seen as more convenient and reliable.

In the opposite, the public transportation like buses, train, subway ...etc. are not available in Saudi Arabia. Public transportations are narrowed to school buses that the ministry of education provides to students. Taxis gained popularity in major cities like Riyadh and Jeddah. However, small cities don't have this privilege. There are many problems that make the daily process of transporting to school or work, a time and money consuming process.

Many female students and employees who don't have private drivers face problems with transportation, when they want to go to their schools, universities and work. They lose a lot of time daily while waiting for a taxi, or waste a lot of money when organizing their trip with one of the existing taxi companies. With the absence of sustainable solution, the organization of the usual trip to school or work becomes a headache.

On the other hand, private drivers don't have a systematic and practical way to find passengers. Instead they usually use typical methods of advertisement like posting ads in public places. The drivers also have problems with managing the registered students' schedules.

This project will help female students and employees to search for available drivers and to choose the most suitable driver that matches her schedule; based on the driver's price subscription and driver's rating, make subscription through the application and participate in a carpooling trips, and inform the driver via the application in case of absence without having to make a phone call. On the other hand, drivers can manage their daily schedule by setting their working hours and their pick up and drop off zones. The application will help the driver to decide whether to accept or reject an incoming request from a passenger based on the path simulation of the trip using Google Maps API, the simulated path will add the incoming passenger's request and location to the trip, and will show the updated path trip, moreover, the driver can generate a path while picking up the subscribed passengers using Google Maps API that shows the path of different passengers registered in the trip. The path will be arranged using Travelling Salesman Problem which is embedded within Google Maps API.

From the admin's point of view, the admin can manage the drivers' profiles (validate registration after identity check, delete account…), the admin role is to provide a mean of regulation on both driver and passenger, because such process needs to be checked manually.

Wassilni shares some features with other application like Carpool Arabia, CarpoolWorld and Sharekni. However, Wassilni system excels over these applications because it supports other features. In table below you can see the features of all the applications compared with Wassilni, note that column1 for CarpoolWorld, 2 for Sharekni and 3 for CarpoolArabia.

Features	1	2	3	Wassilni
Support Arabic	×	✓	×	✓
Available for android	×	✓	✓	✓
Variety of cars	✓	×	×	✓
Provide carpooling	✓	✓	✓	✓
Accept and reject coming requests for driver	✓	✓	✓	✓
Cancel the request	✓	✓	✓	✓
Subscription for a specific duration.	✓	×	×	✓
knowing the driver's mobile number	✓	✓	×	✓
Provide feedback about driver	✓	✓	✓	✓
Generate a path of trip to driver	✓	×	×	✓

Smart Oil Refinery

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ABSTRACT

Many companies that operate on a local, regional, or worldwide scale tend to face endless day-to-day challenges to keep the company on-track and running. Such challenges sometimes force the company to hire and dedicate an entire workforce to monitor and assess specific tasks. This project proposes a smart solution to this problem in the oil refinery sector in Kuwait.

Some of the oil refineries tend to use the old-fashioned manual-diagnosis, while analyzing the status of the oil tanks and pipelines, which extend for hundreds of kilometers. This traditional method demands excessive time, dedicated man power and equipped vehicles, just to name a few. In addition, the data is collected manually, allowing it to be susceptible to imprecision and human errors.

This project is proposed to automate the monitoring and control of various processes in oil refineries. The project aims to optimize data collection of oil tanks and pipelines, trigger an alarm system for any malfunction, apply temporary solution to the corresponding malfunctions, in addition to other smart features that are integrated to the system to optimize its performance. The system-design and the development environment (IDE) for this project are implemented using *LabVIEW*. The data acquisition (DAQ) is done wirelessly using *LabJack* modules to read from the sensors, installed on the oil tanks and pipelines, continuously. The integration between the DAQ and the IDE would provide real-time, continuous and accurate data that determines the status of the oil tanks and pipelines. This proposed project is a mart version of the well known Supervisory Control and Data Acquisition systems (SCADA). It is a system that records, monitors, stores, processes data, interacts and controls a wide range of machines or devices.

The project illustrates the feasibility of handling many processes and different industrial plants that include pressure, heat, flow, oil level, and gas leakage via installing dedicated sensors. Each corresponding sensor sends the continuous data to the DAQ, then off to the control center to be monitored and assessed accordingly. In addition to having a friendly graphical user interface for this project, a mobile application is also included to save the log files for the history of data and to provide means of remotely monitoring and controlling the sensors and actuators, respectively.

It is expected that this project will have a positive impact on the economic, environmental, and ethical aspects of petroleum industry. After developing, implementing and integrating the whole system the SOR is believed to extremely useful in optimizing the performance of oil refineries that are widely used in the GCC. Currently, the scope of this project is being broadened via coordinating with Kuwait Oil Company (KOC), Kuwait National Petroleum Company (KNPC), Kuwait Gulf Oil Company (KGOC) and others as well.

In the future, this project can be extended via using parallel system diagnosis, implementing decentralized sensors with built-in DAQ, and using continuous industrial PID controllers, along with the existing hardware. The developed prototype is functioning accurately and could be integrated into a commercial package that can be marketed in the industry.

EEG-Based Communication System for Patients with Locked-in Syndrome

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Supervisors:
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ABSTRACT

Patients who are conscious and aware of their environment but are physically disabled are known to have Locked-in Syndrome. The causes for this medical condition include traffic accidents, drug addiction and brain clots. Some solutions are available to help them communicate with others, especially informing their caretakers about their needs. However, these solutions generally require some physical training which can be time-consuming and costly. The main objective of this project is to help these patients communicate with their caretakers and manage their daily life more comfortably.

In this project, an Electroencephalogram (EEG)-based communication system has been developed to facilitate communication of such patients with their caretakers. The system is composed of both hardware and software. The hardware consists of a 14-channels EEG module, a display tablet and a smartphone, while the software parts include reading the EEG signals and classifying them based on the patient's needs using Neuro-Fuzzy pattern recognition algorithm via Matlab. The system is interfaced with the tablet using C# and linked to online database that can be accessed by the caretakers on their smartphone to create a two way communication between the patient and the caretaker. This is programmed using Android Java.

The EEG module on the patient's scalp will continuously read the brainwave signals as shown in Figure 1. The patient focuses on one of their six basic needs categorized in colors and displayed on a tablet namely, Food, Water, Washroom, Help, Sleep and Entrainment as shown in Figure 2. The chosen need will be detected when it matches with a predefined reference in the processing algorithm using Neuro-Fuzzy pattern recognition. The analysis is performed using Matlab Neuro-Fuzzy toolbox. The database acts as a two-way communication link between the patient and their caretaker, while the detected state will be shown on the android application installed in the caretaker's phone in the form of a pop notification, as shown in Figure 3. Interchangeably, a response message can be sent by the caretaker to inform the patient that they are on their way for assistance. Moreover, the tablet will generate a voice message to inform the people around the patient with their need.



Figure 1: EEG module.



Figure 2: Tablet.

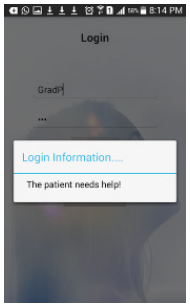


Figure 3: Android application.

The presented system is mobile, lightweight and allows quick help and response to the patient. Furthermore, it does not require any physical effort from the patients while granting them a sense of control in expressing their needs using a noninvasive EEG Module.

Zwarh: A Mobile Application for Social Gatherings Planning and Management

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ABSTRACT

Social ties are very important to people. We naturally care about gathering with family and friends. So, our life is full of occasions. Sometimes people use social media applications such as: WhatsApp, Facebook events, and Snapchat, for planning social gatherings. For example, message broadcasting allows a person to select guests and send an invitation to them. Alternatively, a person may decide to create a group chat of people he/she wants to invite. Although very useful in reaching guests, such applications have limitations when it comes to efficient gathering arrangements. From a guest point of view, invitation messages can get lost between the unimportant ones. People sometimes find it inconvenient to go through a huge amount of chat messages line by line. On the other side, the inviter needs an easy way to manage a huge number of invitees and keep track of the guest list and replies. In addition, the inviter may want to outsource the gathering. For example: if the inviter would like to invite his/her guests to a five-star restaurant he/she must use another application to manually book a table. This leads to another issue which is the need of moving between multiple applications or platforms in order to accomplish the invitation task.



In this project, we propose *Zwarh*, a mobile application for easy planning and management of social gatherings. Our goal is to provide a platform with all features missed by other applications to facilitate social gathering arrangement.

In *Zwarh,* the inviter can invite his guest directly through the platform. He/ she can also receive invitations. The inviter will be able to send invitation card with the gathering details such as: location, date, and time. The guest will be able to accept, reject or make a suggestion. Based on guest replies, the guest list will be automatically generated and updated regularly. If the inviter would like to have the gathering in a restaurant, he/she can choose a restaurant from a list provided by the application, book a table and confirm the reservation. All these functions are in one platform which makes our application a comprehensive one and a suitable destination for smooth gathering arrangement activities.

To implement the proposed solution, we will use the following technologies: Google maps, global positioning system GPS, and MySQL. In addition, our mobile application will be running on Android operating system, so we will use Android studio to implement the application. Lastly, we have plans to make our application available on other platforms.

Intelligent Auto-Focus Glasses

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Supervised by:
Engr. Wessam Shehieb

ABSTRACT

As a natural process, our eyes can easily change focus between distant and near objects. However, under certain conditions, the eyes will lose the ability to do that, which will result in blurring nearby objects.

Available solutions to solve such a problem can be using either the conventional bifocal lenses, progressive lenses or manual adjustable focus glasses. Both bifocal and progressive lenses causes' headache and loss in balance for the user. While manual adjustable focus glasses will require manual adjustment and calibration for each time the glasses is used from a certain distance, which consumes a lot of time, might not be accurately fixed by the user and not a practical solution for both elderly and young users. The aim is to find an effective, affordable and efficient solution by using an automated technique, so that the user can see clearly at all distances without any effort needed.

In this project, Intelligent Auto-Focus Glasses is developed; using the conventional adaptive glasses available in the market, which consists of two thin, wave-shaped polycarbonate "plates" that will slide across each other by means of a small knob on the frame. The position of the two plates relative to each other determines the power of the overall lens system. The system will measure the distance between the objects standing in front of the user and the glasses using sensors centered in the middle of the glasses structure as seen in Figure 1, which will control the glasses plates' position by adjusting the knob using micro-motors attached on the glasses sides. The positions of the lenses change the sharpness of the vision. When the plates are located exactly behind each other, the strength of the lens is zero. Correspondingly, when the knob is rotated backwards the strength of the lens is positive so that focus is targeting near objects. While when the knobs are rotated forward the strength of the lens is negative so that the focus is targeting far objects. Additionally, a Smartphone application will be used to predefine the degree of (Myopia) and far-sightedness (Hyperopia) for multiusers calibration as shown in Figure 2.

The implementation of the system is consist of hardware and software. The hardware is composed of manual adaptive glasses, micro stepper motors, custom design gears, and distance-measuring sensor (ex. Ultrasonic) and Smartphone. While the software part is designing mini stepper motor rotational code based on the values gathered from the sensors using Arduino, attached using the custom design gears to fit the glasses knobs adjustment so the system works on automatic mode. Moreover, Smartphone Application is programmed using Android platform via Android Studio to adjust the eyesight degree of the user, and linked to the system attached to the glasses using Bluetooth technology.



Figure 1: System Diagram.





Figure 2: Smartphone Application.

The proposed system is a lightweight, portable and smart solution, suitable for fitting into spectacle frames, can be designed in different sizes relatively easily and affordable for people in need.

Smart Airport Trolley

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Supervised by:
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ABSTRACT

One of the main concern at airports is passenger delay that can be translated to huge financial losses. The most frequent delay that passenger's experiences is the queuing at the check-in counters. The delay is even more severe at the peak periods of demand. This is a challenging problem at several major airports, particularly in big cities such as Dubai, due to significant increase in the population. Airports either have to expand to meet the growing demand or make efficient use of available resources.

In this project, we are proposing a solution that is a unique design of a self-service technology for luggage check-in processes. The cost of our design is reasonable as our proposal is making use of the available luggage trollies. The proposed design uses the existing trolleys to measure the weight of luggage and verify its compliance with airline regulations.

The aim of our project is to design a self-service system for luggage check-in, which is portable and easy to implement. A smart-phone based application consisting of airport database and barcode reader is used. The barcode scans the boarding pass of the passenger to extract luggage allowance of the passenger and sends it to a central controller such as Arduino. The traveler puts the luggage in the trolley where the load cell measures the weight of the luggage, and the measured weight output of the load cell is further sent to the Amplifier Hx711 module. This module is used for signal processing, so that the signal can be amplified and converted into an output value for further processing with central controller. Using Arduino programming, the luggage weight will be compared with the luggage allowance of the passenger. If the luggage weight is greater than the luggage allowance, then a message will be displayed with all the necessary information (e.g. amount to be paid due to extra luggage). In addition, the passenger has the option either to pay for extra luggage or to reject and reduce luggage weight. If the passenger rejects, then the weight should be reduced and the whole process must be repeated. Furthermore, the system is able to sort the carry-on luggage from others. This allows the system to calculate the number of bag tags required. Finally, when the passenger approaches the counter, all the information will be send to the counter staff using short range technology such as WiFi. The passenger is ready to leave the counter as soon as he/she receives his/her bag tags and pay extra amount, if any. The system working diagram is shown in the Fig.1.

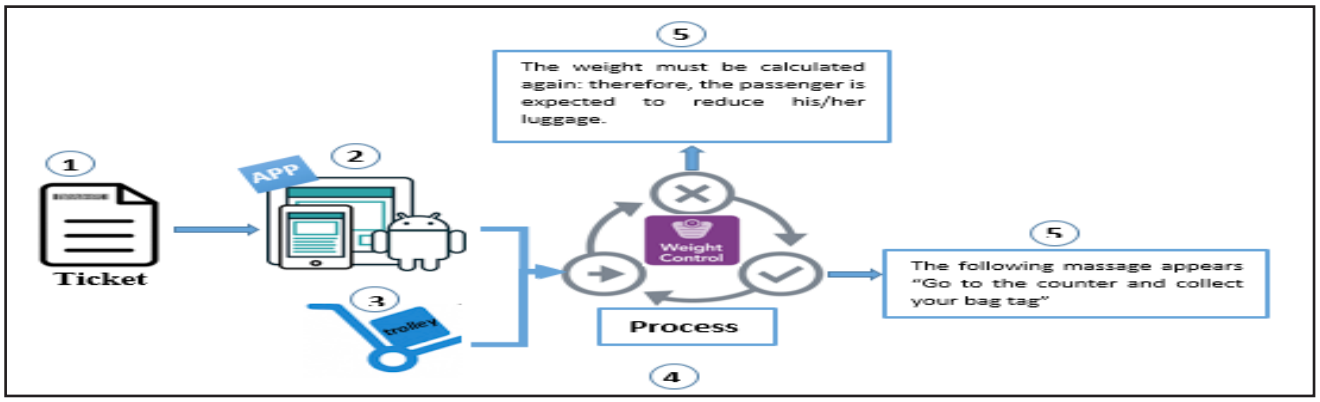


Fig.1: Conceptual Diagram 1

Our proposed system makes efficient use of available resources and is easy to implement. Moreover, the proposed design in our project is cost effective, time efficient, portable and sustainable.

Smart Tremors Tracking System

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ABSTRACT

According to the National Parkinson Foundation, it is estimated that four to six million people suffer from Parkinson's disease, which is a progressive disorder of the nervous system, caused by the death of nerve cells in the brain that affects movement, which means that symptoms continue and worsen over time. As a result, the patients cannot depend on themselves to eat, as the food will spillage from the spoon. Causing the patient to feel depressed and insecurity. There are available solutions of Parkinson's Spoon done by Gyenno and Google that stabilizes the spoon content whenever the hand is shivery, without keeping in mind that tremors diseases can vary, and might affect parts from the body other than the hands only. Which calls for a system that can track the tremors development/healing process, to allow proper analysis given for the sensors results to be given to the specialist doctor to identify any major changes.

The design and implementation of Smart Tremors Tracking System is presented in this project. The main objective is to provide the patients minimal assistance required and to participate in the society more effectively, and track the tremors development/healing process using smartphone application data plotting and analysis for the developed devices connected to it. The system will contain a Smart Stabilization Spoon as seen in Figure 1, which will allow the user with tremor disease to eat normally without slipping the food from the spoon, and alert them when the food temperature is higher than normal. The implementation of the spoon consists of both hardware and software. The hardware is composed of Arduino Nano Microcontroller for calibrating and controlling the system, IMU Sensor to track the movement of the spoon, Servo motors to stabilize the spoon based on the readings. While Thermocouple sensor is connected to measure the temperature of the food by attaching it to a metal material spoon head. Reading results will be displayed using LED arrays to indicate the level of the heat and Bluetooth communication will be established between the device and the smartphone for data collecting.

Additionally, Smart Medical Belt Tracking device as seen in Figure 2 is also associated with the system, incase the user has tremors from other parts of the body, which will allow continuous tremor tracking from a certain part of the body for farther data analysis and healing process tracking. The belt will be attached to Arduino Lilypad and IMU sensor for flexible movement. While connected to the smartphone application via Bluetooth for data collecting as seen in Figure 3.



Figure 1: Smart Stabilization Spoon.



Figure 2: Smart Medical Belt Tracker.



Figure 3: Tracking Results Analysis Mobile Application

Stand-alone test was preformed successfully for the system sensors, to calibrate the servo motor movement based on the IMU sensor readings. The proposed system will introduce a Smart Tremors Tracking System that will enhance continues research analysis and data collecting from patients with tremors comfortably, and help them live their life independently using the Smart spoon feature.

Smart Automated Grocery System

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Supervised by:
Dr. Hasan Zidan, Eng. Yahya Noureldein

ABSTRACT

The term "shopping" describes our daily life, how frequently we go to hyper markets and look for stuffs that our homes need. There are new technologies that will improve our life and make it easier, in the sense of selling & buying methods. These Technologies improve the utilization ratio, to form an intellectual entity by integrating human society and physical systems.

Nowadays, due to the frequent going to markets to get home stuffs, we might face a lot of crowded areas which will cause a waste of time. So we decided to come up with a technical solution to minimize if not totally eliminate these problems. In this project, an accurate Smart Automated Grocery System (SAGS) is designed and implemented to give the customers the ability controls their time and finish their buying process quickly. Simply the customers will check for free places to finish shopping as soon as possible. This smart system can be used in grocery markets. It is very accurate due to the help of image processing which determines the type of items via its shape and color. In addition, it can do a lot of measurements in a short period of time. Moreover, this system will solve various problems that customers face in markets while shopping such as long queues.

This system consists of four main parts; the image processing, the weighting & scaling process, the conveyer belt, and microcontroller with sensors.
The operation of the system starts from the conveyer belt. A sensor will be able to give a signal to Arduino which will order the conveyer belt to move and stop. The system is divided into three main parts:

1) **Image processing:**
In this step, The main program is going to analyze the image of the item, and detect its type. Then the main program will send a command to Arduino to start weighting process.

2) **Weighting process:**

In this step, Arduino microcontroller is going to calculate the weight of the item based on the received signal from the weight sensor. Then the calculated weight will be sent back to the main program.

3) **Displaying process:**

In this step, the main program will calculate the total price, and will print it on a price tag, which will be attached to the item.

This designed system is considered as an innovation; since it offers an efficient, rigid, reliable, and accurate solution, as well as it is not costly. There is one application which will be added to the project, which is adding the payment application through smart phones.

Wearable Technologies for Firefighters

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Supervisors by:
Ms. Tazeen Sharif and Engr. Wessam Shehieb

ABSTRACT

Firefighting is one of the most dangerous jobs in the world, as they risk their lives to save others, which results in massive amounts of firefighters being injured daily. As a solution to this problem; a smart glove and a multipurpose helmet is presented in this paper. The smart glove incorporates multiple features and enables firefighters to activate them using simple hand gestures. These features include communicating with team members, measuring the contaminants in the room, measuring heart pulses and oxygen level. Additionally, it gives the firefighter the opportunity to ask for assistance in case of emergency. The emergency features communicates the fire fighters location to base station and generates an alarm. The system features will be controlled using a proper microprocessor and linked with the smart gloves via Bluetooth to ease the firefighter movements, and duo to the fact that we cannot establish communication between firefighters indoors easily; SMS technology will be used to maintain communication between firefighters and main station in case of an emergency.

Additionally, the multipurpose helmet is composed of oxygen nozzles that is automatically activated when firefighter's oxygen rate decreases, and night vision glasses to see clearly at night. These glasses will be connected to a motor that will be controlled using audible commands through the wireless headset that is connected via Bluetooth Module transceiver as shown in the system block diagram in Figure 1.

Using the appropriate software tools to enhance the performance of the system is a primary factor to achieve the desired goals. The project is focused towards developing the fire fighters safety gear and will be accompanied with a shock-resistant smart helmet to save the firefighter from sudden falling objects, and equipped with many features such as; oxygen nozzles, night vision glasses, microphone, and headset for audible commands.

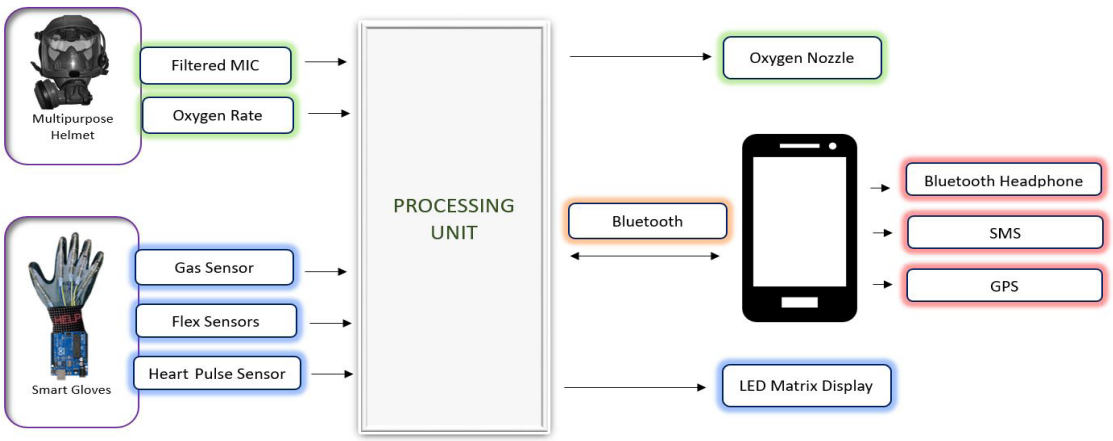


Figure 1: System Block Diagram.

Stand-alone test was performed on flex sensors using Arduino microcontroller, flex sensors where programmed according to their functionality and displayed the results on 8x32 LED Matrix Display, while Bluetooth module was also tested to be linked with the mobile application coded using Android Studio to communicate with the system.

The proposed system is cost efficient, portable which makes it suitable for firefighters with multiple features to communicate and rescue people faster with minimum time required.

Arabic Sign Language Recognition

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Dr. Ouiem Bchir

ABSTRACT

Human communication has been evolving over time. Over the ages, humans have used petroglyphs, pictograms, ideograms, alphabets, sounds, signals, gestures as ways of communication. Nowadays, the predominant communication categories rely on either oral and/or written expressions. However, people suffering from hearing and/or speaking disorders cannot communicate orally with others. Moreover, they usually prove difficulties to learn how to write and read text. Thus, sign language has emerged as an effective alternative to express their thoughts. According to the World Health Organization over 5% of the world's population (360 million people) suffers from hearing impairment. Moreover, the number of deaf and hearing- impaired people among the Arab region exceeded 15 million people. Although many hearing-impaired people master sign language, few "normal" people understand and/or can use it to communicate with others. This affects the communication with deaf people, and results in their social isolation. This gap can be reduced using a system that allows automatic translation of sign language to text and vice versa.

Nowadays, many paradigm shifts in many technology fields have helped researchers to propose and implement sign language recognition systems. Those systems rely either on sensor-based or image-based approaches to "understand" sign language. The main problem with sensor-based systems is that they require deaf people to wear sensors such as cyber gloves. This requirement makes the system impractical for real world applications. On the other hand, image-based systems can be deployed using just smart device incorporating digital camera(s). Lately, image-based Arabic Sign Language (ArSL) recognition has been an active field of research. The published works defined various Arabic sign vocabulary, and introduce promising ArSL recognition systems. These state-of-the-art solutions use specific visual descriptors to represent image content. Despite the considerable amount of researches aiming to recognize ArSL gestures, none of them inspects or investigates the visual descriptors in order to determine the most relevant one for ArSL alphabet recognition.

In this project, we intend to automatically recognize ArSL alphabets using real image dataset. The general architecture of the system is shown in Figure1. Namely, we propose to extract several visual descriptors – also called low-level features – from the input image and empirically compare their performance. The role of these descriptors is to translate the information perceived in the image to a numerical vector that can convey the appropriate information to the recognition system. The assessment will be performed by conveying the visual descriptors to a typical ArSL alphabet recognition system. The recognition performance corresponding to each feature is then recorded. Then, all performances will be compared, and the visual descriptor corresponding to the highest accuracy would be the most appropriate for ArSL recognition. We hope that this project would be the seed for a future research where a full-fledged system is developed to offer this valuable service to the public in the Arab world.

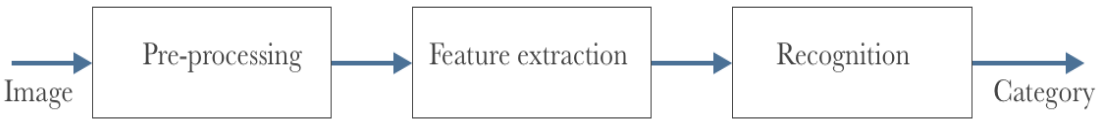


Figure 1: Recognition system.

Student Tracking System for Elementary School

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Supervised by:
Dr. Mohammed El-Abd

ABSTRACT

Student Tracking System will eliminate an incident where children are kidnapped or forgotten on school buses and therefore die due to suffocation. This is done by having a tag on children's shirts were each child will have a unique number. So when a child enters or leaves the school bus, a snapshot of the child will be taken and sent to the parent via an email including the date and time. Moreover, our system requires the school bus to have a tablet so that when the child enters the school bus the child's information will automatically appear on the application's interface. The child's name will be removed from this application if the child leaves the bus. This information includes the child's ID (tag number), name, house address, parent's number, and email address. This application will include a map as well to make the driver's job more convenient. It will allow newly employed drivers to easily locate children's houses. This is done by clicking on the child name and his/her address will be displayed on the application's map.

The most important feature in our project is that when a child gets out of the bus in a destination that is not where he is expected to be, at that specific time the parents will be immediately notified via email and SMS. Both of them will include a Google map link indicating the child's current location along with a snapshot of the child as well. The bus driver and the supervisor will also be alerted.
Our project will also notify the supervisor if the child is not sitting on his seat or if his seatbelt were unfasten. The driver will also be notified if the bus speed exceeds 80km/h.

Using this project parents will also be able to locate and monitor their children while they are in the school bus or while they are on campus. This is done by having a mobile application where each parent will have his/her own account. If the child is in the bus, the location field in the mobile application will automatically be set to "In the Bus" and if the child is out of the bus it will be set to "Out of the Bus" (Fig.1). However, if the child is in school, the location field in the mobile application will be set to either "Class Room 1" or "Class Room 2" depending on the location of the child.

The application also provides parents with the ability to view the child location by clicking on View Location button. If the child is in the bus, a Google map will be displayed with a cursor indicating the location of the school bus. However, if the child is on campus, a live video will be displayed showing the location of the child.

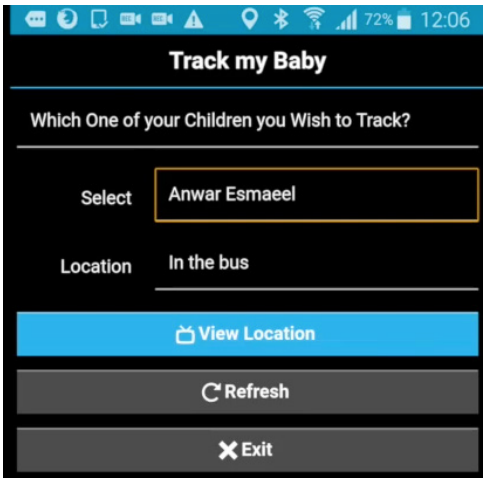


Figure1: The mobile application

The Food Detective

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Supervised by:
Dr. Maram Meccawy

ABSTRACT

Leading a healthy lifestyle is one of the core values that people try to commit too in order to maintain their wellbeing. This is achieved mainly by following a healthy diet, exercising and reducing stress. Making the right food choices is not an easy task, especially when it comes to processed food where there are so many hidden ingredients. Selecting the right food to eat becomes even more critical for certain people such as those who suffer from allergies, who are trying to lose weight or pregnant women. Nowadays, with the technological awareness, people are interested in accessing health information to support their health decisions using personal and mobile devices such as their smart phones, watches, tablets, etc. Consumers could for example distinguish between healthy and unhealthy food by using food applications. These applications that can scan a product ingredients then determine if it is suitable for a number of health conditions like diabetes, obesity, pregnancy, diet and more.

According to a survey conducted by this project, it illustrated that almost %30 of consumers are reading a product nutrients and ingredients before they buy it. Unfortunately, they face some obstacles and challenges that limit the benefits of this process. For instance, manual reading could be time consuming, lack of data in Arabic, difficulties of understanding a product semantics, and so forth. Yet, there is not a unified food application that caters for the multiple of users' conditions or that provide all this valuable information in Arabic in Arabic.

This research presents a new application that aims to serve Arabic speakers users who fall under any of the following conditions: allergies, pregnant women, and healthy dieter in their goal to stay healthy by making the right food choices. The application is called: The Food Detective.
The application provides two main features: food scan and personalized interface, in addition to a number of other services. The scanning feature provides health information about the product and whether it suitable or not for the user depending on his/her category: pregnant, allergic or dieting. The Food Detective provides personalized and adapted interface for each user based on his/her category. By applying a user modeling, the interface changes depending on the user model for each of the techniques, and project's communities (allergies, pregnant, and diet). Finally, there are common personalized services will apply for all categories like the scanner, and schedule, and some services for each user based on his/her condition.

The Food Detective is a mobile application with an adaptable interface which contains three domains (allergy, pregnancy, and diet) developed using Agile-Mobile-D methodology on an android platform. It is aimed towards Arab users hence it has an Arabic interface. It is hoped that it would help people to making better food choices contribute to lead a healthy lifestyle.

Be My Voice

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ABSTRACT

Speech Difficulties is the disability of producing speech sounds correctly or having problems with voice. The number of people that suffer from speech difficulties is about 7.5 million of different ages. Speech difficulty is common, and It can happen out of nowhere or as a result of a medical problem. People with speech difficulties feel sad when others do not understand them or ask them to repeat what they said, sometimes it is a necessity to have someone by their side to help them in communicating. So speech difficulty considered a major problem that has psychosocial, social and academic impact on people who have it. By using the technology to develop an android application that can translate incomprehensible speech into understandable speech and also may improve the pronunciation of words to help those people in communicating and their speech would be clear and understandable. Be my voice application will support android operating system and Arabic and English interface. It will be implantable via Java, Python and Matlab. Each user has its own dictionary that includes all the recorded disorder pronunciation with what qualified it in text that was previously added. The user can press the speaker button on the application main interface and start speaking unclearly then the unclear speech would be converted to a clear one that will come out through the application using some technologies. Also, the user can be taught the correct pronunciation of some words via listening to the right pronunciation and there is a possibility that this feature can improve pronunciation. The application main function is to convert the non-understandable speech of people with speech difficulties to understandable one by using signal processing, machine learning (ML), and cloud computing. To accomplish the main function first a set of voices have been collected from the internet and speech centers in both Arabic and English. In order to use the machine learning voice features must be extracted via using signal processing. The application will use Mel-frequency cepstral coefficients (MFCC) as signal processing algorithm to extract voice features. After that they must be divided as groups based on their speech severity that the speech specialist will identify. So then Machine learning will be used and the implementable algorithm is K-Nearest Neighbor (KNN) which will be used in two things first for making the search fast for a previous recorded voice and the ability to present a set of similar recorded voices in case of not finding the exact searched voice also KNN is being used in the process of identifying the new added voice belongs to which severity group. Cloud computing is used for storing and hosting and the used cloud service provider is Amazon. Storing application recorded voices in Amazon S3 service will save storage in the mobile and will not annoy the user with not enough storage alert. Also, having a NoSQL database that is Dynamodb for storing the application data such as user account information and voice dataset. The application operations need a high processor for it to work properly so it is best to host the application in EC2 service over the internet. Be my voice application can help people with speech difficulties in communicating and to feel much better because it will allow people to understand them and all those people want is to be understandable.

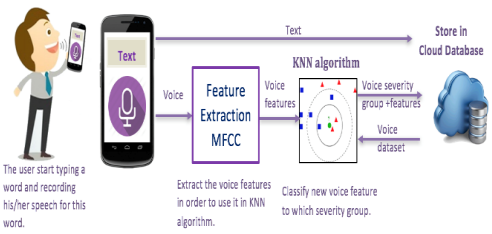


Figure1: The user adds a new Voice (methodology step1 and design)

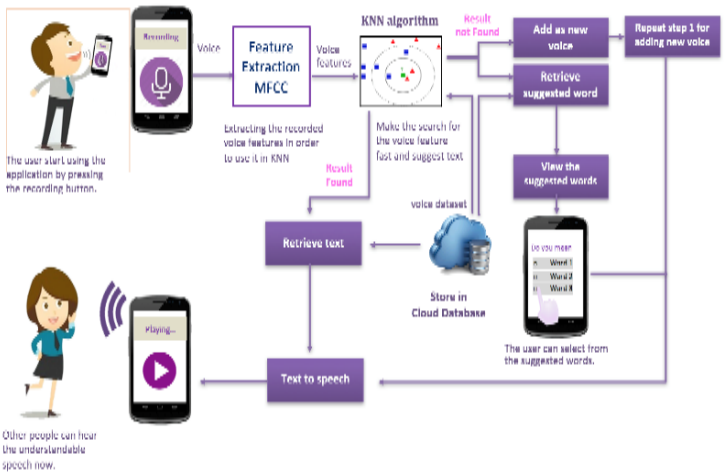


Figure2: The user start using the application (methodology step2 and design)

Cracking Wi-Fi Connection

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Supervised by:
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ABSTRACT

WiFi is prevalent today as the favorite method to connect to the Internet. It uses radio waves to transmit information across a network with most devoices having built in antennas and adapters. With Wireless access came security concerns and the first secure protocol WEP (Wired Equivalent Privacy) was introduced. However WEP has been proven weak and was soon replaced by WPA (WiFi Protected Access) and then WPA2. WPA2 introduced CCMP (Counter Cipher Mode with Block Chaining Message Authentication Code Protocol) to replaces WPA TKIP with Future Robust Secure Networks (RSN). WPA2 using AES is the current standard for protecting wireless networks, however it suffers from its own weaknesses. If the attacker has access to the WPA2 network, he can access the handshake messages, it is a matter of time before he can break the connection.

In this paper we use Gerix-Wifi-Cracker, which is a GUI tool to perform attacks on access points and wireless routers. We will use dictionary attack by trying all the combinations from a pre-arranged words list. We believe this method is very efficient because people normally do not bother themselves to memorize very long and complicated passwords. They either leave their routers using the default password or choose common, short and easy password. In this project, we are trying to prove that even "Script Kiddies" can perform complicated attacks by using tools and scripts from Kali Linux to break into WiFi networks. The Gerix Wifi Cracker uses GUI interface to give the user the ability to transform terminal commands to simple clicks by the mouse to perform the same commands as writing it on the Unix/Linux terminal.

We need to establish a new authentication's infrastructure. The old methods such as memorable passwords are not secure, and it is easy to bypass it. It can be difficult to obtain authorization by add a new authentication layer. By adding a graphical password authentication, which works by select from images in specific order alongside with password authentication, this double authentication layers can eliminate chances of break networks. An example of graphical password authentication is Draw-A-Secret (DAS) Scheme, which work by redrawing a certain pattern and it must be in the same grids in the same sequence to authenticate a user.

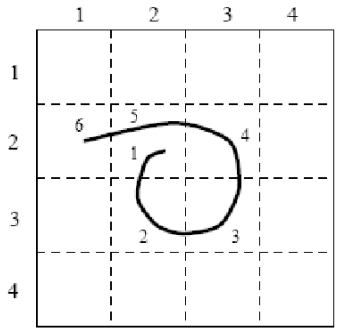


Figure1. Input of DAS password on a 4X4 grid.

We demonstrated that with simple procedure and ready tools, any guest connected to your WiFi could crack the password. We recommend strong passwords, modifying them regularly, enabling network encryption, filtering by MAC address and reducing the router range. An additional point is to establish a new authentication way to enter networks. Using multi-factor authentication such as passwords with graphical password authentication will make breaking networks extremely hard and it will be more secure.

Murshed: An Augmented Child Tracking Mobile Application

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Supervised by:
Dr. Evi Mansor

ABSTRACT

From many years ago until today ,there are a lot of stories talking about losing a child in public places .In most cases ,families found their child ,but unfortunately some of them have lost their child forever .The problem usually comes from both parties ,parents and children .For example ,parents may not give enough attention to their child when being in a public place .Nonetheless ,parents sometimes give the responsibility of their children either to elder siblings or their nanny when going outside such as to a shopping mall or a restaurant .On the other hand ,some children are hyperactive and do not respond to their parents 'requests .They just go wherever they like without permission without even feeling afraid of strangers.

Recently ,some applications have been produced to minimize the effort of tracking and detecting others 'location .Although these applications resolve a main problem ,but they still do not spread much and they do not provide all the needed functionalities that could encourage parents to use them frequently .In fact ,notifications feature is not presented in most of the available applications. Moreover ,the available applications track the location using only GPS ,but they do not track the heart rate and the speed which are considered as important indicators of the child's current situation .Therefore ,there is a huge demand for a specialized app that contains all the missing features in the available applications .More importantly ,the application should be user-friendly and customizable based on children's preferences to attract parents to use it.

Murshed application is an IoT based parent guide mobile application that helps parents in locating and looking after their children)Figure .(1 In fact ,this application if developed may reduce this problem and if occurs ,find an effortless way to deal with it .Basically, the main idea of the *Murshed* project is having the child wear a sensor attached in a ring or watch that is connected to the *Murshed* mobile application installed in the parent's mobile phone .An augmented reality feature is implemented in this application in order to give an addition that eases the use of the application for the parents .Parents can scan the surrounding to have a3 D avatar that will indicate the movements of the child who wears the associated sensor .Nevertheless ,this application will noticeably fasten the process of finding a lost child and reduce the spent efforts .Moreover ,the application has an alarm feature which works when the child exceeds a certain speed ,distance and heart rate range .In fact ,the challenges in implementing this application are the augmented feature and IoT technology as they are new technologies.

Interviews were conducted and surveys were distributed among parents to gather the requirements of the application .After that ,the application interfaces were designed following the design principles and usability testing sessions were conducted to validate the design .The results found from these sessions were analyzed and considered in the development phase .Moreover, the augmented reality feature was tested using Vuforia and Unity software .Currently ,the basic functionalities of the application are developed using Android Studio ,and the team is working to enhance the application to implement the IoT technology and all the other features.

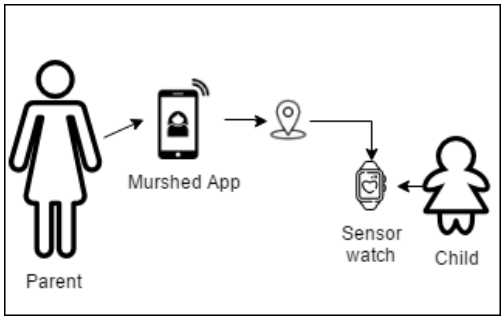


Figure 1: Murshed Application Illustration Diagram

Smart Event

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Supervised by:
Dr.Helen Bakhsh

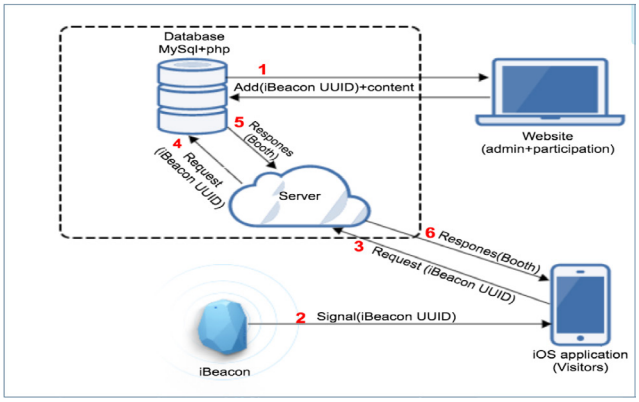
ABSTRACT

Today, with a fast grow in modern technology, the world becomes digital in all its dimensions. Modern technologies can be used to solve problems that face us in different life aspects to improve them. One aspect is the voting matter credibility in the competitive events such as in venues and exhibitions. The other problem is that venues consume a huge amount of paper in business cards and flyers (Ads) ...etc., which negatively affect the environment.

Regarding the voting matter there are two types that are used in venues and exhibitions: papers based voting and electronic voting (E-voting). The flaws in the paper based voting is that it is time consuming and the chance of incorrect result is very high. However, in the E-voting it overcome the flaws of the paper based voting, but it has its own flaws. It is not reliable in case people voted without attending the venue only to make their friends win. Also, E-voting systems devises are expensive therefore, few number will be provided.

Our project idea named as Smart Event is to solve the previous issues by Internet of Things latest technology known as beacon. Beacons are location-based sensors which use a newer version of Bluetooth called Bluetooth Low Energy(BLE) main advantage of this new Bluetooth that it consumes less battery. Each beacon has a specific range, it detects when the user is inside its range and sends broadcasts to this user's phone.

Smart Event is a system that contains a website for the admin to manage beacons and beacon content, and a mobile application downloaded by the visitors of venues and exhibitions. Smart Event system will facilitate and save time for the visitors to collect information by providing electronic contents allowing the visitor to save, share and collect favorites of these contents. Also, the system will cut down on the paper consumption. Finally, the system will provide a reliable voting process using voting algorithm to guarantee an accurate result.



Bucket Brigade Attack

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Supervised by:
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ABSTRACT

This study explores the vulnerability of Internet users to bucket brigade attack (Man in the Middle Attacks) and provides recommendations on how Internet users can avoid being victims of this type of hacking. The advancement in technology has come with a challenge regarding the security of those using technology devices. Hackers have been known to cause great harm to institutions and individuals regarding financial losses as well as leaking of important files to potential malicious sources.

Even security measures have been put in place to counter the problem of a security breach in institutions; it is impossible to design systems that are hacker proof since malicious hackers are working hard to get through the systems the same way ethical hackers are trying their best to have access to online information.

Previous Internet security studies were not able to indicate a solution to this problem because experts assume that a hacker will be positioned at either end of the network channel without knowing that there is a possibility of an outbreak in the middle.



This study simulates an MITM attack by creating a wifi network, connecting one target computer that operates on MacOS, and accessing information from it via Ettercap from a computer running on Kali Linux. It then provides recommendations to prevent MITM hacker attacks by using VPN, IP encryption by SSL, and Secure Shell Tunneling.

The way to protect a system or a user is by using VPN, Encrypted Proxy Server and Secure Shell (SSH). Using these three features will allow a user or a server to protect incoming traffic by encryption; this feature will allow the attack to work but the data will be configured, but using a VPN will encrypt the IP so the attacker can't find the victim.

Smart Steps: Add-on Smart System for Blind Navigation

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ABSTRACT

According to the World Health organization, of the 285 million visually impaired people in the world, 39 million are blind. Outdoors, most use either the white cane or an assistance dog to navigate, but, indoors, the white cane may be too long to use effectively or might damage furniture, and the assistance dog needs to rest and requires daily maintenance such as food and exercise. Hence, these people are faced with the recurring problem of navigating through their homes. Even if they memorize the layout of their houses, they still rely on holding one hand in front of their chest to avoid walking into furniture or to feel the wall to make sure they are going in the correct direction. The Smart Steps project is an energy-harvesting and obstacle-detecting wearable device aiming to assist blind people in navigating freely in indoor spaces, thus freeing their hands to do other tasks and replacing their stigmatizing canes. The Smart Steps device will be available as an add-on device.

Obstacle detection will be achieved through three add-ons. Two add-ons attached on both legs will support silent mode through utilizing vibration devices allowing the user to navigate indoor places. The third add-on attached on the wrist will support non-silent mode through utilizing voice synthesizer allowing the user to navigate inside his home. The add-ons on both legs will each consist mainly of a pro Arduino nano, three ultrasonic sensors, and three buzzers that will produce a vibration that will be felt on the side of the leg where the obstacle is detected, so the user will know to avoid walking in that direction. The travel time of the wave from the sensor to the object and back will be used to calculate the distance to the obstacle and hence will be capable of notifying the user of an obstacle ahead of time. Based on experimentations, the ultrasonic sensors were programmed to detect obstacles 0.5m ahead and to the side of the user to give the user enough time to change direction. Furthermore, based on experimentation, the ultrasonic sensors were capable of 30° obstacle detection only. Thus, the choice of three sensors on each leg was made. The add-on on the first leg will be capable of front and side obstacle detection along with staircase detection in case the blind user is going upstairs. The add on the second leg will be capable of front and side detection along with ground detection in case the blind user is going downstairs. Finally, the third add-on will consist of an Arduino nano that will communicate wirelessly via an XBee module with the above Arduinos in case an obstacle is detected. In turn, an audio sound will be produced through attached speakers notifying the user of nearby obstacles. Secondly, Smart Steps is environmentally friendly footwear since it converts the energy generated by the user walking into energy that can be used to charge smart devices. This is possible with the use of piezoelectric discs attached to the bottom of the device and a power bank attached on the back of the leg. Finally, if the device is lost, it can be easily using the attached RF buzzer. This feature is essential because the user has trouble finding objects once they are misplaced. One of Dubai's plans for 2021 is a city of happy, creative & empowered people. This project aims to ensure the happiness and the empowerment of blind people. It privileges them by allowing them to navigate around confidently and freely. It ensures their comfort and hence their happiness through replacing their stigmatizing canes with an obstacle detecting wearable device. It also addresses another plan that is to build a smart and sustainable city by 2021.



Figure 1: Testing of Smart steps using LED lights. Obstacles were detected on the front and on the side.

Conclusion
Smart Steps aims to ultimately empower the blind people by supporting blind navigation through 180° obstacle detection by utilizing vibration devices in indoor places and audio speakers inside the blind user's house. This feature allows the user to utilize it anywhere without having to worry about any noise produced. The device is easy to set up and operate, safe to use, and does not stigmatize the user when compared to their other options for navigation making it user-friendly. Also, it is an environmentally friendly device that converts the energy produced while walking into electrical energy used for charging smart devices.

Wireless Healthcare Monitoring System using GSM module

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Department of Engineering

Supervised by:
Dr.Mohamed Nasor and Eng. Mujeeb Rahman

ABSTRACT

GSM based Patient Health Monitoring Project mainly works for allowing doctors or relatives of patient to check the status of patient health remotely.

In hospital health care monitoring systems, it is necessary to constantly monitor the patient's physiological parameters. For example, the vital signs of a pregnant woman such as blood pressure (BP), heart rate movements of fetal etc. to control their health condition, which requires availability of patients in the clinic.

The primary function of this system is to constantly monitor patient's physiological parameters such as pulse rate and patient's body temperature, and telemetered to remote location reliably and efficiently. In the hospitals, patient's physiological parameters need to be constantly monitored and recorded by the specialist.

In this proposed project, the transmission module continuously reads patient's heart rate, temperature and breath rate using suitable sensors. Using a GSM module acquired data transmitted to remote location and then data could be retrieved with minimum possible error. The schematic of the proposed system is shown in the fig (1) below.

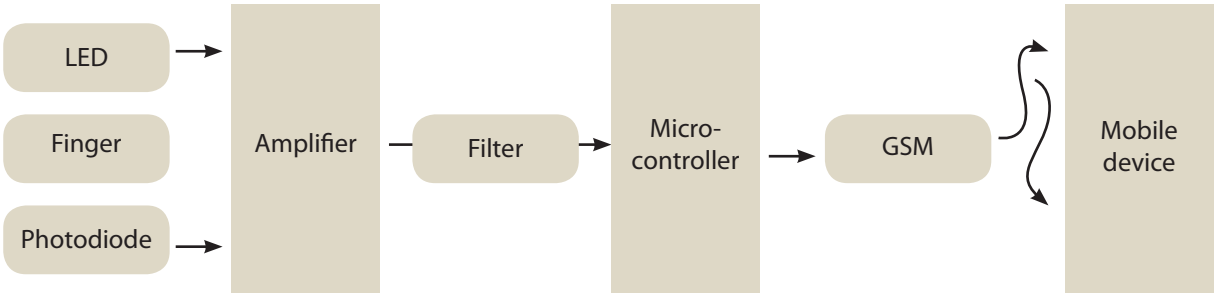


Fig 1- Schematic of Proposed wireless healthcare monitoring system

Using this device, real time monitoring of the vital signs from patients is possible eventually increases access to health care while decreasing the healthcare delivery costs. The doctor does not need to visit the patient to monitor. These systems do not require the patient or doctor to be limited to a specific location.

The system also introduced a function through which a doctor will able to check the status of patient after a certain interval of time by sending message. The system efficiently updates doctor about health of patient as well as accurately calculates the health parameter of patient.

Photovoltaic Cell Dust Mass Monitoring System

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Ajman, UAE.

Supervised by:
Dr. Maher

ABSTRACT

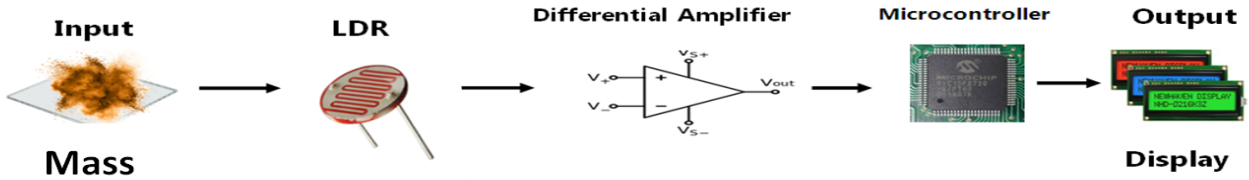
Photovoltaic (PV) panels convert sunlight to electricity. These panels are covered with a glass plate to protect them from external elements. However, the glass plate is sensitive to dust from the environment, and with time, the accumulation of this dust affects the efficiency of the solar panel. Once the panel is covered with dust, less light penetrates through the glass. Therefore, penetration of less light leads to the generation of less energy, thereby the reduction of the efficiency of the solar panels. This project helps in saving PV cell holder's time, money and effort.

Introduction

Photovoltaic cell dust mass monitoring project is used to measure the mass of the accumulated dust on a PV cell and monitor the dust mass, in order to maximize the efficiency and the energy output from the PV cell panel. Initially, the mass of the accumulated dust is measured and displayed on an LCD, and then according to the amount of dust accumulated on the panel, an LED is switched on to alarm the authority if the surface is needed to be cleaned. Monitoring technique follows the traffic light rules, that is:

- When the accumulated dust measurement is in the safe range (not affecting the output efficiency), a green LED is turned on,
- When the accumulated dust is affecting the efficiency of the panel in a small scale, a yellow LED is turned on,
- When the accumulated dust is affecting the efficiency of the panel in a large scale, a red LED and a buzzer are turned on.

This monitoring technique saves the time and effort of PV cell holders.



Project implementation uses simple electronic components such as LDRs, microcontroller, and LCD display. Initially, the resistance of the LDR in the presence of dust on the surface of the PV cell is inputted to the differential amplifier, which is compared to the resistance produced by the LDR when the surface is clean. Then, the amplifier output is fed to the microcontroller for further processing. Finally, the value of the mass of the dust acquired from the microcontroller is displayed on an LCD display. The value of the dust mass is further used for the monitoring of the PV cell efficiency.

Autonomous Brain-Controlled Wheelchair

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ABSTRACT

A physical disability is one that causes the immobility of one or more limbs of a person. In most cases, aiding devices such as crutches, manual, and electric wheelchairs are used to enhance its users' quality of life. In other words, it allows the disabled person to become more independent. However, even the most advanced, accessible, and useable of such equipment, the electric wheelchair, does not accommodate individuals living with severe disabilities. For instance, in extreme but very plausible cases, a person may become incapable of using all four limbs; hence, incapable of operating joystick controllers attached to the electric wheelchairs currently found in the market. According to the World Health Organization (WHO), 10% of the world population is in need of wheelchairs. However, the WHO does not provide the number of people who are in need of wheelchairs yet incapable of using one. Unfortunately, this is an indication that there is a great, often overlooked, need to accommodate and increase the autonomy of people living with such severe disabilities. The only data that was found is from a study conducted in the United States that found almost 40% of people that request wheelchairs from rehabilitation clinics are deemed unfit for its use due to different factors such as the poor motor functions and sensory impairments. For this reason, those who are disabled would require the constant help and monitoring of a caretaker, who is mostly a paid employee. Their lives also become filled with a number of limitations such as societal, educational, and most importantly psychological.

The only most advanced solution that is found in the market is the electric wheelchair, and any other solutions are only found as research proposals in academic journals. However, the optimal aiding device for people with severe disabilities would be a modified version of the existing electric wheelchairs that can be operated without a joystick controller.

That is why, the proposed solution is to create an autonomous brain controlled electric wheelchair. In other words, the wheelchair user's brain signals are read, analyzed, and utilized as a control signal in order to enable him or her to move the wheelchair accordingly. This can be implemented through Electroencephalography (EEG) monitor, EMOTIV Insight headset, which consist of 5 electrodes, placed on the scalp that detect brain activity triggered by facial gestures or even specific thoughts. The readings of the EEG monitor are then transferred to a brain computer interface (BCI) that can analyze the signals and send information to an Arduino microcontroller which moves the electric wheelchair. Furthermore, the wheelchair will have the feature of an additional home assistive navigation system which, in essence, locates the wheelchair's position within the user's household using a cluster of RFID tags placed on the floor of each room. The wheelchair will have an attached RFID reader. Whenever the wheelchair passes over one cluster of RFID tags, a question will be triggered asking the wheelchair's user where he or she wants to go next. Then upon the user's desire, the wheelchair will move to another RFID cluster corresponding to a different room.

Air Quality Monitoring in UAE using UAVs

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Supervised by:
Prof. Ali Abou-Elnour

ABSTRACT

Air monitoring is a very important process in many places, it is very helpful for those who concern about environment and air quality. Measuring the air quality in UAE, which is known for its efforts in renewable energy and eco-friendly projects, is very effective procedure so we can adjust the greenhouse gases by many ways.

The Greenhouse effect is caused by the function of greenhouse gases in the atmosphere. Primary greenhouse gases include carbon dioxide (CO_2), methane (NH_4), nitrous oxide (N_2O), water vapor (H_2O), and ozone (O_3), each gas has its normal concentration in the atmosphere that will keep the greenhouse effect at normal levels. Human activities such as use of fossil fuels has increased the amount of greenhouse gases in the atmosphere, this may affect on the earth and cause what known as the global warming which makes a lot of changes in our system like Climatic phenomena. A lot of human activities which emit the greenhouse gases may cause many harmful effects on the earth in the future, so we should monitor and restrict the emissions of these gases from human activities. And our project is very efficient because we can monitor the air quality continuously in places which we can't reach easily.

In the present work, an accurate and efficient air monitoring system using Unmanned Ariel Vehicle (UAV) has been designed and implemented. The system is designed to be able to monitor air quality at height that is not easy to be reached by conventional monitoring system. Our system is capable to continuously measure and send the data to a local monitoring unit through wireless communication system. Moreover, the system is capable to record the measured data to allow continuous monitoring in regions where wireless communication is weak and not existing.

The system consists of a microcontroller based monitoring unit mounted on the unmanned aerial vehicle (UAV). The mentoring unit consists of microcontroller (control unit), air quality sensors and storage device. In the present work, we choose Arduino microcontroller because it is easy to find its compatible hardware in the market, it is simple to integrate with other hardware and software, and it is easy to create a user friendly interface with it. Sensors are playing important roles in emerging pervasive computing technologies that are required for the efficient realization of monitoring and controlling systems. Effectively, sensors are essential to collect the air quality data has been chosen due to its sense to certain gases and its accuracy. The system accepts all kind of sensors and physical-electrical transformation functions. The storage device (SD) ensure that all measured data are recovered and this will allow efficient and accurate air quality monitoring even in regions with weak or with no wireless coverage. And it has to be mentioned that the system is made by using commercial that yet accurate components to allow for a further development to fulfill different users' requirements. Finally, we have taken our measurements in different heightsusing the system as shown in table 1 below.

Table 1: The measurements of different parameters in different heights on Tuesday 14/2/2017 at 3:00 pm (latitude: 25.133027, longitude: 56.293559)

Height / Meas	Humidity (mb)	Pressure (%)	CO_2 (ppm)	CH_4 (ppm)	O_3 (ppb)
0 m (Ground)	32.00	1011.49	413.21	938.46	82.00
110 m	40.00	997.43	380.00	808.31	80.00
200 m	43.00	988.22	307.60	759.50	77.86

Water Quality Monitoring in UAE using UAVs

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Supervised by:
Prof. Ali Abou-Elnour

ABSTRACT

Measuring the quality of the main element of life is very important, water quality monitoring means a lot to those who concern about geographic In UAE, there are a lot of wells and other water resources, and according to that, the water quality monitoring is very important process economically to measure the quality of different areas to know exactly the quality of the water, then we can categorize these different areas according to its quality to do some useful projects like building a desalination station.

We have a lot of water sources in the Arab countries, like for example the Arabian Gulf. But the water quality in the closed water areas is decreasing, so measuring the quality regularly and accurately is very important. Measuring the quality accurately by the traditional ways using conventional sampling and laboratory-based technique is difficult and expensive. Additionally, this way does not cover the needs of the country because of the few number of the water maps in UAE. And here, we should mention Dr. Zein El-Abedeen[1] in Ajman University who has created the first water map of Ajman and he is the only reference in that.
In the last decade, intelligent monitoring systems were introduced by utilizing the achievements of research efforts in enhancing sensor and network capabilities, communications technologies and data delivery formats. For example, wireless sensing systems offer the potential to reduce the system cost considerably.

In the present work, an accurate and efficient water monitoring system using Unmanned Ariel Vehicle (UAV) has been implemented. The system is able to test the water quality and to get the preliminarily results which show that it can be efficiently used for on-shore and off-shore water quality process. The system is capable to record the measured data to allow continuous monitoring in regions where wireless communication is weak and not existing. It has to be mentioned that the system is made by using commercial that yet accurate components to allow for a further development to fulfill different user's requirements.

The idea of the project includes the ability of implementing a system which can measure salinity, conductivity, TDS, and gravity of the water as shown in figure 1. This project could help the society to make the first water map in Fujairah and to select the most appropriate place to build the desalination station with a high efficiency of work. We can explain this according to the ease of the work of the desalination equipment if the water is low salinity, because the equipment will not do much work as if the water is very salty. So, the Sea with low amount of salt gives a good result with low energy, less pollution, and less cost.

Reference [1]: Water sources in the United Arab Emirates, Dr. Zein El Abedeen Rizk & Dr. Abdul Rahman Sultan Al Sharhan, United Arab Emirates University Library, Al-Ain, United Arab Emirates, 2008. (Arabic Book).

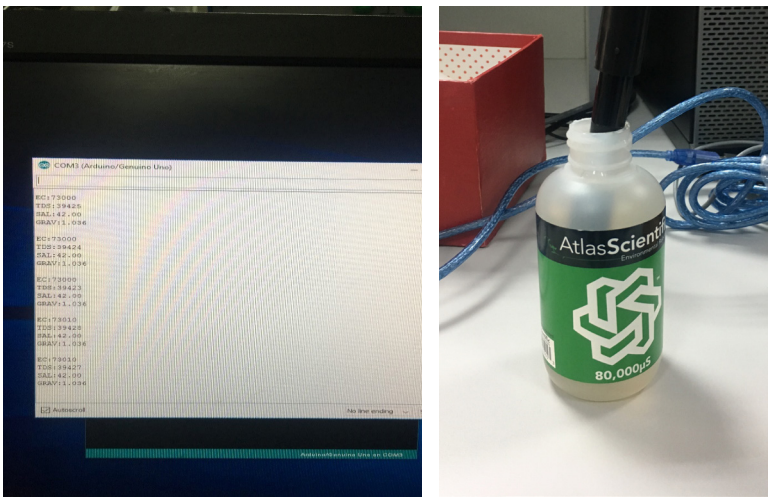


Fig. 1: Water Conductivity kit and its measured values shown in Arduino Uno program

Using Calm Computing to Improve Smart Homes

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Dr. Eleana Kafeza

ABSTRACT

"Don't fix it if it's not broken" is a saying for when something is working adequately. What if there is a room for improvement? A technology we over pass has been there for many years, it just needed us to focus the light on it. Recently, calm technology has been introduced so that it improves the relationship between technology and humans. Calm computing means to lessen the "excitement" of data over-burden by letting the client select what data is at the focal point of their consideration and what data is peripheral. Especially now that our obsession with technology is increasing, things need to be taken in measures. In this paper we consider how calm technology is missing the element of "synchronization", and how this element can offer to humanity, If it were to be implemented?. In our research, we plan to find ways to implement calm computing in the context of a smart home, where smart devices will synchronize utilizing real time indicators like temperature, noise, user preferences etc. In our research, we introduce a standard for designing smart devices, where each device will be equipped with a range of possible modes of operation with different associated degree of calmness.

In a smart home, devices are connected through Internet Of Things (IoT) technology. In our research, we will develop algorithms for synchronizing the connected devices intelligently so that all the devices are connected while applying calm computing principles. For example, the system can check in real time the users mood via his/her mobile, through social media posts or the users location, and can decide upon the intensity and configuration of the housing lighting. A synchronization algorithm can also synchronize the lighting with music and the volume can be further synchronized based on the current level of noise, the users preferences and schedule, the mood as extracted by the current social media presence etc. All of this contributes in making a smart home even smarter and calmer. Calm computing aims to make the clients happy and keep them in a calm and happy environment.

Introduction

In this day and age, technology is evolving so rapidly that we can't keep up with it. Our role as computer scientists is to understand technology relationship to us, as it keeps on impacting how we live our lives. Calm computing started as a vision by Mark Weiser who explains the principle as *"that which informs but doesn't demand our focus or attention."*[1] Case adds to that ….. more definitions of calm computing.

Calm computing is implemented in many aspects of life. We can find calm computing all around us, for example in videoconferences where communication sometimes is carried out as gestures and expressions, this allows peripheral information to be gathered [3]. Also, inner office windows allows outside people to know whether the person inside the office is busy or not [4]. The main focus of this research paper is the use of calm computing in smart homes, and how it can be improved by using synchronization and variability.

Galactic Maneuvers: iOS and Android Mobile Game

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Supervised by:
Dr. Marwa Sharawi

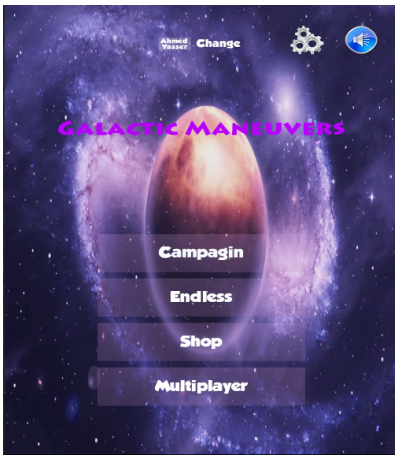
ABSTRACT

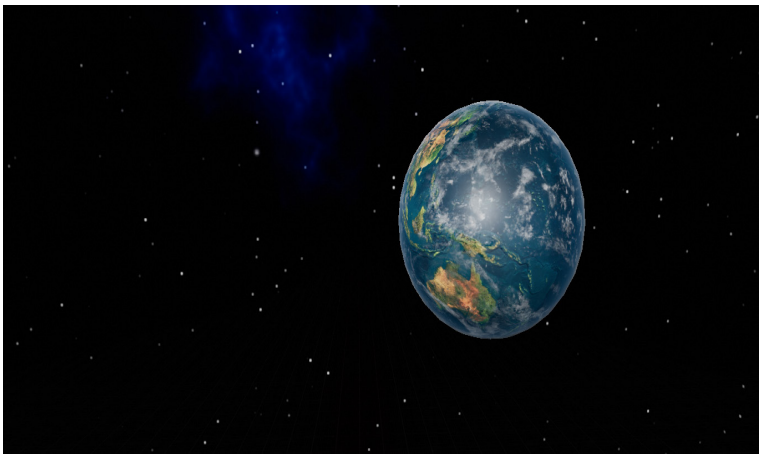
Galactic Maneuvers is a cross-platform *for IOS and android* mobile platforms. It is a third person perspective type of game: "*A type of game Perspective in which you can see the player character moving in front of you on the screen and control their movement and actions*". The game falls under the category of Runner games: "*A game category by which the game character runs along a path collecting gold coins, gold magnets, crystals and other game objects to achieve high scores and compete with other previously high scored players*". "Galactic maneuvers" is inspired from a famous game called "Subway Surfers".

The contribution of this project focuses on recapping the endless runner game with different perspective. It transforms the mode of the game from single to multi player and adds a challenging dynamic (interactive) environment to the game. The project has two new features; game story, multiplayer. In "Game Story" the player must complete the game levels in order to finish the story. In the multiplayer feature two players on separate mobile phones can compete with each other locally through LAN or widely through WAN by three different multiplayer modes (highest number of gold collected wins, highest score wins, last one to die wins). The game is taking place in outer space in the Milky Way galaxy; the player must travel across the nine planets in order to complete the game, the game also has an endless game mode by which the game character runs endlessly until he dies and then the score is calculated and compared to other player scores. The game also has a shop where you can purchase in-game items (e.g. jet packs) or upgrade existing items using your collected gold. However, some items can be purchased only using real money.

The development of Galactic Maneuvers is built by "Unreal Game Engine". The project started by developing the GUI for the game main menu using unreal game engine for coding and Photoshop for the graphical work. Then the space environment for game levels along with the solar system planets and the collectable objects; Gold coins, Magnets for gathering coins, Boosters, Obstacles, shield for protecting game characters from obstacles; were developed using 3DMAX and unreal engine. Characters were developed using Maya and blender software's for modeling and Photoshop for texturing and mocap and device for animating them. The multiplayer system was developed using unreal game engine by using the engine technologies to enable the LAN connections and a server to enable the WAN connections.

Galactic Maneuvers enriches the classical "Subway Surfers" game by adding the multi-player mode, portability and boosting player's creativity.





The Harvesting Robot

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Supervised by:
Dr. Mohammed El-Abd

ABSTRACT

Harvesting in greenhouses needs a large number of workers to pick up the ripe crops. Manual labor causes money loss if they do not pick up the crops once they are ripe. In our region, workers face many obstacles; one of them is the poor climatic conditions that prevent them from doing their job effectively. Moreover, greenhouses' owners spend part of their production money on the labor's salaries. Many people who have home gardens prefer not to bring a harvester to pick the crops from their home to protect their privacy.

The harvesting robot is a robot that is created for harvesting fruits, such as tomatoes or strawberries in households and greenhouses. The project aims to protect the privacy of people who have their own gardens at home, and they do not want to hire workers to harvest the garden's crops. The weather in Kuwait is very hot, which prevents the harvesters from working the whole day. Therefore, in big greenhouses, if the worker does not finish harvesting on time, the fruits become rotten, which causes wastage and money loss. Therefore, using the harvesting robot, shown in Figure 1, is an excellent solution for harvesting in hot weathers like in Kuwait. The robot picks the fruits that are ripe enough without causing any damage to the surrounding, and leaves the ones that are not ripe yet. The robot has a pixy camera that identifies ripe fruits using color detection and returns its coordinates. After that, the robot picks the ripe fruit and places it in a basket. In addition, the robot picks the rotten fruits and places them in a different basket. The achieved harvesting rate of the robot is two fruits per minute. The robot repeats the previous steps until there are no ripe or rotten fruits left on the tree or until the boxes are filled.

The Harvesting Robot can empty the full boxes when one of the two baskets of fruits is full; this is done using a reflective IR sensor. Furthermore, the user is notified when the harvesting process is completed.

The harvesting robot does not have any side effect or harm on the environment. The robot does not emit any harmful gases or smoke which protects the environment from being polluted. The batteries that are used for the harvesting robot can be recycled. If we recycle the batteries, we will have some advantages, such as saving natural resources, and reducing pollution. Thus, the harvesting robot is environmental friendly. Moreover, the harvesting robot can be recharged using a solar cell, which makes the robot lifetime longer.



Figure 1: The Harvesting Robot

Brain Computer Interface Guiding Alzheimer's Patients in Muslims' Prayer

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ABSTRACT

Alzheimer's disease (AD) is a chronic disease that affects the brain. AD affects short-term memory, and an impaired ability to concentrate. Thus, the patient needs others' help in all things in his life. Especially as Muslims, it is difficult for the patient and those around him to guide him in his prayer since he needs to concentrate and present his memory during it. From this standpoint, we proposed to use Brain-Computer Interface (BCI) headband that can detect the level of attention to help AD patients.

We defined a system to measure the attention by using insight 5 channel EEG and recording the movements of prayer opening (Takbir), bowing (Roko) and prostration (Sujood) by using the electrical brain signals for each extracted movement from the headset. It will help if the system observed the decreasing in attention's level, the patient will be directed phonetically to next move depending on the previous movements that have been recorded. Classification electrical brain signals of prayer movements are the heart of our understanding of this project. The first step of the process is to build the dataset of the prayer movements by starting with the extraction of the electrical brain signals of those movements which is known as the Electroencephalography (EEG) from the active channels on the headset which are (GyroScopeY, ACCX,and ACCZ) as shown in the figure below. And then filtering these signals from the noise, then after that extract the required features using fast Fourier transform (FFT) algorithm in order to get the final form of the EEG representing the movements. After getting the dataset, we will be able to detect the movements of the patients and then comparing them with the dataset and classify them by the classifier.

Getting the determined brainwaves accurately, and thus classify the intention movement brainwave signals is the main challenge in our study.

The last aspect of the problem would be the features selection and extraction, where there are several methods which can be used, but with different results. Our goal is to get the best classification and features those could be afforded by the limits of BCIs. EEG waveforms are the capturing of the brain's electrical activity over a period of time. Mostly, the EEG brainwaves are used for the detection of brain's damage, anesthesia and the attention and focus of the patient. The EEG waveforms can be classified into different categories depending on the frequencies of each wave (theta – alpha – beta – delta – gamma – mu).

EMOTIV Mobile headset will be used to detect attention of AD patient and to determine the position of the patient in the prayer when low attention is detected by using EEG. The data set which contains EEG for a sufficient number of people while they are praying will be obtained using EMOTIV headset. Methods for extracting and selecting features from EEG will be used.

The importance of such systems is to help AD patients to get their attention back to complete their prayers, without the help of another person, and so AD patient can rely on himself, and this has a pivotal role in improving his psyche.

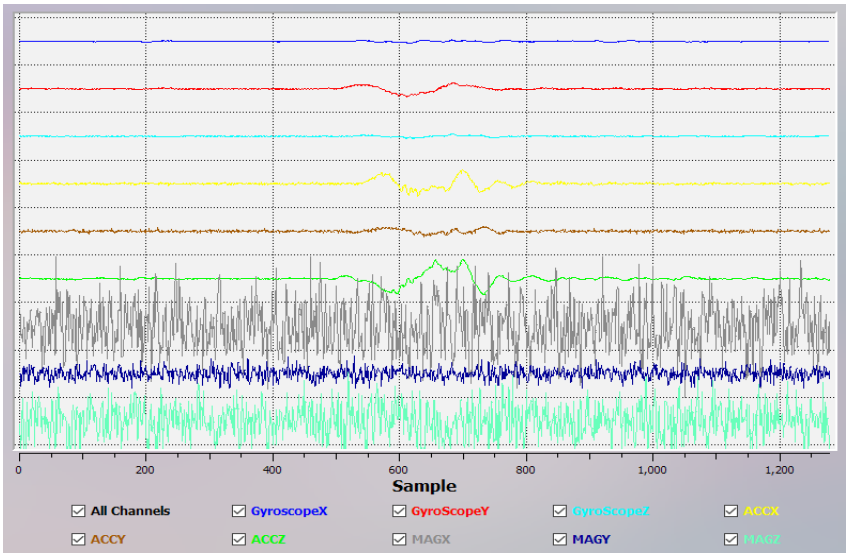


Figure 1: (Active channels recording EEG)

Medicine Prescriber Device

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Supervised by:
Eng. Rabiya Rehman

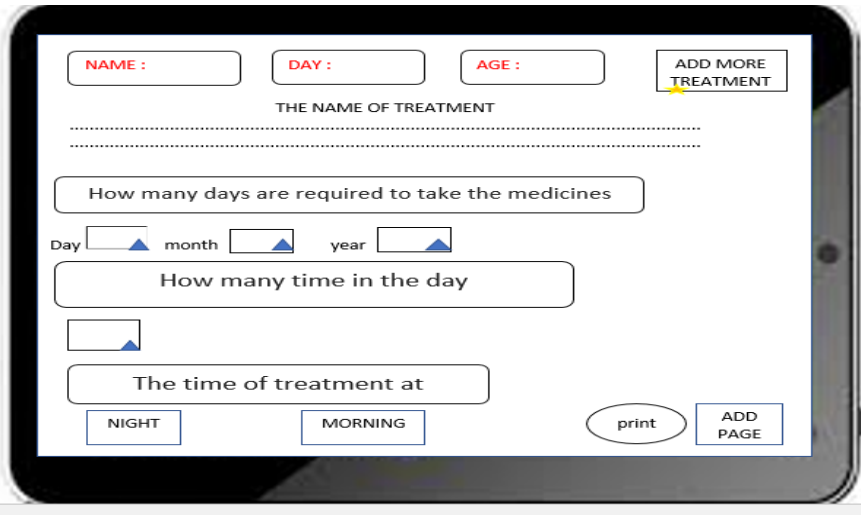
ABSTRACT

Nowadays, technology makes our life easier in all aspects of life. Especially in medical fields, technology enables knowledge that was not possible before. It helps the doctors to know more about diseases in order to provide the appropriate medicines to the patients.

Our idea is to create a special type of tablet. The tablet will help the doctors to write a very clear prescription for the patients. When the doctors hand-write the treatment instructions for the patients, most of the time it is hard for them to read.

To solve this issue, our proposed tablet contains all of the aspects of a prescription and will correct the handwriting of a doctor to avoid mistakes. The tablet works with the pen to help the doctors write easily. The tablet also has many characteristics that will be able to translate all types of medicines into language that is easy for patients to understand. Moreover, using the tablet is very simple. First, the doctor writes the name and age of the patient. Second, the doctor writes the date that the medicine was prescribed. Third, the doctor writes the name of the medicine and he gets many choices for the best treatment, all of which are generated by the tablet. Under the name of each treatment, three options about the treatment will appear on a drop down menu. For example, the doctor could write "pendulum treatment" then chose from the drop down menu how many days or months or years the medicine would be prescribed for the patient. Then from anther drop down menu, the doctor can choose how often the medicine should be taken, and he can choose the time of day it should be taken as well. If necessary, the doctor can add more medicines through the "add" icon. Another useful feature is that the doctor can select the duration of medicine intake. For convenience, the doctor can print the final prescription of medicine in an easy-to-read format.

To sum up, the main goal of our idea is to reduce medical errors involving prescriptions. This tablet design would be a convenient and helpful device for doctors and pharmacists, as well as for the patients to understand the medicines and treatments as prescribed.



High Sky Services

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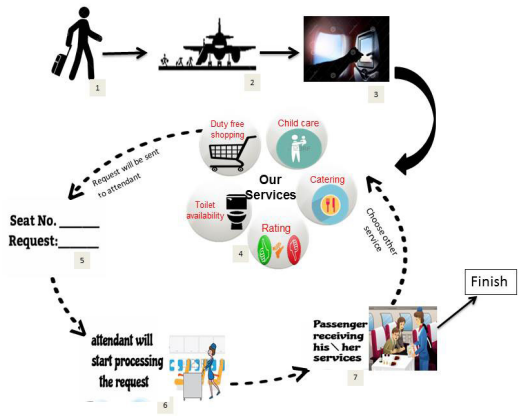
Supervised by:
Karan Jetly

ABSTRACT

Imitating the birds was the start of a revolution for developing the airline industry. At the beginning, inventing the aero plane was the main concern that occupied human minds. However, later on people start thinking how to develop the airline industry and start using it as one of the essential transportation. Then, the concern moved from developing the airline to enhance the services that can be offered during travel. As we can see, in these days the airline services have grown rapidly. In this paper we are going to explain our system HSS (High Sky Services) which can be implemented in all modes of travel like airline, buses, trains to hospitality industry which can revolutionized the way services request is made and handled. HSS (high sky service) is an Android based system that can be installed on the onboard entertainment panel and allows passengers to interact with attendant using entertainment panel. In case, there is no on board entertainment panel, the passenger can download the app in his smart device like smart phone or tablet and request for the service by tapping the icons of HSS system thus replacing the traditional call bell which till now is used by the passengers for requesting any service. Therefore, passenger can send their request via the system. The system will alert the attendant that there is a request from a certain seat number and he/she can attend to it directly instead of going the passenger seat and asking for his request. Also it can show toilet availability status on the entertainment panel instead going to toilet and finding out if it is free or not and then waiting in a queue to use it. Add to that, duty free shopping in the system is available, passenger can check if the selected item is available or not unlike where he makes a request and attendant has check the availability physically, thus reducing her effort. Also, the passenger can rate his travel experience and his feedback can be used to enhance the services. In addition, the app can calculate the time is taken by each crew member for processing the service. HSS will enhance travel experience with the improvement of communication between passengers and cabin crew. Moreover, HSS will give a good impression about the airline which will lead to better business for the airlines. It will help in assisting cabin crew for giving better services which will reduce job stress and it will decrease job shift .HSS is not only can be used for airline but it can be implemented for other luxury transportations and hospitality industry, Hence it has huge market potential which can create huge impact.

HSS will work as the following:

1. Passenger is ready to travel
2. Passenger is taking off
3. Passenger will start using HSS
4. HSS services will be available for the passenger, he should select the required one
5. The passenger request will be sent to the crew attached with the his seat number
6. Crew will start processing the request
7. Passenger will receive his request



AirUino: Public Transportation Pollution Sensors

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L. Noura Alhakbani

ABSTRACT

Air is vital for life and nature; all humans and livings consume air. Air could be polluted and that negatively affects human beings health specifically and nature in general. Good air quality refers to clean, clear, unpolluted air and healthy to breathe. To assess the air quality; air pollution levels has to be measured and assessed. Measuring is important to understand the status of the air and plan different measures to improve air quality.

Air pollution can result from both natural causes, such as; dust, forest fires, volcanic eruptions, wind erosion, pollen dispersal, evaporation of organic compounds and natural radioactivity, as well as human activities such as; increased traffic flow, burning of coal or wood and chemicals released by spill or underground leakage. All these factors put stress on humans breathing process and threaten our planet.

In this project, we aim to build a system as presented below in Figure 1 that consists of air pollution sensors mounted on public transportation vehicles. The pollution measurements are displayed locally in each vehicle to the passengers through 3D indicators. Moreover, pollution measurements are sent to the server where it can be visualized to the mobile app users through maps and graphical charts.

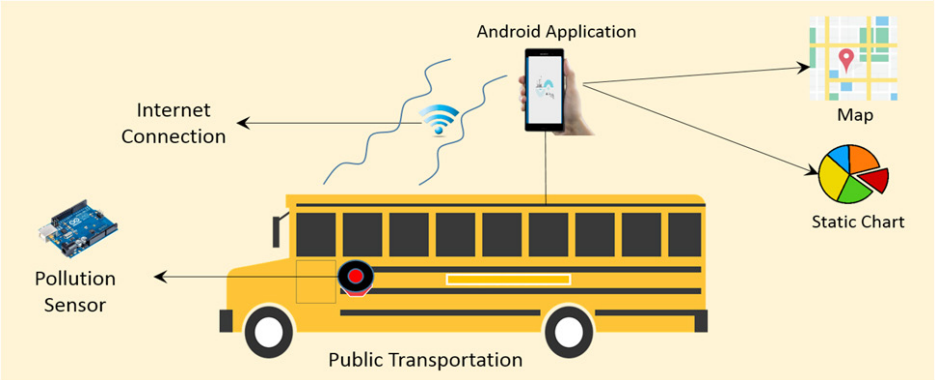


Figure 1: AirUino System Architecture

In this project, our goal is to raise people awareness about the amount of pollution in the air to help them make informed decisions. Mounting the sensors on moving vehicles is cost effective; since a small number of sensors measure air pollution for a large geographical area. Besides, 3D indicators visualize readings to the passengers which help in attracting a wide range of people's attention, therefore, raising more awareness to air pollution's magnitude.

Game-Based Learning: An Effective Learning Approach in Computer Science Curriculum

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ABSTRACT

In the modern world of information and computer based technology, there is a continuing need for skilled technical professionals to fill job positions in this dynamic and ever-changing world. Yet it is interesting to note that many undergraduate university students are reluctant to major in a Computer Science curriculum. There are reasons that can account for this but one reason is that there is a fear barrier that must be overcome. This can be related to a misunderstanding that Computer Science is primarily about programming, without considering the vast range of activities and skills of all sorts that are needed in this complex and expanding field.

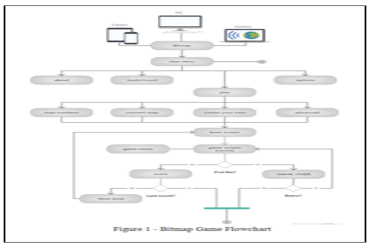
The misunderstanding and reluctance can be resolved easily in primary and secondary schools so that maturing students can make a more informed decision regarding a future career. A preferred approach would consist of introduction to computers and related topics such as information processing and data management. The different aspects of this critical area can be attractively introduced in the educational curricula to give a full picture of the field and how it is a dynamic and exciting area to work in that is central to the future of society. In this regard, Game Based Learning tools have been studied and seen to be an important way to introduce and teach concepts that stimulate further study and work in the Computer Science field.

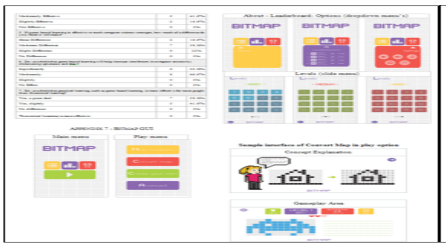
The overall problem that needs to be resolved is to encourage larger numbers of students to become interested in the field of Computer Science and pursue a career in this broad, dynamic, and critical field that is essential to the modern world. A relatively modern approach and tool to potentially solve this problem is called Game Based Learning. The concept of Game Based Learning is a stimulating area of research and work. This is an area that must continually evolve and grow to meet the expanding scope of computer science as we proceed into the future using its key tools to expand possibilities and capabilities.

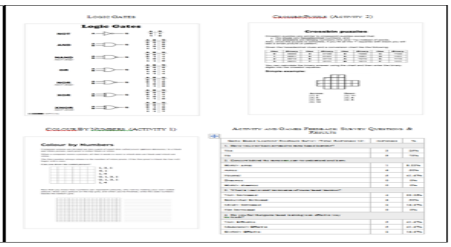
The motivation to pursue this area of research is to increase learning capabilities in the field of Computer Science and to gain greater understanding of Computer Science based learning methods and techniques. Another important objective is to assess and analyze what the strengths of Game Based Learning are as well as what the weaknesses are so that maximum benefits and insights can be realized by using this learning tool.

This paper looks at the concept of Game Based Learning (GBL) in the context of stimulating interest in the field of computer science education. In contrast to theoretical learning, GBL is a practical learning approach that is meant to be enjoyable. The objectives of the research are to determine further insights into Game Based Learning and to assess whether or not Game Based Learning is an effective educational tool in the field of Computer Science. Another important objective is to assess and analyze what the strengths of Game Based Learning are as well as what the weaknesses are so that maximum benefits and insights can be realized by using this learning tool. The data is gathered by constructing the structured questionnaire and experiments are done on the controlled sample set of students.

Finding of this research shows that it is effective in transferring knowledge, enhancing learning, and providing enjoyment in the process of stimulating more students in computer science than just the theoretical approach. Feedback from learners has been positive along with demonstrated results. A proposed game model is included to provide visual context for GBL. Accordingly multiple activities are conducted to derive the reliable conclusion.







A Modified DNA Steganography Technique Using Playfair Cipher, Substitution and Insertion Techniques for Better Security and Hiding Capacity

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ABSTRACT

The rapid development in network technologies today raises the demand for safe data transmission. Recently, the advances in biotechnology has proven the capability of DNA to store huge amount of data. Merging between information security and biotechnology, DNA steganography techniques emerge as a promising solution for both data storage and secure data transmission. DNA steganography is simply the art of hiding data in real DNA sequences where the resultant sequence is almost indistinguishable from the original one. The parameters for any DNA hiding technique is a key used for hiding, and a reference DNA sequence, which is a real DNA sequence used as a data carrier. In order to guarantee correct data extraction, both parameters must be shared between the sender and the receiver.

The most recent approach in DNA hiding techniques proposed a new algorithm based on substitution and insertion methods where the message is substituted with the reference DNA sequence and then the resultant sequence is inserted in the reference one. Therefore, only the key is shared, since the reference DNA sequence is hidden. Although this technique is considered to be better than all the previous approaches since the reference sequence was not sent separately and as a result the security level is increased, but on a practical basis this modification made the resultant DNA sequence even more suspicious. It increased the length of the resultant DNA sequence by 100%, where this increase ensures its maliciousness. Moreover, this approach used a DNA-based playfair cipher as a pre-processing step to increase the security as well. This encryption technique adds some header bits to guarantee correct decryption, where one third of the encrypted DNA sequence is reserved for these bits, and therefore suffers from a low hiding capacity which is 1.5 bits per nucleotide. This is in addition to redundancy in the preprocessing steps that lead to an increase in the processing time resulting in high time and computational complexity.

In our project, we propose an enhancement on the current approach to increase the security level, maximize the hiding capacity and decrease the time complexity as well. Our algorithm works on three phases. Firstly, the data is encrypted using a modified DNA-based playfair cipher named DNA-based 4x4 playfair cipher, where the need of adding header bits is removed and therefore the hiding capacity is maximized to 2 bits per nucleotide. Moreover, the use of the modified DNA-based 4x4 cipher eliminates the need of the redundant processes and as a result the time and computational complexity is decreased. Secondly, the substitution method is applied followed by the insertion method, where the reference DNA sequence is hidden within the resultant fake DNA sequence. Thirdly, the resultant sequence is divided into two equal segments that are composed of non-sequential DNA bases. The sender sends the first segment of the fake DNA message, and only if the recipient receives it safely, then the sender can send both the key and the second segment afterwards through a secure channel.

The proposed technique guarantees a secure transmission process, since the sent sequences look relevant in sequence and length to the normal real DNA sequences. Moreover, if the attacker suspects the first-sent DNA sequence, they will never receive the key nor the rest of the DNA message and hence full data extraction is nearly impossible. Additionally, the use of the modified DNA-based playfair cipher maximized the hiding capacity and time performance. We implemented the algorithms of the current technique and our enhanced one using .Net platform and MATLAB, where the conducted comparative study confirmed the effectiveness and outstanding performance of our proposed technique over the current one.

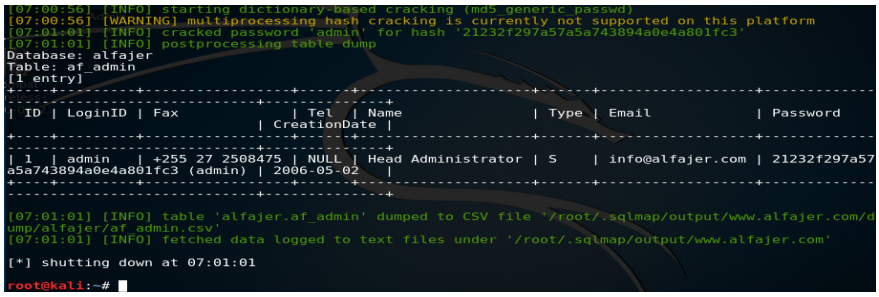
Demonstrating SQL Injection Attack using SQLMap

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Zayed University, Abu Dhabi, United Arab Emirates

ABSTRACT

SQL injection is a type of attack where a hacker exploits a vulnerability of a website by injecting malicious SQL commands though a page input. It can basically ruin a website's database and expose its security to danger. It could be used to steal sensitive information from the database, be in control of the website, delete or alter information in the database. SQL injection is actually classified into three categories, In-band, Inferential and Out-band. In-band SQL injection is the easiest and the most commonly used SQL injection. It is where a hacker launches the attack and gathers information using the same communication channel. There are two methods of an in-band SQL injection, error-based and union-based. An error-based SQL injection is an attack that relies on errors from the database server when supplying an SQL statement with an improper input. This could be performed either directly via web browsers or terminal commands using a Kali Linux tool called 'SQL Map'. Kali Linux is a security-focused operating system that is ideal for security evaluation or penetration testing. For that, we installed Kali Linux and used it via the virtual machine 'VirtualBox'.

In a live demo, we will implement an error-based SQL injection using the 'SQL Map' tool. We will explain how Google Dorks -strings or keywords that search engines use- can be used by hackers to determine flaws and vulnerabilities of websites to help them perform SQL injections. We will also demonstrate the steps used in the SQL Map tool to retrieve data from a vulnerable website. To do that, we first retrieved all the available databases of the website using a single command that contains the vulnerable page link. Second, we listed all the tables inside the targeted database using also a special command that contains the name of the selected database. Third, we extracted entries from the desired table, which contains all the valuable information.



Consequently, hackers can use this tool to find extremely sensitive information in the website entries like the login information, where given admin username and password can be used to log in to the website as an administrator. However, some websites have their passwords hashed, which means a plain text password is transformed into a long cryptic string. For that we used a technique to crack hashed passwords and that is by first identifying the hash language using another Kali Linux tool called 'Hash Identifier', and then using an online decrypting tool to convert the hashed password into plain text. Finally, we will demonstrate an easy way to find the admin login page of the website using only Google Search. Furthermore, retrieved login information does not only mean usernames and passwords, they could also include emails, telephone numbers, fax numbers and basically any private information a website had collected from its members. This means that SQL injection does not only threaten websites, but also leads to privacy violation and further attacks against members of the website. Since this could harm both website owners and individuals who use and trust these websites, we think it is important to raise awareness of SQL injections amongst the general public and suggest countermeasures that can be implemented. Some of these countermeasures are to have prepared statements, monitor for attacks by using different Intrusion Detection Systems, block attacks by having database firewalls and probe for vulnerabilities by manually testing penetration.

Arabic Speech Recognition Training for Visually Impaired on GPS

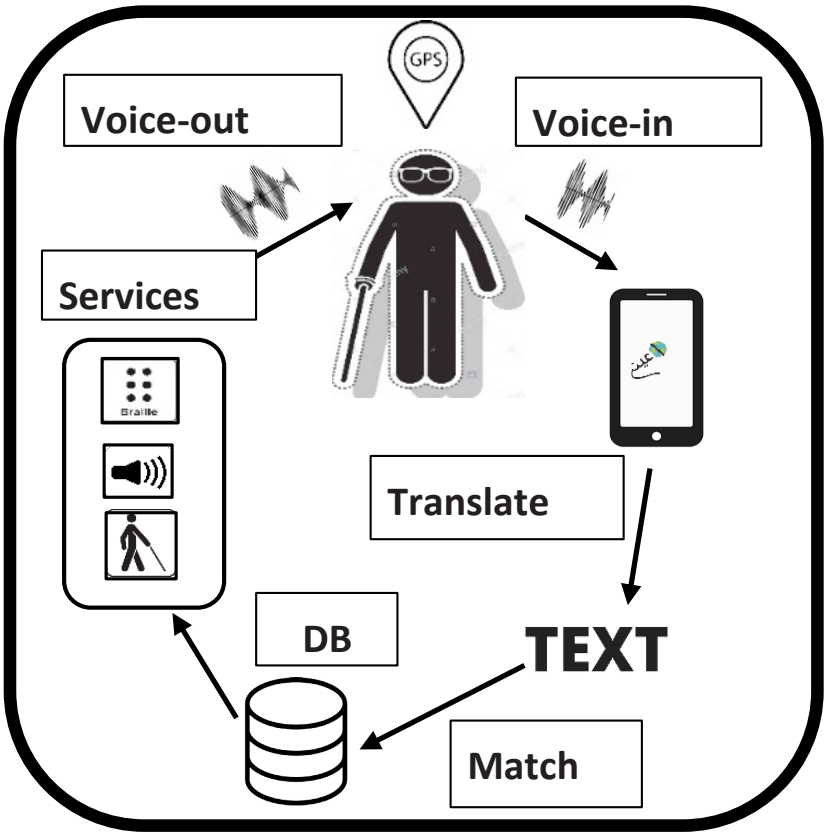
Roaa Kordi , Sara Al-Rashoud , Lamya Alaqeel, Siwar Rekik , Amjad Alofaidly
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ABSTRACT

Recently, Automatic Speech Recognition (ASR) or Speech Recognition (SR) technology has a large impact on many aspects of people's live. It has been the primary tool for communication for people with special needs such as visually impaired people. Many SR projects deploy different languages when using the SR software. Arabic language researchers in SR is still limited comparing with other languages due to the language challenges such as different accents and the morphological complexity. Therefore, this project is an android mobile application using Sphinx toolkit as an Arabic ASR system that supports visually impaired in their daily movement outdoors.

The concept of helping those people for gaining knowledge about different services available to them in the location they planning to visit. This goal can be achieved using*Google map API* tool to customize the map to specific locations to be define in a local database that providing facilities such as voice facilities, Braille language and accessibility.

As the application is design especially for blind users, Therefore, all the interaction will be in a form of voice. Before the user speak to the application, the application will request the user current location. After the speech in being entered through microphone (voice-in), it will be analyzed unit by unit via HMM model then look for a match word in the Arabic dictionary of the training model. If the pronounced word is recognized, it will be converted to a text and will be spelled out (voice-out) to ensure result correction and locate the same word with a match word entry in the google map database to get the location information of blinds services and spell it out to the user. The project application will be based on Hidden Markov Models (HMM) modelling algorithm for text dictation. Therefore, the SR model will use Sphinx toolkit which is based on the HMM. The application will take the advantage of *Sphinx4* version that is written in java and can be modified. Also, there is *Sphinxtrain* that provide training tool for acoustic model. Our project consists of reducing the gap between the society environment and visually impaired people and will also focus on enhancing the research field for the Automatic Arabic Speech recognition (AASR).



Multi-UAV Task Allocation in Search and Rescue Missions for Flooding Disasters

Alreem Almuhrij, Hanan Alotaibi, Hayfa Alshowaish
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Supervised by:
Sarah Mohammed Alhassan

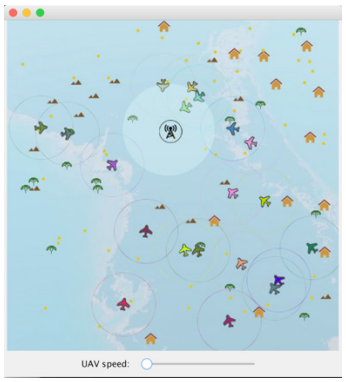
ABSTRACT

Death tolls from flood disasters have been increasing all around the world due to the late response. As a matter of fact, accelerating the search and rescue missions can save people's life. However, one of the biggest obstacles - when such a disaster occurs - is that human or ground transportation cannot reach the flood sites. To overcome this issue, rescuers can rely on Unmanned Aerial Vehicle (UAV), which is an aircraft without a human pilot on board capable of performing missions that are considered unsafe or difficult for humans [1]. Obviously, by using UAVs, the chances of locating survivors will increase and a response team can be dispatched as soon as possible.



Recently, many researches have been carried out on multi-UAV in militaries and disasters [2] [3], but none of which focused on using it in search and rescue missions in the events of a flood using flood heuristics. Thus, the main aim of this project is to find a reliable solution that maximizes the number of survivors in the event of a flood within a certain time frame.

The proposed project focuses on developing a simulation environment that imitates real flood disaster programmed specifically for multi-agent UAVs in search and rescue missions. In fact, one of the greatest challenges facing researchers in this field, is deciding how to allocate the search and rescue missions over multi-UAV efficiently to fulfill the urgent need to rescue the people who are most in need when a disaster occurs which is classified under the NP-hard problems where finding an optimal solution in suitable time is significantly complex. As a consequence, this project implements and compares - in term of the number of survivors - two different decentralized algorithms, max-sum algorithm and auction algorithm, in which the UAVs are coordinating.



In order to get the best results, some heuristics observed from the real flood disasters were taking into consideration while implementing these algorithms to enhance their performance. Finally, the project will enable the user to test the algorithms on their preferred scenario including, the number of UAVs, survivors, trees and many other parameters through a Graphical User Interface (GUI) to enable an efficient and friendly user interaction with the system which is not found in the literature, to the best of our knowledge, with simple parameter settings.

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NFC-Based Attendance and Routing School Bus Framework

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Supervised by:
Sarah Mohammed Alhassan

ABSTRACT

Students all over the world need safe transportation to go from home to school and vice versa. In Saudi Arabia, the status quo of managing the attendance and routing of school buses has shown several incidents which ultimately affected the student's safety. The incidences are a result of careless checking of the students when they board or leave the bus, accordingly they may get trapped in the bus causing them to either fear or die of suffocation as shown in [1-4]. In Saudi Arabia, to our knowledge, the routing process of the buses is done using manual, trivial methods which waste cost and time.

The proposed project (Safe Bus) aims to address the previously stated problems by enhancing the school bus service in Saudi Arabia. This project is developed to manage the attendance and routing of the school buses via employing the use of Near Field Communication technology (NFC), a short-range wireless technology with high frequency that allows communication between two NFC enabled devices occurs at 13.56 MHz frequency [5], smartcard to manage the student's attendance, and distributed databases that assures the system availability. Also, it utilizes metaheuristic algorithms, Simulated Annealing (SA) and Ant Colony System (ACS), to find a route for the bus dynamically based on the attendees which also minimize the total distance taken by the bus. The SA algorithm is imitating the process of heating metal in a high temperature in order to reform or reshape it and gradually be cooled [6]. The ACS is a variation of Ant Colony Optimization algorithm that is inspired from the nature of the ant's behavior when it searches for food and mark the path with a chemical signal called Pheromone [7]. Further, routing is considered as a Traveling Salesmen Problem (TSP) which is an NP problem, thus finding an optimal solution in suitable time is a difficult task. Both algorithms (ACS and SA) are used in the path planning problems resulting near optimal solution in suitable time. Further, the system helps the driver to identify the total number of students inside the bus and the students who departed from the bus at any given time to avoid forgetting any student under any circumstances. Additionally, it provides the guardians with instant notification about their child status including his registration, attendance, and emergencies during the bus traveling time.

There are similar systems to the (Safe Bus) where they manage the attendance such as [8-10], but none of them support the bus routing feature. Similarly, [11] system supports the bus routing without considering the attendance. Our system was designed to support the attendance and routing of the school buses with a dynamic routing strategy based on the attendees in the bus. Further, all the systems were designed to support bus stops as final destination, whereas the (Safe Bus) supports house locations. Regarding notification, [8,10] supports attendance notifications, and [9] does not support notifications, whereas the (Safe Bus) provides notifications instantly about the students as described above.

This project also contributes by enhancing pheromone update strategy of ACS which we called Enhanced ACS. An experimental evaluation has been carried out to prove the effectiveness of the Enhanced ACS algorithm as well as to compare between two metaheuristic algorithms belonging to different categories which are population-based (ACS) and single-based (SA). The evaluation included experiments between the ACS and Enhanced ACS, SA parameter setting experiments, and stopping condition experiments. The results of the experiments showed that the Enhanced ACS that was developed by the team outperforms the ACS and SA algorithms in terms of the minimum total distance found by the algorithm, thus it is used in the framework for the routing process. The Enhanced ACS beats the SA by 2.7%, whereas it gives 0.06% enhancement compared to the ACS in large datasets. Furthermore, the stopping condition experiments showed that the algorithm finds a good solution in 15 seconds in the small problems. Up to the present time, the team has developed the first version of the system which supports the attendance, routing, instant notifications, distributed databases to increase the availability along with conducting algorithm performance experiments to select an algorithm for the routing. Furthermore, they have performed scenario based testing by covering different cases to evaluate the system performance.

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Autonomous Luggage Cart

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ABSTRACT

We often notice everyone at the airport, especially elderly and special needs people are facing difficulties in pushing heavy weight cart and carry many thing in their hands, so the airport authorities are providing an assistance to take care of them and providing services in-order to get their satisfactions and accommodate their needs.

The Autonomous Luggage Cart has been developed to follow a specific user in the airport without any manual intervention. The challenge in this project is to implement a tracking technique without Global Positioning System (GPS). We combined ultra-high-frequency Radio-Frequency-Identification (RFID) tag reader along with the Inertial Measurement Unit (IMU) and Ultrasonic sensors to develop our Indoor Tracking System. The user of the cart is recognized using RFID tags. The IMU sensor with 9-Degrees of Freedom is used to define the orientation and the direction of the user, and the ultrasonic sensor is going to measure the distance between the cart and the user. The cart will measure the luggage weight and display it immediately on LCD placed on the cart, once the luggage is loaded, also it will have a mechanism to help the user to off-loading his luggage once reaching the check-in counter. A security feature is added to notify the user that something goes wrong with the weight while the cart on pause mode, using an alarm system.



The tracking system is working as follows: Each trolley will have a specific tag differ from each other, and those tags saved on the database of each trolley. The trolley is programmed to be smart enough to recognize the validity of the tag, and after recognition, it will keep checking if the user is still within the specified range. In case valid tag is recognized, then the trolley will follow this specific user and ignoring any other users even if they enter the reading area. If the user goes outside the range of RFID (2 meters), the cart will stop following him and notify the user through Bluetooth that he is out of range. An Ultrasonic sensor is measuring the distance from the cart to the user, a distance of 0.5 meter will be kept between them during the following. In addition, there is a stop push button to stop the cart from following at any time (e.g. after finishing from counter stage). An alternative option will be added to help the user to place the trolley at the trolleys place after check-in, by controlling the trolley through a mobile application.

Finally, we admit that the tracking system which we have developed can be used in several applications, not only for the airport (e.g. medical applications, shopping carts, etc.). We believe that our project has an impact on the society where it saves users time and ensure a comfortable journey for everyone, as it gives the chance to experience luxury & technology.

Computer-Based Detection and Treatment of Stuttering

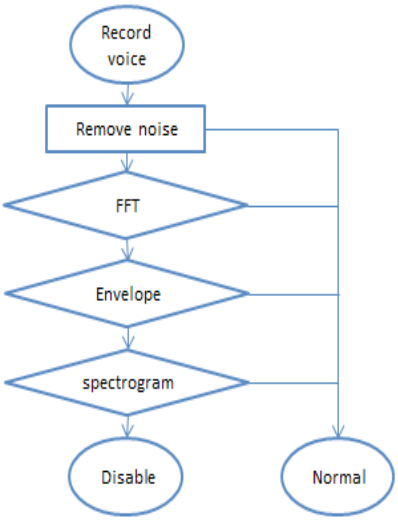
Alaa Ali, Dina Jamal, Mariam Mustafa
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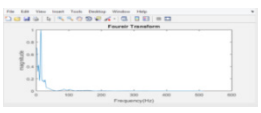
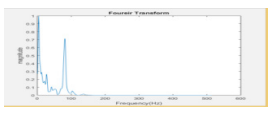
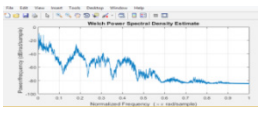
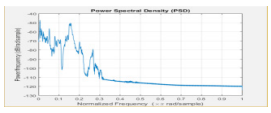
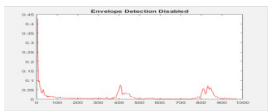
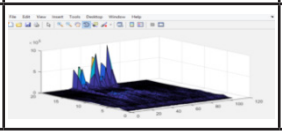
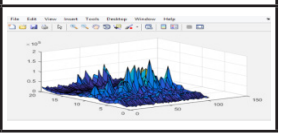
Supervised by:
Dr.Tarique Mohammed

ABSTRACT

Stuttering affects the fluency of speech. It begins during childhood and, in some cases, lasts throughout life. The disorder is characterized by disruptions in the production of speech sounds, also called "disfluencies." Most people produce brief disfluencies from time to time. For instance, some words are repeated and others are preceded by "um" or "uh." Disfluencies are not necessarily a problem; however, they can impede communication when a person produces too many of them. Early detection is important to speech disabilities, so that they can go through early treatment. However, the detection of the voice of disability in children is a difficult task due to the generation of their voice system is still to be developed. Thus, there is always a chance of error in diagnosis of disability in the voice of children. In this work we provide audio signal processing techniques in order to identify the voice of disability in different ages. In contrast to other relevant research we applied a number of signal processing techniques for the analysis of sound which envelop detection, spectroscopic, formant, power spectral density, and MFCC. We got some parameters by analyzing the number of voice samples. Then we try to treat by using repeat technique standards with those of a person naturally.

In this paper we investigated two voice samples namely pathological voice and normal voice in order to detect voice disability among children .Many researches have been conducted and many innovations have been dome in this field. But, choosing the right tool is still difficult choice. In this work we use a number of tools in order to investigate the properties of the voice signal in time domain, frequency domain, and both. By using this tools we extracted some voice features including FFT, envelope, and spectrogram.



Results	Normal	Disable
FFT		
PSD		
Envelope		
MFCC		

Smart GPS System for Omani Fishermen

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ABSTRACT

The modern technology has contributed to the development of science and technological applications quickly and made it different and it will make tomorrow's world completely different from today's world. For the importance of the fishing in Oman and its economy, in this paper we prove that Omani fishermen will benefit from using our proposed system. This project is aimed to develop a model navigation and application of "Smart GPS system for Omani Fishermen".

Fishermen accidently might cross the sea border of Oman thus violating Omani laws, some areas in the sea are marked by the Omani authorities as prohibited to be fished in, predicting the weather condition using traditional way might not be accurate. Best areas or poor areas for fishing might not be easy to be determined by the fishermen. They usually depend on their memory in remembering the laws & regulations for fishing in Oman, In addition, there are many fishermen that might get lost in the sea or their boat might stop running while they are very away from land. Our proposed system "Smart GPS System for Omani Fishermen" will offer methods that will help fishermen in Oman to overcome these challenges easily and accurately.

The system in the current phase will be applied and be tested at Gulf of Oman area, however in the future we plan to extend it so it would cover GCC countries and other regions as well. The proposed system will play an alarm automatically whenever the fishermen is near to the border. Areas that are marked by the authorities as prohibited for fishing will be marked on the system's map & fishermen will receive a warning voice message if he is in a prohibited fishing area. Weather & fishing condition will be collected from trusted meteorological sites and delivered to the system that fishermen will be using it. In our proposed system we will include all the laws & regulations for fishing in Oman and make it available for the fishermen who are using the system. The system will learn through input from different users the best places for fishing, worst places and dangerous places. Also the system notifies the coastguards with the historical information for every fishermen regarding the route they used, this information would be useful in tracing them in case of an emergency.

The software technologies used to implement the proposed solution include Android studio, XAMPP, MySQL and PHP. The system for fishermen will be installed on waterproof mobile phones that has GPS module as well.

The ministry server's database will contain all the laws and regulation, border points, prohibited fishing area, weather forecast, etc. These information will be pushed to the fishermen's mobiles. The system will automatically warn the fishermen about the prohibited areas, crossing the border, track their route, etc.

E-Game for Blind or Visually Impaired People

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ABSTRACT

Blind / visually impaired people would like to play with their sighted parents, friends, brothers and sisters. With the multiple games that have been developed for blind people there are no games that could allow blind people to enjoy and play a game against a sighted opponent. This project has multiple challenges like finding a suitable story that could be played by both and suitable game type. In this project, we are trying to solve this problem by creating an iOS game application that has 3D audio to let the blind imagine the game world and to add more entertainment for the sighted player, and there will be three-dimensions graphical user interface. There will be two modes in the game; blind and sighted. In the two modes, the players get the same resources and information to equalize between them.

First, the player must specify if s / he is blind or sighted to identify the mode. Second, the player should register using the username. Third, a tutorial will be shown to the player forcibly for the first time that contains the game story and instructions to play the game. Also, the tutorial could be played from the main menu as well. Fourth, the player could start a new game from the main menu. Then, the player selects the level of difficulty (easy, medium and hard). After that, the player and the opponent choose each other, and then the game starts. Finally, the result of the game will be informed to each user. The only differences between the modes are the tutorial and the way the players interact with the interfaces. Note players must be connected to the Internet. In this game, blind could play against other blind as well as sighted.

We are using Unity 3D in designing and developing the game, so that it can attract sighted people to play and share the fun with blind people. In Unity, there are many platforms to publish on, it also provides an audio system that is flexible, powerful and can be used to model the eco system. Unity has an optimized graphics and provides 3D animation features. Also, it allows creating multiplayer networking, so, both players can play the game together at the same time.

There are enormous number of games that have been developed but, there is no game that blind player could play against sighted player. The games for blind people have no graphics or simple graphics and sighted may play as blind. Also, when blind player wants to play against sighted s / he needs to learn how to play a game that does not support blind people so, the sighted player has more opportunity to win. Blind people have the right to play and enjoy. As a part of the society, we ought to respect them and create a game for them with sighted people. We are seeking to create a game that fully supports blind and sighted people.
Our conference format will be live demo Insha'Allah.

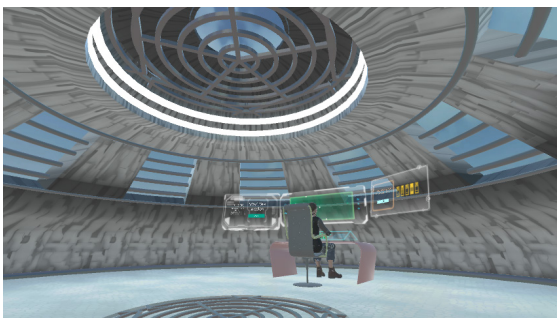


Figure1: Control room



Figure 2: Character

Academic Workload Allocation System (AWAS)

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ABSTRACT

In the academic domain, academic staff (instructors) make great effort to meet the academic environment's needs and challenges. Teaching courses require both in-class and out-of-class activities such as course preparation, teaching, marking exams and assignments, and supervising research papers and projects. Hence the amount of effort spent on teaching an individual course is not measured only by the actual number of credit hours of an individual course. Some universities establish a set of well-defined policies and regulations to organize the process of workload distribution and allocation. While other universities initiate general rules and leave the implementation to the department chairs to apply the rules in which ever method they find suitable.

There exists software tools which assist department chairs in distributing the workload amongst the academic staff but all these tools do not measure the actual effort spend in the teaching process.

The idea of this project is to provide an algorithm that will achieve a satisfactory fairness in the workload allocation amongst instructors with regard to the actual teaching effort done by the instructors. The solution we provide depends on three important factors a priority of an instructor to teach a specific course, the actual effort spent for each taught hour of the course and the instructor's preferences. The priority is calculated based on the instructor's major, the instructor's experience, the number of times the instructor has taught a certain course, and the department chair's recommendation. In addition, the algorithm will also calculate the actual effort spent per one taught hour of the course. The actual effort depends on the number of students in the course, course preparation hours, the number of exams and assignments, and course projects if any.

The proposed algorithm generates a fair workload distribution and allocates a finite number of Instructors to a finite number of courses, where all instructors will carry out the same effort. The actual effort depends on course profile and instructor profile. Each course has a profile including a constant number which is the in-class contact time plus other attributes which define the out-of-class time. In addition, each instructor has an instructor profile which has an impact on the total effort.

In this project, the workload distribution policies are obtained from King Abdulaziz University (KAU)'s general Regulations and Procedures which discuss the maximum credit hours of teaching based on academic ranks along with Australian Catholic University Workload Model.

The algorithm will be developed using one of Search Techniques that reduce search time and provide the best solution among many solutions. The chosen technique is under Evolutionary approaches, which is Genetic Algorithm. The logic of this algorithm was inspired by the natural selection concept in Genes in the biological being.

The algorithm passes many rounds until the best solution is reached. The algorithm predefines a priority table which calculates the level of priority of a specific instructor teaching a specific course. A population of random solutions is generated. A fitness function is used to evaluate each solution and measure the degree of satisfaction of three aspects: balancing efforts, priority-based distribution and fulfillment of instructors' preferences. Balancing is achieved if the resulted allocation of the instructors to the courses requires fairly equal efforts from all instructors. Next, the algorithm deploys selection, crossover, and mutation techniques to generate better solutions. The previous method is used repetitively evaluating each solution until the best solution is achieved.

The system is being developed as web application. The technologies used to implement the system are, asp.net and SQL server.

Solving Edge Matching Problem with SAT Solvers

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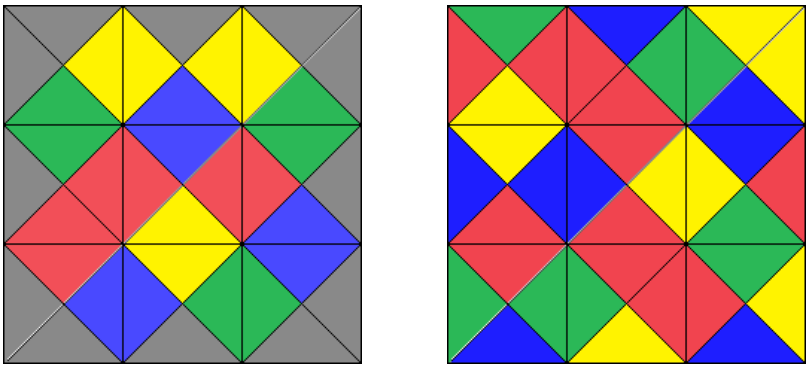
Supervisor by:
T. Tasniem Alyahya

ABSTRACT

Edge matching (EM) is a popular puzzle discovered in the 1980s by Thurston in the United Stated. Formally, EM problem asks to arrange a given collection of several identically shaped but differently patterned tiles (typically squares) so that the patterns match up along the edges of adjacent tiles. EM problem become a more famous game when it classified as prized contest and NP-complete problem. One of the prizes reaches (2,000,000 $) for the first solver. After prizes contests creativity increases so, computer scientist proposed many solutions. Among the approaches, reducing the EM problem to the Boolean satisfiability (SAT).

SAT is a central problem in computing theory and mathematical logic. Formally, SAT asks if a Boolean expression can be made True by assigning Boolean values to its variables. SAT solvers have undergone outstanding improvements because of their importance in various practical applications including planning, scheduling, software and hardware verification, software model checking and software testing. Although SAT is classified as a NP-complete problem, it has been proven by Cook that all problems can be reduced in polynomial time to SAT.

The objective of this project is to study the reduction algorithm from EMP to SAT and vise versa. We aim to: (1) build a tool for encoding the EMP problem to a SAT instance based on the work of Ansótegui at.el , (2) build an application that automatically solves a $3\times33\times3$ bounded unsigned EM problem (Figure1 a) and unbounded unsigned EM problem (Figure1 b), by reducing it to SAT, finally (3) conduct an empirical investigation to study the performance of the reduction algorithm.



(a) (b)

Figure1: EM type Problem

The Use of Artificial Intelligence and Sign Language Studies: Applications to Enhance Sign Language in Universities

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ABSTRACT

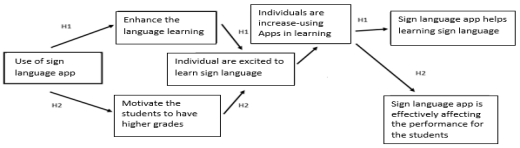
Teaching sign language in both elementary, high schools, and universities can be beneficial to both hearing and deaf students. It can help to boost communication between the students, and prevent mainstreamed deaf students from feeling isolated at their schools. It brings awareness to the deaf culture throughout the community.

This paper explores the importance of sign language and how it could be taught to student using a real-time non-verbal communication system from natural language instruction by introducing an artificial intelligence. By using those applications, it facilitates students to be fast learner and remember the sign language easily. The present findings demonstrate that most of the people are interested in learning sign language because it will enhance better communications among the society. Signing is useful skill that can open up for you a new world of relationships and understanding.

However, the natural writing with unconstrained words remains a very challenging problem in artificial intelligence and pattern recognition. In addition, it presents some available applications for the participants when chatting with each other, not just based on text or predefined gesture icons, so the communication is more natural between deaf and not deaf people. Previous research has demonstrated the importance of sign language. The present work is designed to be the first to consider teaching sign language in schools and university. It introduces the idea of existing applications and systems that helps to learn the sign language. The findings demonstrate that most of the people are interested in learning sign language because that will enhance better communications among the society. Signing is useful skill that can open up for you a new world of relationships and understanding. The main aim of this research to propose a complete system to the ministry of high education that is suitable for sign language teaching and training as well.

The model followed is technology-accepting model. The Technology Acceptance Model (TAM) is an information systems theory that models how users come to accept and use a technology.

In order to best fit the research, the model is further enhanced and changed to satisfy the suggested-hypotheses.



Based on the survey analysis, the majority are interested in learning sign language and willing to take sign language course if it is available within the general courses in the university. After conducting the experiments and performing testing, it is clearly observed that learning sign language through them could be beneficial and it will be easy for the students to learn the letters, words, and even the gestures through those applications.



Fig 4-How To Sign Language App



Fig 5 – Sign Language Dictionary App



Fig 3- find My Smart Hands Baby Sign Language Dictionary App

Football Field Reservation

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ABSTRACT

The purpose of the website is to search and select football fields at specific areas that the customer chooses. Booking fields are done through specifying the price & sizes of the field along with preferred time. Then a payment method is created through SADAD payment system, where the user will receive a confirmation email that includes a code, which can be entered through any of the local banks to complete the payment transaction. In both Web and mobile app, the user will be able to retrieve his/her booking details (number and location of field, booking time and amount) either by an email with all the information of his reservation

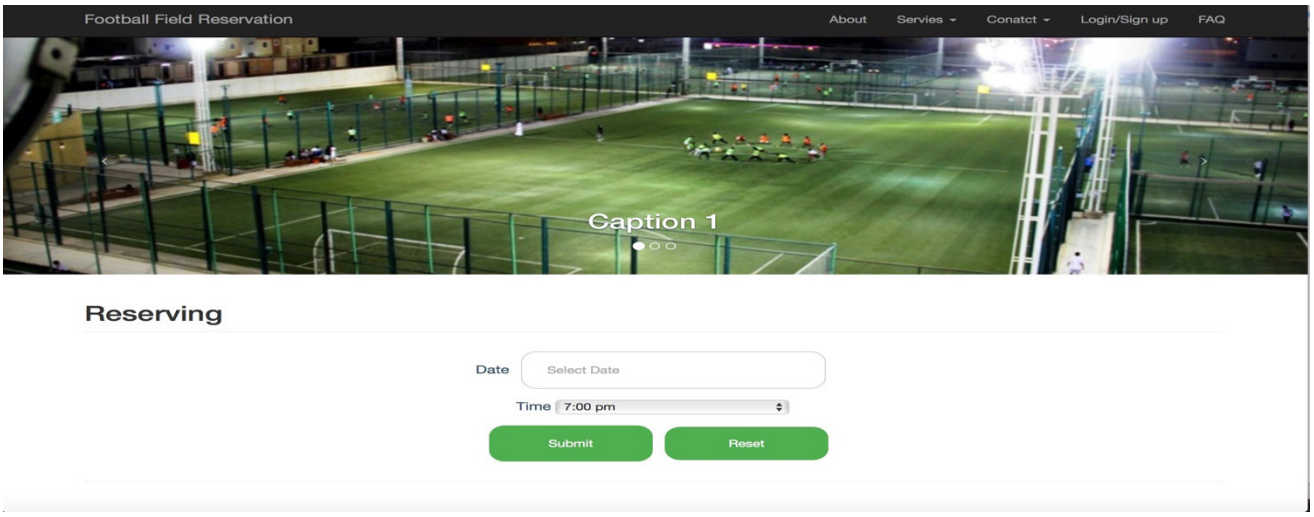
Problem Statement

The old-fashioned way to reserve a field which is to book via a phone call is problematic due to many factors. If the customer calls to book, there is a good chance that the phone number will be busy. Using the website can help avoid this issue for you can reserve any time of the day. Another problem that sometimes the customer needs to retrieve his reservation details which cannot be easy for a phone call but easily done through the website. The location of the chosen field might be unknown if the customer didn't use the website. The site can provide the customer of the description of the field's location.

System Perspective

Although this project mainly focuses on making the customer experience as smooth as possible by minimizing physical efforts and enhancing the provided services to ensure maximum customer satisfaction, yet even the companies involved will benefit from it as well.
This project will bring more customers to the companies because of its easy accessibility. This service will be available 24 hours unlike the sports facilities offices which are bound by fixed working hours, therefore reaching a bigger number of potential customers.

Screenshot



E-Tourism Evaluation: SafeTrip Application

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Supervised by:
Dr. Ali Alkhalifah, Ms. Samar Alduyji

ABSTRACT

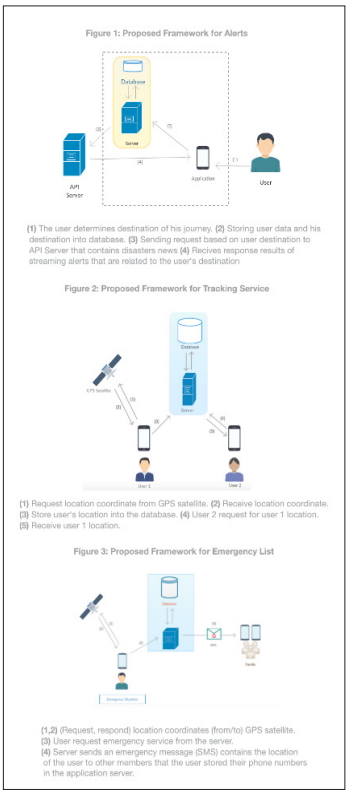
Travel safety is the major concern that people should consider in their trip. According to Skift newsletter, in 2015 75% of Chinese tourists consider the safety as a main factor that affects their destination choice [1]. Despite the rabid increase of using mobile applications on the side of traveling and tourism nowadays, there is a lack of mobile applications that concerned about the safety of travelers. According to Phocuswright study, between more than 3,000 outbound travelers 77% of them consider themselves as independent traveler [2]. They are mostly depending on online traveling websites, experiences of other people, or a misguided adventure tourism experience. On other hand, the risk rate may increase such as the environmental hazards or terrorist incidents. The traveler needs to be aware about what happens around him before and during the trip to help him make a right decision about the destination.

This project provides a mobile application with services that related to travelers' activities concerning their safety. There are some existing applications that related to travel safety such as: "Safety tips" [3],"Earthquakes" [4] and "Family Locator" [5]. However, most of these applications focus on a specific country [3], natural conditions [4] or limited personalization services such as focusing on just tracking family members [5]. Our project provides an extension of the existing applications by designing and developing more useful features and services. These include:

Disaster Alerts: The application alerts the user about disaster warnings based on specified destination and the user will receive the alert until the trip interval ends.

Tracking Members: The user can track other member's movements in the trip. Also, the group can select a specific place to visit (e.g. park) and when any member of the group leave this place, the application sends an alert to the group members to warn them all.

Emergency List: The application will send an automated alert as an SMS by using a touch aid to the user's family or friends with a current location.



To provide a better user experience, we propose a model based on Technology acceptance model (TAM) to determine and test the factors that may affect user intention to use mobile applications that concern about safety in travel.

Currently, the application is under development. After that, the application will be tested by a group of people who have travel experience. Then, the results of testing will be analyzed through using Smart Partial Least Square "SmartPLS" statistical software to determine factors that are more affective in user behavior intention towards using this application.

The project contributes in Information Technology field specifically E-Tourism from both community and individual perspective:
- Help society to travel in a safe way.
- Make travelers able to identify issues related to their destination
- Help individuals by keeping them aware about their relevant travelers.
- To enhance e-Tourism safety.
- To identify some IT theories in the evaluation of e-Tourism services.

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Fuzzy Logic-Based Automatic Hiring Application

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Supervised by
Mr. Ahmed Al-Amayreh

ABSTRACT

The Problem:
Fresh graduate students usually rush to get a job and therefore they rush to apply for any job announcement they can access. This behavior leads to a difficult situation, which is when they are called for personal interviews for most of the job vacancies they have applied for. So it will be difficult for a fresh graduate to travel every few days to attend an interview in a far town or city and come back home, especially for females. Also, the case of the employed people, who look for better jobs, is similar to the fresh graduates. Since they are busy and tied to their current jobs, they won't be able to attend the many personal interviews especially if they are far away from where they work or live.

The Methodology:

Fuzzy Logic-Based Automatic Hiring Application (FLAH) application is an approach for making the process of job application and hiring easier and more automated. FLAH system is consisting of two schemas; the Jobseeker Scheme (JS) and Recruiter Scheme (RS). The first scheme is a mobile application intended for jobseekers. It assists the jobseekers for building and updating their profile and applying for announced job vacancies.

However, the second scheme is a website system intended for recruiters. It allows and assists the recruiters in deploying job announcements and specifying the requirements and the specifications of each job entity. Once the jobseekers select to apply for the announced job, FLAH system will create a short list of candidates for the recruiter screening and review. The short list will be created based on a smart TOPSIS fuzzy logic algorithm for selecting the best candidates for the job.

The system will assist the recruiter in minimizing the number of candidates for the best selection by different means, the system includes a smart matching algorithm which will be used to match between the jobseeker qualifications and the job vacancy requirements. The output of the algorithm will be as an ordered list based on the matching percentage weight of each application. This list will be the first short list of the candidates. The recruiter then can specify the minimum acceptable match percentage to create a shorter list of candidate. And the system provides a communication channels between the jobseekers and the recruiters. Therefore, the recruiters can ask the jobseekers for more information or details (like recording a short video or audio, sending support documents or photos) to show the jobseeker capabilities which may reduce or eliminate the necessity of the personal presence. The system also includes a fuzzy logic based algorithms which helps the recruiter in selecting the top best candidates by providing the system with some selection criteria.

The Conclusion and Result:

The system is intended to be useful and beneficial to the three targeted parties: the fresh graduate students, the currently employed people who look for a better job and the recruiters. It will reduce the fresh graduates, employed people's time, cost and effort by different means they can apply for job vacancies by a mobile application. Also the system provides a communication channels between the jobseekers and the recruiters. Therefore, the recruiters can ask the jobseekers for more information or details (like recording a short video or audio, sending support documents or photos) to show the jobseeker capabilities which may reduce or eliminate the necessity of the personal presence.

The system also includes a smart and fuzzy logic based algorithms which helps the recruiter in selection of the best job candidates.

Innovative Smart Building with Dynamic Envelope

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ABSTRACT

In the present work, an innovative smart building with dynamic envelope is introduced to reduce the energy consumption and to enhance the comfort level inside the building. The smart envelop of the building consists of windows that made out of electroactive polymers (EAP). The electroactive polymers change its shape according to the applied voltage on it (as shown in fig.1). Making used of the previously mentioned characteristics of electroactive polymers, the amount of light entering a room and the amount of heat gained from a window are adjusted by closing a percentage of the window and therefore achieving human comfort in the room by effective control of the applied voltage on the polymer. The controlling procedure, given in fig.2, starts by setting the desired comfort levels of parameters like temperature and illumination. Sensors are distributed inside and outside the building are going to determine the indoor and outdoor comfort parameters status. Based on design equations, the optimal areas of the openings to achieve the maximum comfort are determined. From the electroactive polymer characteristics, the required control voltage to achieve the required opening is determined.

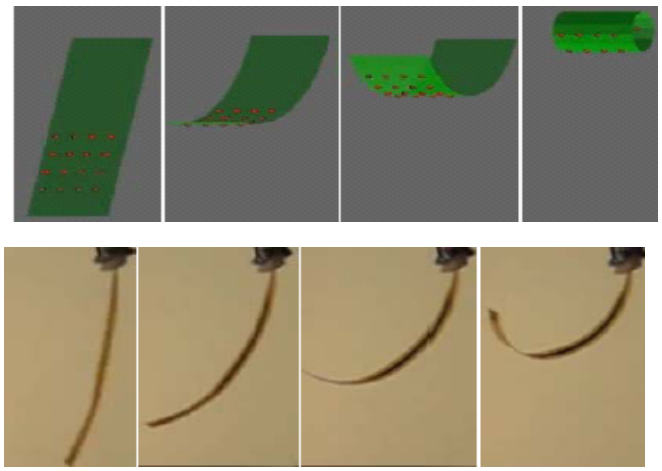


Fig. 1 Deformation of Electro active polymers under theoretical (a) and experimental (b) applied voltages

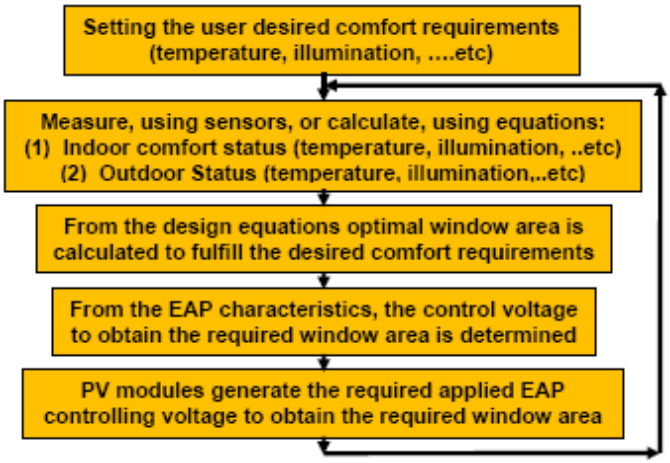
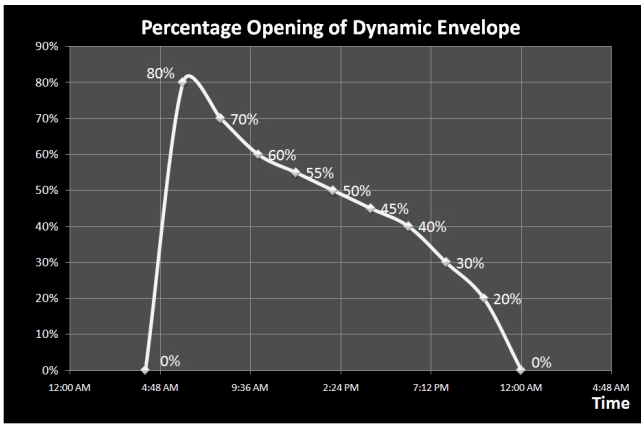
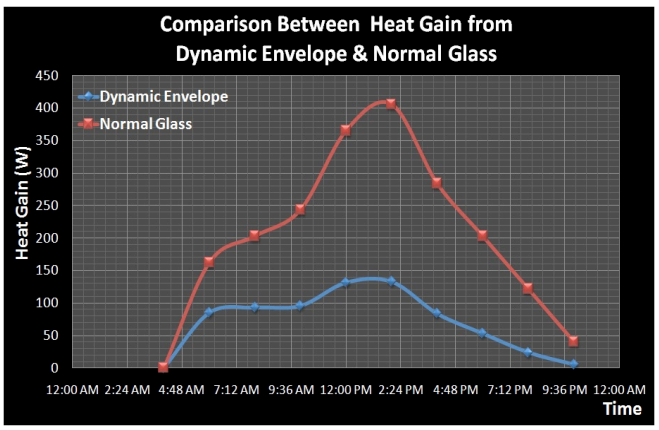


Fig. 2 The dynamic envelop controlling methodology.





The simulation results show that our suggested dynamic envelope opening (fig. 3) works in an efficient way as it reduces heat gain (fig. 4) and hence reduces the power needed by air conditioning to achieve comfort. The electroactive polymers represents an excellent integration between the building envelope and the building services achieves the best performance in terms of energy efficiency and indoor environmental comfort. A deeper exploitation of solar energy by direct conversion via PV devices represents an interesting perspective, which may allow to increase the efficiency of the façade and to explore new building skin concepts, based on the direct use of the electrical power within the façade itself.

Around Me: Global Medical Guidance

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Supervised by:
Dr. Saoucene Mahfoudh

ABSTRACT

When you travel to a new city (or even if you are a citizen but do not know about the different services in your city), you feel like you are lost and do not know any of your around different services. You may need to know about your nearest best doctors, good restaurants that offers the best dishes, hotels that offers the best services, etc. Hence, you need a guide that can help you to find your needs easily. Nowadays, the best and easiest guide is a mobile application. Our solution is to create a mobile application that can help these people to find their needs in different fields in one application. In this project we focus on the medical field. What makes our project unique is that the application is not specified for a specific hospital or clinic. It provides information (among many other features) about different doctors from different clinics. The main target of our project is to allow user to find easily the best and nearest doctors around him.

There are some applications that solve a part of our problem. For example, in the medical field there are some mobile applications designed for specific hospitals that offer the possibility to make an appointment for patients. In other fields like hotels, some mobile applications are designed to make reservation, rate the hotels and write comments.
Figure 1 represents the high level architecture of the application.

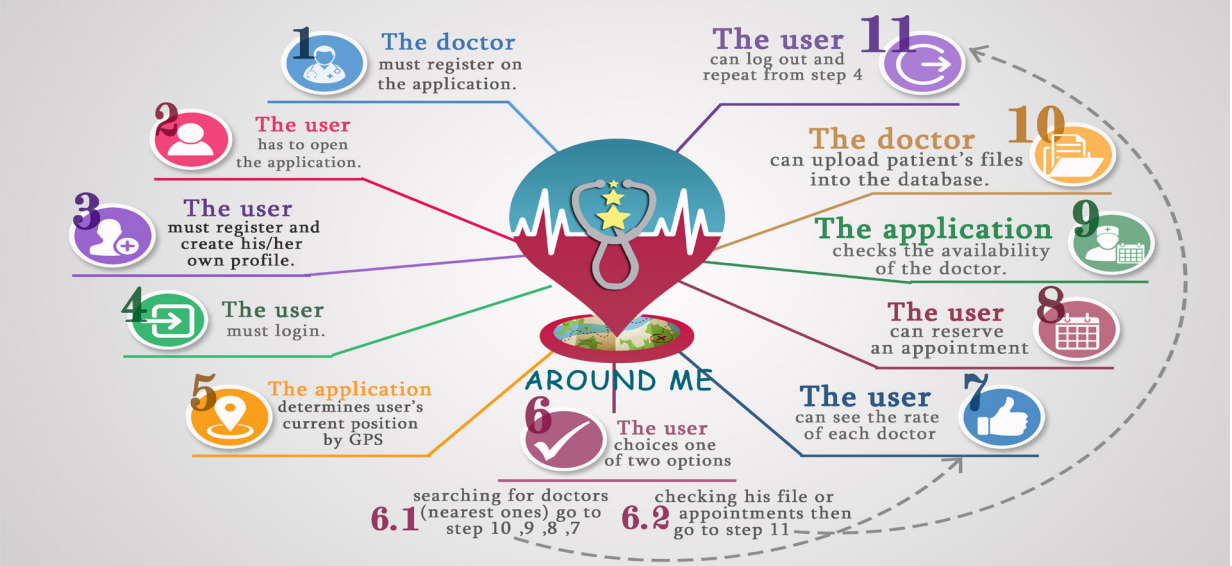


Figure 1High level architecture of AROUND ME application

Our solution is a mobile application that permits to the user to know the location of the best doctor around him and localize doctors of specific specialty. Using GPS technology, the shortest path between the user and the doctor will be displayed. Moreover, this solution gives to the user the possibility to check the doctor's availability, book an appointment with him through the application and rate the doctor after consultation. Furthermore, doctors can upload patient's file. Hence, these files are available if patient changes the doctor. Regarding, the security issue, we propose to encrypt patients' files which are uploaded to the central database, Therefore, only doctors that are registered in our application and that the patient reserved an appointment throw our application are allowed to see patient's files. The patient can see his files at any time. The doctor has the ability throw our application to register his clinic, upload his schedule, update his patients' files on the application and be aware of patients' comments.

Matrah Castle Website

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Supervised by:
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ABSTRACT

Because of its geographical location, the Sultanate of Oman has many tourist attractions such as castles and forts which are unknown for many individuals including some Omani citizens. The project is a global website, managed by Oman Ministry of Tourism that provides information about the castle. One of the difficulties that might be faced during data collection process is that Matrah Castel is opened for the first time. Also, the distance causes another obstacle because Matrah Castle is far away from Sohar. Therefore, it might be difficult for us to visit the castle and collect the required pictures and information. The fact that Matrah Castel has been established for the first time necessitates effective advertising efforts. Thus, one of the main goals behind creating Matrah castle website is to reflect the role we play as Data Management students in this regard. Moreover, the project aims at providing tourists with adequate information in relation to the historical sites in the Sultanate of Oman and to improve the digital tourism through our project. In order to achieve these goals, data will be collected through meeting the manager of Matrah Castle and some employee in the ministry of tourism and there are many software we are going to use in our project such as, Photoshop, Wordpress for design the website and hosting it.

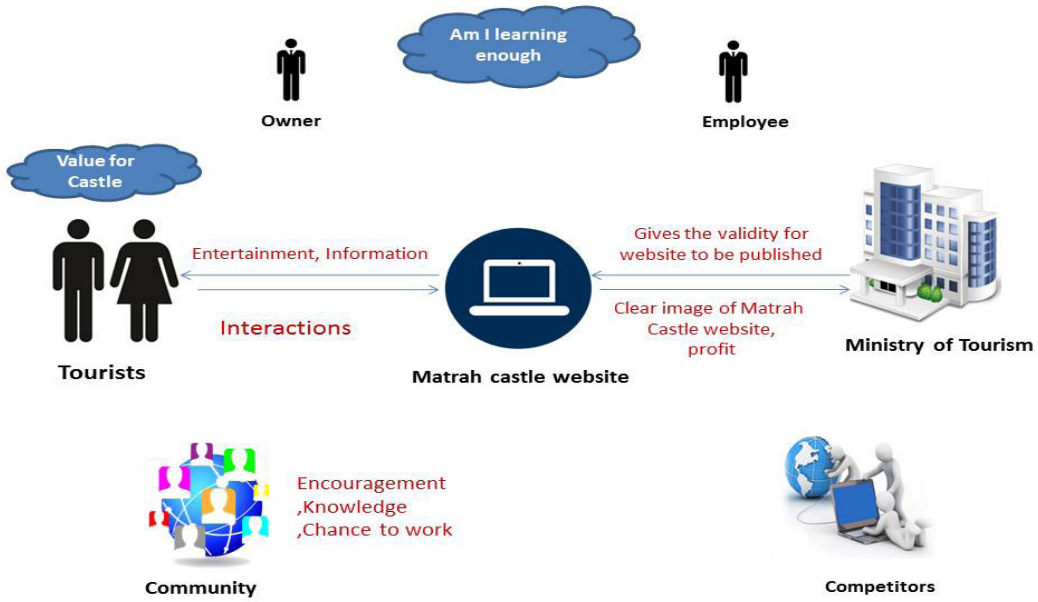


Figure1: Rich Picture for Matrah Castle Website

EARLY DETECTION OF AUTISM: A COMPUTER BASED APPROACH

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ABSTRACT

Autism, a common disease around the world, affects physical and mental functions of the infected person. It causes social difficulties, language difficulties, nonverbal communication difficulties, and inflexibility. Early detection of autism is important to control the behavior of the infected child. By using the advanced digital image processing algorithm autism can be detected at its early stage. There are many existing techniques are currently being used to detect autism. One of the major limitations of the existing systems is that they not very efficient because they depends on a procedure of watching the behavior of the infected child for a long time1.

Our project is to detect autism by analyzing brain images by using image processing toolbox and wavelet toolbox associated with Matlab program. Figure 1 illustrates our procedure. We choose wavelet to de-noise the brain images. Then we extract the image features of the de-noised image by using image processing toolbox. We make comparison between autistic child's brain and normal child's brain so that we can differentiate between the two.

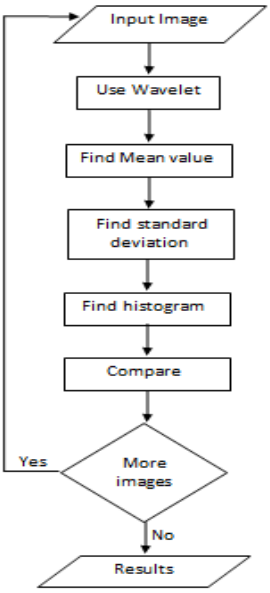
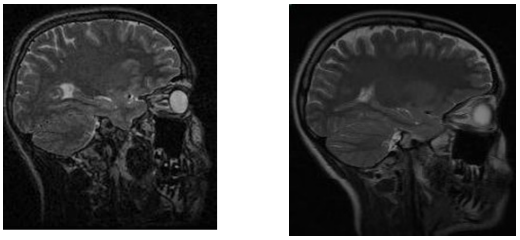


Figure 1 The Procedure

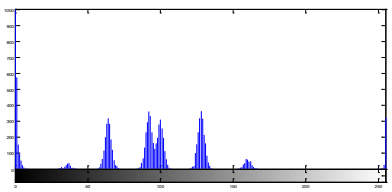
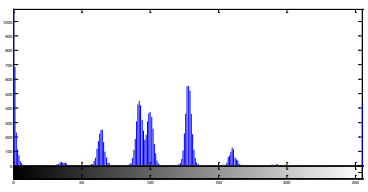


(a) Autistic (b) Control

Figure 2 Brain samples of autistic and normal babies

Figure 2 shows the sample images that we used in our investigation. We started by calculating the mean value and the standard deviation of each brain image. As we can see from Table 1, the mean value of an autistic brain is around 21.73, and it is around 19.18 for a normal brain. From table 2, we conclude that the standard deviation of an autistic brain is around 43.5, and it is around 41.07 for a normal brain.

Table 1: Comparison of image features

Image Features	Normal	Autistic
Mean	19.1203	21.7306
Stand. Deviation	41.3507	43.9500
Histogram		

We also plotted the histogram for each brain, and we found that number of black spots as shown in Table 1. Our analysis also shows that using histogram is more useful to detect autism because it shows clear difference between autistic brain and normal brain. In future we will use more samples to get more accurate results, and we will combine all the methods (i.e., histogram, mean, and standard deviation) in order to detect autism.

.Grandin, T., & Panek, R. (2013). *The autistic brain: thinking across the spectrum*. Boston: Houghton Mifflin Harcourt

A Prototype for Digitalization Tourism Fort in Oman

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Omar Mohammed Abdullah Al-Saadi ,Halima Ali Ibrahim Al-Balushi ,
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Supervised by
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ABSTRACT

Digitalization opens new possibilities to cut the costs. Digitalization is already applied in a wide scale not only in industry but also in other sectors such as tourism, and healthcare. The tourism and travel sector makes extensive use of both information and transactions in all stages of the value chain. The majority of people currently are using the internet to make their plans for their holidays and to visit places. Nowadays, the promotion of the tourism industry in Oman, can be effective through a number of mechanisms used in the digital era. Therefore, on this project we are focusing on building a prototype for one of the oldest Fort in Oman, called Nizwa Fort. Statistical information shows that Nizwa Fort gets about 250 visitors daily, however no official online resource available about Nizwa Fort, actually most the materials are available only on printed paper and brochures.

Enhancing visitors' experience at cultural heritage sites is a main concern for many international and national tourism planning and development bodies. Oman, as an emerging tourist destination, has been pushing toward the transforming of its cultural heritage assets to become a tourist attraction. In addition, this project will effectively help number of other sectors, such as economic and education sectors. Regarding, the economic sector, our web application will market the Omani history globally giving a chance for a larger number of tourists to visit Oman, which will result in increasing the national income. In terms of education, students learn about Nizwa Fort, so we believe this project will provide the information on an interactive environment using advanced technologies such as VR, AR (for the mobile app) and 360 videos. Using these techniques is a great challenge to the researchers but it worth it, in order to deliver our message to the community showing the great benefits and significant results of applying these techniques.

The project consists of two parts: smart web based application and mobile app. Advanced technologies will be used to effectively present the historical building information and to make an interactive web. The web based application is to provide a number of information about the Fort, the local area, online games (educational game about the Fort) and interactive forms for the visitors. The mobile application is to provide virtual reality (VR) environment, some augmented reality (AR) materials and 360 videos. Furthermore, the web based application will be online resource (most likely to be marketing by Ministry of Tourism), also the website will be providing the downloadable link mobile app that is available only in it. So, users who visit the website can download app from it. we are done from first phase which is collect information and picture and now we are in website design phase.



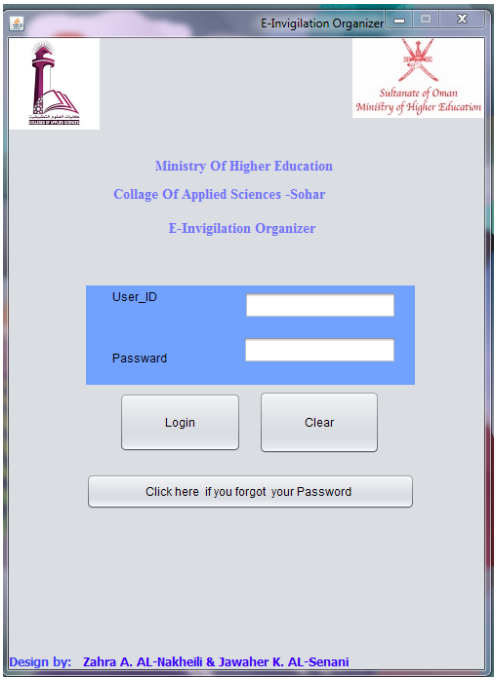
E-Invigilation Organizer

Zahra A. AL-Nakheili, Jawaher K. AL-Senani

Supervisor:
Mr. Marwan M. Ammous
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ABSTRACT

The Electronic Invigilation Organizer is a Java based application system that can create an automated exams timetable for different departments in any higher educational institution. Now a days, because the high capacity for some Universities and colleges to register thousands of students and hundreds of instructors. We need to adopt a robust system that shall save time, effort and deliver a best quality for all the higher education institution staffs, academics and students. Also, we should take in our consideration the differences in the exams time, dates and the conflicts might happen. Therefore, we are proposing the E-Invigilation Organizer application, which will organize automatically all the details that related to the exams such as the course name, the invigilator name, the exam time, the exam hall building and the exam hall no.. In addition, all the system data should be stored for the future artificial intelligence programming decisions and for the equality of duties between the staff members. Thus, any cancellation of any exam will reset the duties automatically on the system and will organize it with reference to the complete exams timetable, and notify the users about it.



The E-Invigilation Organizer is a unique isolated system from the students information system SIS in the registration center for securing them from loads of users and threats, the E-Invigilation Organizer has an Administrator window that can help him/her to controls the addition of data for the major tables like the users, the exam halls, the buildings. So, the administrator should keep updating the major data according the changes or updates. Also, the system has an exam creation window, for requesting/adding new exams and invigilators. The system has a backup system that can save the space in the media storages, which mean faster in creating the backup, transferring and for the restoring process. The E-Invigilation Organizer is a system that can handle and manage the timetable arrangements for the different activities like the Midterm exams, Final exams, exhibitions, conferences, symposium …etc. Our aim of creating this software is to be useful for all the higher education institution staffs, academics and students. It will be helpful for the administrative whom doing their work manually by themselves. An automated system will increase the productivity of the administrative if we save their time and effort.

As a result, the E-Invigilation Organizer shall be flexible for different higher education institutions. It clarifies the actual needs for any exams organizing system, and made a great enhancement for the traditional manual system. Also, it contributes to the provision of the most prominent ways to get the appropriate services in reference with the speed and accuracy of the current manual systems. We are hoping that it will be helpful for the higher educational institutions in their compliances with everyone, by offering a real time system to arrange their exams invigilation.

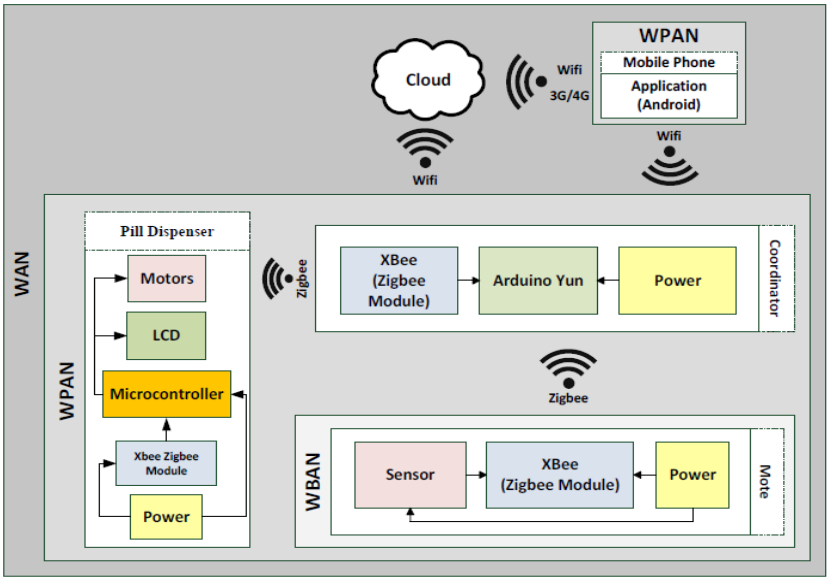
Zealth: ZigBee-Based Wireless Body Area Network

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ABSTRACT

Electronic health (eHealth) monitoring is a vast and very important topic in today's modern society. People of all ages require efficient and fast monitoring of different health parameters. However, visiting health care centers for checkups becomes less and less convenient for the public due to the nature of modern day's hectic lifestyle. Long waiting lines, overcrowded emergency rooms, and underequipped and understaffed hospitals, are few challenges that face any health care system in any country. This is where eHealth monitoring has stepped in and filled in the gaps. With eHealth monitoring systems, one can get constant and live feedback on different health parameters without the need to go to a specialist. This can result in multiple positive outcomes such as early detection of heart disease, strokes and general early diagnoses. This concept is often misunderstood to only include already ill or sick people. Nonetheless, eHealth monitoring is a great tool for not only patients, but also parents, researchers, athletes and many more. eHealth monitoring includes all ages, genders, and occupations and benefits everyone in a specific way.

Inspired by the aforementioned reasons, we worked on designing Zealth, a wearable Wireless Body Area Network (WBAN) that monitors patients remotely for both preventive and diagnostic reasons. This WBAN is based on the cutting-edge technologies of Wireless Sensor Networks (WSNs), ZigBee (IEEE 802.15.4), cloud computing, and Android-based applications. As the patient uses smart clothing that has the WBAN embedded in it, critical bio-signals are measured and communicated in real-time to a cloud server that builds a complete history of the patient's health data. An Android-based application was developed to allow a physician or a researcher to remotely access the cloud server to check upon the patient's state. Furthermore, the physician can remotely communicate with the WBAN to control the sensors directly (to enable/disable them). The WBAN can send critical alerts to the physician in case the patient requires immediate care. The whole system was also supported with a pill-dispenser that can be accessed wirelessly to alert the patient about the exact times to take his/her pills. A major benefit of our system is that it preserves the mobility and convenience of the patient to conduct his/her normal life at home without being confined to a bed or the routine schedule at the hospital. Also, such a system can reduce the pressure over hospitals and physicians to take care of more patients. The target users of the systems can be patients, athletes, or children. For children, the use of WBANs is highly convenient as they are compact in size and do not bother the fussy nature of children. The proposed system architecture formulates the basis of a power and cost efficient practical smart clothing product.



System Architecture

News Validation using Machine Learning Techniques

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Supervised by:
Madawi Alotaibi

ABSTRACT

Recently, the World Wide Web (WWW) plays an important role in our lives. It was reported that the total number of current online websites over the WWW exceeded 1 billion websites in 2014. Websites expose users to miscellaneous subjects. In addition, users can access a website at any time and everywhere, which makes the information rapidly available. Major search engines (e.g. Yahoo! News or Google New) may deliver useless and redundant information when searching for a specific information. Another issue is the misleading information which may cause harmful effects not only on individuals but on society as a whole.

News articles are one of the significant electronic media that cover many topics, which rapidly spread globally. Thousands of web resources discuss related topics. There are many Arabic news websites (e.g. Al-weeam, Al Arabiya, Al Jazeera) that publish news articles every day to keep users fully informed of the world news. However, one of the disadvantages of the news websites is the fabricated or inaccurate information, which spreads over the web resulting in confusion among readers. Therefore, the news manipulates people's opinions, leading them to make a crucial decision which may influence their lives or other people's lives negatively. Furthermore, navigating the same topic on different web news can be time-consuming. However, in terms of the Arabic news articles, research has not dealt with retrieving accurate news. To our knowledge, previous studies interested in Arabic news articles focused mainly on categorizing news articles using either classification or clustering methods.

For the purpose of this project, K-means clustering algorithm and Support Vector Machine classification algorithm (SVM) will be implemented on Arabic web news topics, with the aim of performing unsupervised and supervised machine learning to aggregate related Arabic web news topics as shown in Figure 1. Moreover, we investigate the state of the art method for returning users' query free of rumors. The purpose of the clustering technique is to categorize all Arabic news articles that are sourced from the websites. Furthermore, clustering technique participates in elevating the authenticity of the news. The classification technique aims to categorize the users' input news using classification algorithm such as Support Vector Machine in order to determine the suitable cluster to retrieve accurately related news articles. This system helps users save time and retrieve accurate news.

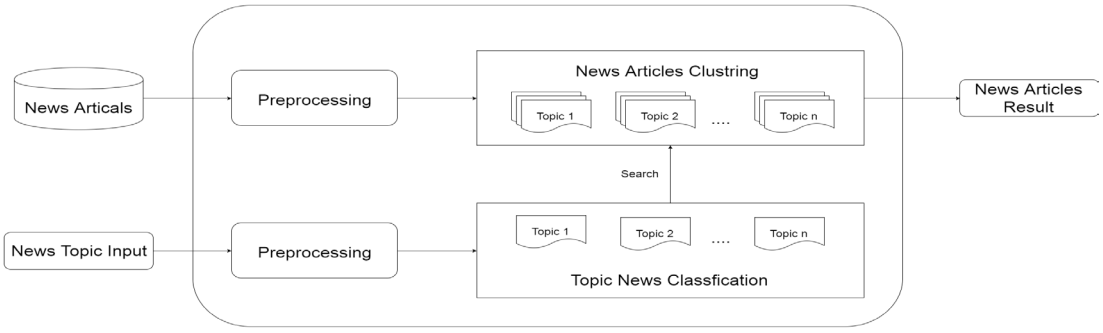


Figure 1 News Aggregation using Classification and Clustering Methods

Using Gamification for Omani Forts and Castles

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Supervised by:
Dr. Hilal AlMaqbali

ABSTRACT

Within the Omani context, cultural heritage sites have witnessed a clear enhancement in the way they are managed and commodified for visitors. Many Omani heritage sites, which are currently open such as Nizwa Fort and Kasab Castel, provide their visitors with many experiences and learning opportunities. Only traditional interpretation tools, including signs, posters, guidebooks or maps, are used in these sites. These interpretation tools attempt to demonstrate how Omanis used to live and how the old Omani towns look like, for instance. However, in order to be aware of the life style in the buildings, the visitors may need their imagination. Furthermore, traditional methods cannot provide direct or indirect online views of the physical real-world environment, apart from the printed pictures. These tools have failed to show, for example, the techniques and methods used to fight the enemies from inside the fort besides other methods used to defend the people inside the fort. In fact, these methods can be imagined to some extent by reading a considerable number of details. Having considered the limited travelling period, tourists might find it difficult to keep reading, especially those who do not have any background information.

Additionally, there are two main challenges regarding the current use of traditional methods of advertisement and marketing. Firstly, the only way to browse how the building looks like and what is inside the building is by travelling physically to that fort. In other words, there is a lack of online materials that provide interactive information. Some of the visitors are not local, so visiting these sites might be time and money consuming. Secondly, most of these forts provide the information to visitors using traditional methods such as brochures, flyers and printed pictures.

Thus, our project aims to use a web-based prototype application that uses gamification features and 360-degree videos. The project will show all the forts and castles in Oman using these advance techniques in interactive and informative methods. Furthermore, this web-based application includes information about the location of each fort and castle, open access time for visitors, brief historical information, virtual reality building of the fort or castle and a game for entertainment.

This project contributes to the development of tourism in Oman, particularly with reference to forts and castles. Furthermore, it provides visitors with sufficient information and saves their time and effort to know about the places.

Mobile-Based Indoor Positioning System

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ABSTRACT

Presently, it is very easy to locate an object, person, or smartphone using GPS if you are outside. But for the areas that satellite has low or weak sight line like indoor areas, locating process is not easy or efficient! Where GPS has neither enough resources nor accuracy to access indoor areas.

As a solution, radio networks are used to locate an object inside a building such as Beacons which work as transmitters that transmit radio signals continuously for specified radio frequency. Beacons use the Bluetooth Low Energy (BLE) technology that helps save battery power.

In this project, indoor area is covered by a number of Beacon units as shown in figure1, taking into consideration the range of each one which is 70m, but in order to have more practical positioning system we reduced this range to 15-20m, also to include higher number of beacon units for more accurate locating.

When the mobile phone of a user detects the signals coming from beacons, an application will start locating the position of user by comparing the strength of each beacon's signal (closer to the beacon means stronger signal), then the app will be able to determine the coordination of the user. In addition to that, the mobile application will show the map of the covered area and how far the user is from each beacon unit. At the end of the process, we want to send coordination of objects and people to other devices via Wi-Fi in order to achieve the tacking process which can be useful in reducing the problem of lost children for example! Other applications are finding people's way in universities, shopping malls, museums, and other buildings. This system can also send notification when the user gets closer to a certain point (see figure 2).

There are many reasons behind choosing BLE beacons to implement the system, beacons are cost-efficiet yet quiet accurate, eco-friendly, flexible to integrate, and compatible with both iOS and Android.

In terms of results, we built our own application for indoor positioning system similar to the already-existing app of Estimate Beacons, the aim is to make the system not only shows the results or map like said application, but to be able to send them to a third party. We apply the system on the engineering labs area of the university. As an initial trial we covered two labs only with 6 beacon units, where we need more than 10 beacons to cover larger space. Till now, the built app can notify the user about the strength of the signal coming from the beacons and in which lab the user is located.

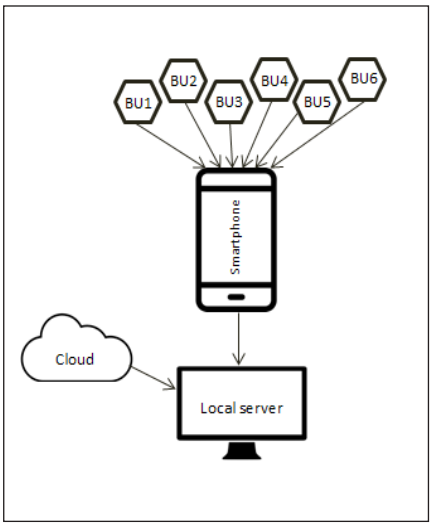


Figure1: System block diagram

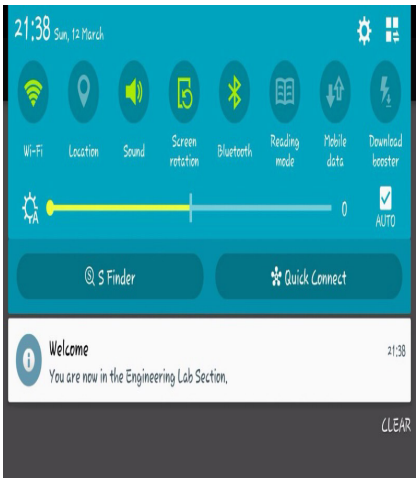


Figure2: Notification of location

I Know What You Did There: A Traffic Analysis Attack for Identifying Users' Online Activities

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Al-Imam Muhammad Ibn Saud Islamic University, Riyadh, Kingdom of Saudi Arabia

Supervised by:
Dr Firdus Kausar

ABSTRACT

With the high growth of the software-as-a-service numerous applications are delivered through the web, and internet is now used to process a very sensitive data. A common approach to protect users' data is to encrypt the traffic. Although it helps preventing users' data from being logged, it doesn't provide complete security. Traffic analysis is a serious threat over the network. An attacker can analyze network traffic patterns to infer packets content despite that it is encrypted with the state of the art cryptographic techniques. What makes such attacks possible is that traffic is exposed on the network and an eavesdropper can intercept packets. These intercepted packets can be analyzed to find the visible features of a traffic for instance packets size, sequence and inter-arrival time.

This project targets encrypted network traffic and demonstrates a traffic analysis attack that exploit vulnerabilities in encrypted communications. This project specifically make use of encrypted traffic features to retrieve visited web pages, watched YouTube videos, and identify users' activities within mobile applications such as sending a tweet or reading an e-mail.

Project considers a thread model shown in Figure 1 consist of a passive attacker running the sniffer to record the network traffic and all the network traffic is secured via use of Secure Socket Layer and Transport Layer Security. The project is decomposed into three modules. In the first module traffic is captured and processed. The next module takes the preprocessed traffic and extract features. Final module is a classification algorithm. The project considers different features such as timestamps, number of bits in a peak, number of bytes transported by outgoing and incoming packets.

What makes retrieving visited webpages possible is that timestamp traces are distinct for each web page. Different web pages have different number of connections to third parties. It might also contain dynamic content. Objects in a web page may all reside in the same server causing back-to-back requests. Connection closing timing vary for each web page. These timing features make timestamp traces unique for a web page. In the case of YouTube videos retrieval, videos are divided into blocks of video content, these blocks are periodically transferred producing cycles of ON-OFF periods. The project uses the number of bits transferred in each ON period (peak) as a feature. In mobile apps, we consider a time series of bytes transported by outgoing and incoming packets.

We design a system that make use of advanced machine learning techniques to achieve an effective way to infer user's' activities with high probability of success. We then demonstrate the use of such attack by presenting an application that builds a profile for specific victim, and predict their next actions, interests, probably major or job and builds a behavioral profile of the targeted victim (e.g., wake up time, work time).

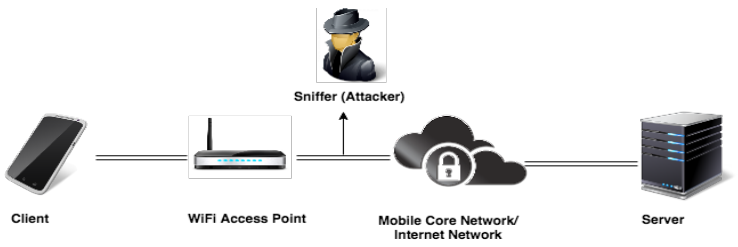


Figure 1: Illustrating attacker of the type considered.

One-Click: Volunteering Mobile Application

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ABSTRACT

One-Click is a secure mobile application that aims to enhance the process of having the right volunteer in the right position that fits their abilities perfectly. One-Click application targets both events' organizers and volunteers in order to build a connection between both parties. By using One-Click, the volunteers will fill interests form and attach the CV so the events that they will be notified of the events that best fit their interests. The organizations, on the other hand, will add events with the ability to check the list of volunteers' profiles that have registered in previous and current events.

Even though there exist many applications that support volunteers and assist them in finding opportunities, these applications are used for a specific region or country. What makes One-Click so special is that it is customized for University students. Moreover, One-Click classifications for events depend mainly on the interests that the events need. When volunteers register, and fill their interests form, the application will automatically match between their interests and opportunities that fit them. Having these two features strengthen the need for such an application, that benefits from the energy of University students based on their interests and skills.

One-Click application idea has been proposed for Prince Sultan University (PSU) in order to help events' organizers in finding appropriate volunteers and students in volunteering and participating. The potential users for One-Click are volunteers and volunteers' seekers (events' organizers) (Figure 1). The functionalities for volunteers include registration, filling their interests form with attaching CV, and displaying a list of upcoming events that are filtered based on the volunteer's interests. A notification of upcoming events that fits volunteers' interests will be received. Registering in any event will require a single button press, since all the information are stored in volunteer's profile. Functionalities of events' organizers include adding an event after registering and displaying the list of registered volunteers in upcoming and past events. After collecting users' requirements and analyzing them, development of the application has been established. Registration functionality has been developed for both volunteers and organizers, and due to shortage in resources a free server was used, so the information are stored on the server. In order to enforce authentication and authorization of the user, a one-time code sent to the user's email and should be entered to complete registration or signing in. In addition, to ensure confidentiality of user's password a hash function with salt was used before storing the password in the database. For organizations, adding an event functionality has been implemented, with an email notification that indicates successful adding of an event and the ability to display the list of registered volunteers. Moreover, volunteers' registration and displaying of events have been implemented.

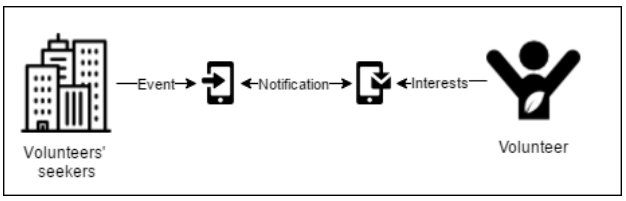


Figure 1: One-Click Volunteering Application

In the future, the application could include volunteering opportunities inside and outside PSU. Moreover, One-Click application could be used by other universities, hospitals or any organization that has special volunteering events. It could be customized to be used as a gate for those who are looking for a job either a part time or a full-time job in any sector as the application eases the process of finding the right and the suitable opportunity.

Arabic Part of Speech Tagger

Danah Albarrak, Sara Almousa
King Faisal University, AlAhssa, Saudi Arabia

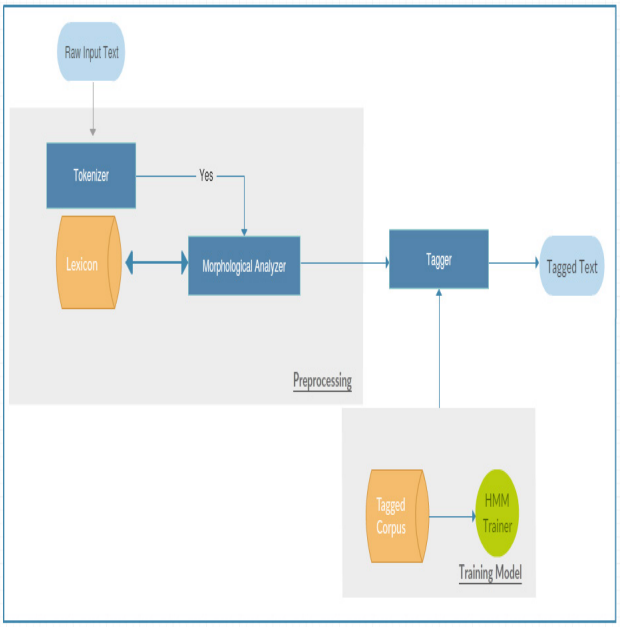
Supervised by
Dr. Bader aljohar

ABSTRACT

A language is an image of an existing nation with its thoughts and culture. It has its unique existence and it is proportionally related to its people. Therefore, in order for them to rise, they must fight in favor of their language. Arabic is not only the official language of the Middle East and North Africa but also a language of many Muslims worldwide. However, there is a void in the area of Arabic language processing. This paper aims to develop a functional Arabic Part of Speech (POS) tagging tool, which is the automatic process of assigning accurate tags to parts of Arabic text.

There are several challenges in the way of processing the Arabic Language such as affix recognition. Some words have affix which looks like additional letters but they are actually part of the word. As an illustration, the word (المتقي) meaning met, starts with letters ال which are considered articles but in this word they are part of it. This means if the two letters (ال) were removed the word will no longer have the same meaning.

Some words in Arabic language raise the issue of ambiguity which is natural in this field. It is considered an aspect of Arabic language. For example, certain words can have multiple candidate tags such as a noun and a verb. One of these multiple tags is the accurate one. So, it needs a mechanism to exclude the others. It is evident that ambiguity should be minimized and its existence reduces the overall performance of the tagger. Indeed, supporting tools raise another challenge due to the limitedness of Arabic language in NLP, it is quite challenging to find state of art version of each tool as it is both time and effort exhausting. In essence, some of the problems that the project aims to solve are that available Arabic part of speech taggers are mostly expensive to license and not user-friendly.



In order to tackle such previously mentioned issues, a hybrid approach will be applied. The hybrid combines the best of both rule-based and stochastic approaches along with supervised learning and preprocessing. Certain tools are adapted from previous research and improved to further meet the needs of the project while others are self-built as there is a shortage in the available field. A lexicon, morphological analyzer, and stemmer are built successfully. Since the work applies supervised learning, a tagged corpus of a general domain is adopted from AMIRA project. The process entails that once a text is inserted it is preprocessed by removing diacritics, sentence detection, punctuation removing and tokenizing. Then each word is passed through the lexicon if it exists it is tagged, if not then it is passed through the morphological analyzer and checked again in the lexicon. If all else fails, machine learning is applied to assign the accurate tag to unknown words. The current project is developed using Java language. Since, previous research showed that there was one major problem in using Python to develop NLP tools for Arabic especially in handling Arabic characters. Therefore, building such tool that solves the mentioned problems will be used to enhance any Arabic NLP application. This project aims to develop a functional Arabic part of speech tagger that will serve Arabic language and open doors for further research in the future.

Driver Drowsiness Detection System using Arduino

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Imam Muhammad ibn Saud Islamic University, Riyadh, Saudi Arabia

Supervised by: **Dr. Lamia Berriche**

ABSTRACT

Drowsiness or sleepiness is the strongly desire to sleep. The danger of drowsiness comes with something needs person's focus or attention such as driving. Drowsiness and driving are dangerous combination. About 518795 accidents happened according to the General Authority for Statistics data in 2015. There are many researches and methods for distraction prevention to help drivers drive safely. However, there are less awareness of the danger of drowsy driving, which increase possibility of traffic accidents. Drowsing can impair drivers by causing slower reaction and compromised vision.

To resolve this problem and to avoid these destructive accidents, the state of the driver needs to be constantly under observation. Consequently, many researches have been done in recent years about detecting drowsy driver by different measures. Vehicle-based measures which take a number of metrics in consideration, movement of the steering wheel, deviations from lane position, pressure on the acceleration pedal, etc., are continuously monitored. It has limitations depending on vehicle type, road conditions, and driver experience. Physiological measures evaluate different physiological signals such as Electromyogram (EMG), Electrocardiogram (ECG). However, the noisy nature of measuring physiological signals remains an issue to be addressed. And behavioral measures, the behavior of the driver, including yawning, eye closure, eye blinking, head pose, *etc.*, is monitored through the use of image processing, wireless technology or micro processing programing. Digital cameras are the basic and popular behavioral method for detecting and tracking the eyes, but video camera has limit to deal with light distribution, and cannot carry out good vision at night when the monitoring is most important. To overcome this limitation, an infrared Light Emitting Diode (LED) have been embedded with a video camera, to detect the eyes by extracting the eye region from the face shape. Conversely, infrared camera with LED get excellent result with high accuracy, but it has high cost.

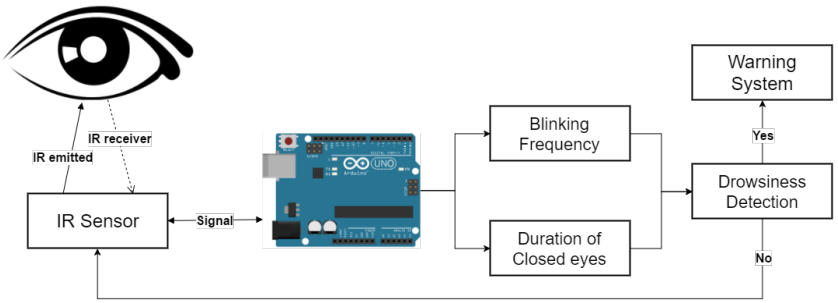


Figure 1: Diagram of the proposed system

In this work, a Driver Drowsiness Detection System Using Arduino is proposed; we mainly concentrate on the driver's visual distraction whether his eyes are open or closed. This system comprises three steps as in figure 1. First, monitoring the eyes of the driver whether they are open or closed with an IR (infrared light radiating) sensor in front of the driver's eyes. Second, measure the blinking frequency and the duration of closed eyes. Finally, alert the driver by activating a buzzer when the driver is drowsy. The system can monitor the driver's eyes to detect short periods of sleep. In different light circumstances, the system gives an excellent eye blinking detection achieving high accuracy. Also, to avoid harmful effect on driver's eyes as it was mentioned in studied before, the radiation of the sensor will be periodical. Additionally, a study will be held on the relationship between the infrared device distance to the driver eyes and the system accuracy.

Test Generator: Automatic Test Creator

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Supervised by:
Dr. Noura Al-Saud

Learning and testing processes are intertwined together and cannot be separated. Where tests are an effective methodology of measuring students' ability of understanding, as well as to know their level of performance. Therefore, instructors must create a good, effective and appropriate assessment for their students. We all know that creating exam papers are usually done manually. The quality of exam mostly refers to the instructor's knowledge, experiences and so on. This is the reason behind the lots of time consuming in creating the exam papers, that includes writing the questions and formatting the paper.

To address this issue, we work to create a system that helps instructors to create a good exams to properly fit the understandability level of the students, which means the exam are not very easy to answer or far away difficult. As well to avoid the extensive amount of work and effort, the exam papers will be formatted and generated automatically.

There are mainly three intended users of the system which are the coordinator, instructor and student. Every academic course has this division, in which instructors are registered into a course under the supervision of a coordinator. The coordinator of the course is the only who's responsible for selecting the exam factors and generating the exam papers. When the exam is generated, the coordinator will be able to delete the exam, download it or print it. Figure1 depicts the process of each user.

The coordinators and instructors manually write different sets of questions from time to time without being concerned about repetition and duplication of the past exam's questions while the exam bank keeps growing. Each question entered in the bank has set of factors, including complexity level, certain topic and the chapter…etc.. During exam generation, the selection of the questions is based on randomization techniques by randomly selecting the questions from the questions' bank based on different factors without repetition of the questions.

In addition, in order to test the student's ability of understanding, instructors can make short quizzes consisting of only multiple choice questions to assess their students' performance before creating the exam. Where the results of the quizzes are going to affect the coordinator determination of the exam difficulty level.

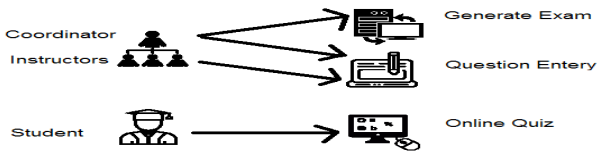


Figure 1: A diagram represents the process of each actor.

In this project, we plan to develop a web-based system as well as mobile-based. The web-based technologies used to implement the proposed solution include Apache Web Server, MySQL, and PHP. While the mobile application is developed to run on Android OS.

Exchanging Needs System

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Supervised by:
Tr. Haifaa Al-Husaini

ABSTRACT

Saudi Arabia attaches great importance to helping the disadvantaged, by providing charities to support them as much as possible. Because of the desire to facilitate the provision to the disadvantaged and not to restrict it to charities only the Exchanging Needs System (ENS) was developed. Actually, there are numerous reasons behind developing the system: Firstly, there is a domestic surplus in homes which is an issue to many, the ENS helps them to take advantage from this surplus by providing it to those who need. Secondly, there is plenty of young talent that needs to be supported especially due the lack of career opportunities available. After searching for the available technical solutions in relation to this problem we found that there are web sites for charities but these are concerned mainly with the definition of the organization and their activities, all the services require people to attend their premises and no help is available on line. The same thing with the business support organizations. Also, you will find that it usually very bureaucratic and has long and often complicated procedures.

ENS is a web application that acts as a gate between people and disadvantaged people, also between people who have small business who need small capital and sponsor who can support the business financially so it can start successfully. Figure 1 shows a high-level architecture diagram of ENS.

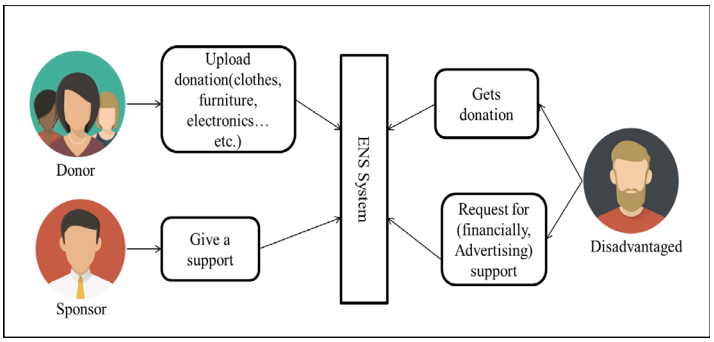


Figure 1: High-level architecture diagram of ENS

The system allows the user after signing in to upload a donation with a picture and description, so the disadvantaged can then browse what is available at the website and take what he requires freely by contacting the person who owns this item.

One additional feature of this application, is the wish list; if the disadvantaged needs something that is not available in the website they can request it using the wish list. So, it will be browsed in the wish lists section and any one can see it and provide it to the disadvantaged. On the other side, the system provides business support to the disadvantaged. It will encourage them to start a business, this will contribute to raising their standard of living and achieve financial security for them. The disadvantaged can select the business support page, then choose from two available options: either financial support or advertising support. Then fill a form with all the details related to the business. With regards to financial support the request will be displayed on the business support requests page, so any sponsor can select from the business to support it. But in advertising support the request will display at an advertisements page in the website to help the business gaining more customers.

The software technologies used to implement the proposed system include HTML, PHP, MySQL and Apache Web Server. The web application is developed to run on all devices that have an internet connection.

Using Smart Application for Kids Center

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Noor Al-Jhawari ,Ibtisam Al-Shibli ,
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Dr. Hilal Al Maqbali

ABSTRACT

Kids land is a private center located in North al Batinah Oman. The center mainly provides entertainment and educational services for Omani kids. This project aims to build an interactive smart mobile application that will include all the vital information related to the services offered by the center and will be helpful in establishing and creating an interactive, lively learning environment for the children in the center. Since Kids land center is a new establishment , the center will benefit from the new advance technologies such as smart mobile application which is a great innovation that can enhance not only children playing experience but also stimulate learning while having fun in the center. The smart mobile application is subdivided into two parts. The first one will be for the administrator who has the full permission, control and access to the application while the second part are for the users online approved by the administrator after registering on the center's website by filling up required information on the system . Our motivation is to be of help to the parents to experience the use this smart mobile application .

The main objective of this smart mobile application is to facilitate an easy process of booking and accessing offered activities by the Kid land center . Furthermore, this can also be a medium of communication by the center in order to disseminate relevant news, announcements and virtually market the children center through digital advertisement for the children and their parents. Additionally, the smart application will be able notify parents about their children performance by the use of an online tracking system. This online system will provide details about the kids movements inside the center (by number of steps), heartbeats, body temperature and the type of food chosen to eat by their children. All these details will be track electronically by sensors and data will be send to the server to reach the parent account in an instant through the use of our application. The smart mobile application will enhance the center monitoring capabilities, and will get an instant parents feedback that will give the center set guidelines of children activities that will not only children learning environment and experience but make sure that they are safe and their needs are being attended to by the center.

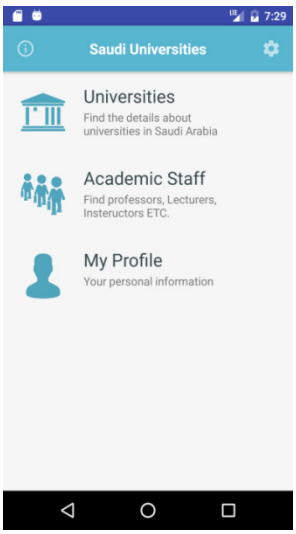
In the future, we hope that the smart mobile application will bring great changes not only in the Kids land center but can also be useful to other children's center in the country .Utilization of a more advanced application that can contain and gather larger amount of information in more than one children's care center that can be used in long term basis can help in further research and study that can the impact children education and health conditions in Oman.

SAUI: Smart Higher Education Information Tracking System

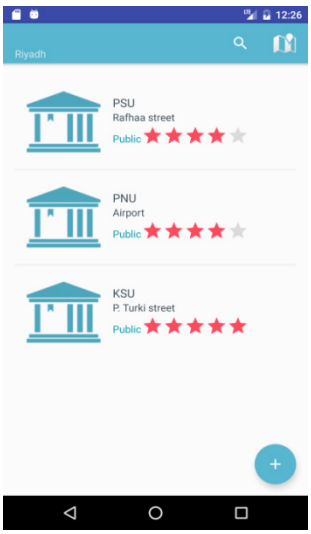
Alanoud Al Toraif, Tahani Otaibi, and Dr. Liyakathunisa Syed
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ABSTRACT

In the past several years ,the use of smart phones has quickly evolved from a fringe curiosity to an absolute necessity .In today's connected world ,the impact and usage of mobile phones- especially smart phones -is prevalent among today's student populations .Thus ,it has become imperative for educational institutions to integrate mobile technologies into their student communications plans and strategies .Searching for a university to pursue higher education has never been an easy process ,it requires a lot of time .The decision varies according to the individual's preference and many factors should be kept in mind ,like: the university's size ,location ,rating faculty and much more .If there is a way of narrowing down all the universities in the region to compare and see what would best-fit one's preferences ,the process could be made easier as it takes less effort and time. The main problem is ,there is not much information or directories available to track the universities in Saudi Arabia ,this result in insufficient knowledge about universities in Saudi Arabia to those who want to research all their options before applying for higher education .Companies and individuals in Saudi or abroad who seek opportunities to collaborate with Saudi universities struggle to find the required information .In this paper we have proposed a Smart Mobile Application for tracking Higher Education Information Tracking System .The proposed mobile application serves and provides insight into the higher education system in Saudi Arabia .So that ,search is simplified for people in the kingdom or abroad .It can be described as an e-catalogue that contains information about all universities and academic staff to discover and track .Thus ,offers profiles of staff and university with their specializations and contact information and much more .The following technologies were used to develop the app ,GPS to display and customize location information ,XML to customize the user interface and SQLite to preform basic database operations .The basis of applications is built on many methods provided from the Android SDK such as Activities ,Lists ,Views ,Dialogs and much more .All incased in an Android platform .As a result ,the system narrows down the search required for selecting a particular university for many searchers .Effortlessly interconnects the app with other apps such as mail ,phone ,browser ,maps… etc .Future enhancement on the application includes ,ranking feature ,and feedback section within the profile of each university and staff member.







Books Exchanging Mobile Application with Recommendation System

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Supervised by :
Nouf AlAloula

ABSTRACT

Throughout our years as university students, we face a considerable challenge in acquiring the textbooks and references that are mandatory for the courses, which the students take, especially in the beginning of each semester. In addition to the effort, and time spent on finding the books, cost is also a concern. This warrants a necessary utilization of a new method that could ease the process of searching and saving resources through rapidly providing used books. The current methods of using students' own social networks, communicating via conventional texting, emails, or groups, are unorganized and chaotic solutions.

One of the unique presented solutions is a designated mobile application that intends to serve as a medium between students to search for books from friends, colleagues, or previous students on one hand, and provide them with the means to offer their books for borrowing on the other hand. Additionally, a recommendation system, which is a multi-disciplinary system, that involves fields like Artificial intelligence, Data mining, and Human Computer interaction will be provided in the application. The Content-Based Approach, for it should make the obtaining of required books easier to find for the users.

Universally, technology has incorporated into this process as a medium. Such as students who create a website to exchange or give away their books. Nevertheless, the previous methods, as combination of book exchange with recommendation system, are not implemented in our region, even though it is practical. Consequently, it will be unique in the proposed application. The goal of acquiring desired books conveniently for the user is consolidated by using Automatic Recommendation System, which is one of the fundamental features in this application. It takes advantage of prior knowledge of the User's major and courses in purpose of suggesting relatable books that are available for exchanging. It should be with high precision.

Meaning, high probability that the user will need the suggested books. The chosen filtering approach is the Content-Based Filtering (Figure 1). This approach is very useful in the book exchanging case. It directs students who share the same field to get recommended for each other. For instance, Computer Science students should have an interface slightly different from the Business Administration students' interface. That is because the system will recommend books based on the content they search in addition to the content they share.

The application supports the exchanging process through the concept of crowdsourcing. It provides an environment for students to request the books they need from other students whether in intentions of borrowing the books or obtaining them for themselves. Moreover, they can rate their experience with each other; they can even report the other side of the exchange if they receive an abuse or any offenses by them.

Essentially, the Application aims for a socially and digitally safe connecting method that focuses on academic books for various college's students without commercial profits. This can make effective impact by encouraging students to read and recycle their already finished books by exchanging them with each other.

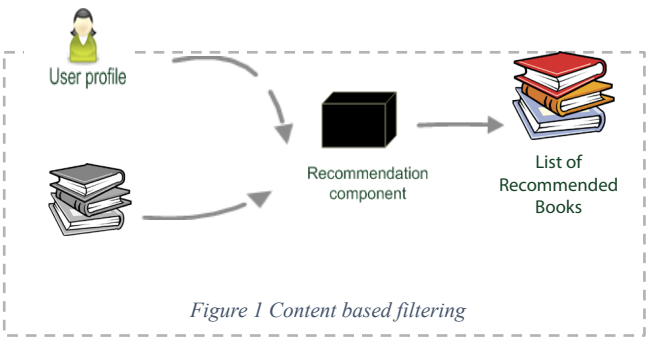


Figure 1 Content based filtering

Learning Algorithm Game

Rawan Abdulaziz Al Harthi, Asma Abdul Hadi Daraan, Mariam Mohammed Noori, Reem Aboud Al Nofei

Supervised by:
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ABSTRACT

Data structures and algorithms are important cognitive field in computer science. They play a key role in programming, problem solving and organizing information into a computer, which means that you must learn data structures to become a good programmer. With no Arab Specialized websites in this area, the idea of our project began. This project aims to help students who want to learn the algorithms and data structures in a simple, smart and entertaining way by providing information, explanation and example to solve it about a particular concept in every stage of the game. Learning algorithms and data structures through a game that combine education and entertainment, enable the player to get information and facilitate understanding of algorithms and data structures and interact with the system via passing stages in the game. We also focus on the progress of the player and the competition by challenging himself to be faster in the matter of time. We want to make sure that it can be available at any platform from the beginning. Therefore, we choose to do it as a website so it can be accessed from any device (Computers, phones and tablets). Learning Algorithm Game website will programming using HTML, PHP and JavaScript languages.



Initial Prototype

Breaking into a Secure Wireless Connection WPA2

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Supervised by:
Monther Aldwairi

ABSTRACT

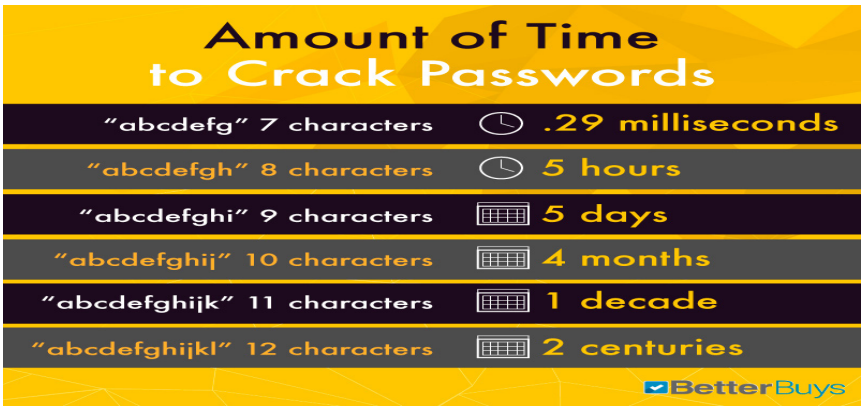
In this paper I will briefly explain how you can break into a wireless network connection using Kali Linux. Kali Linux is an open source operating system. Kali Linux provide many tools and support multiple languages. Kali Linux have more than 600 penetrations tools disrupted between thirteen categories. Each category have its own tools name and uses. The basic commands that we use to break the wireless connection are:

- Airmon-ng: to show what type of wireless card that`s attached to the PC.
- Airmon-ng start wlan0: this command is to enable monitoring the packets from the network.
- Airodump-ng wlan0mon: this command will start capturing the packets.
- Aircrack-ng: is the command we use to get the communication channel (handshake).

The process of breaking the wireless connection is based on a list of passwords. This mean that if the password is not listed the program will not be able to find it. In the first stage of breaking in the wireless connection we will need to use Airmon-ng to know the type of the wireless card that we will use it in the next stage. After that we will use Airmon-ng start wlan0 (wlan0 can be different from one device to the other). Using this command will enable monitoring packets in the network. To start monitoring the packet we use Airmon-ng wlan0mon. This command will start capturing the packet that go through the network and it will provide specific information about it such as:

- The BBSID (Basic Service Set Identification), the MAC address,
- CH: Channel number (taken from beacon packets),

and much more information but we are interested in these only. After we find the target that we want to attack we use Ctrl + C to stop capturing. The next stage is using Airodump-ng –w name of the wireless –c channel number –bssid the bssid wlan0mon, this command will allowed us to get the station of the wireless that we will use to make a handshake and get the password. Aireplay-ng –deauth number of tries we want to do –a the router dassid –c the mad address of the station wlan0mon. After we get the handshake address, a file will be created with the name of the network-01.cap. In order to try and crack the password using different passwords lists, Aircrack-ng –w/root/Desktop/dark0de.lst "this is the root/location of the list and you can download them from internet" –b station address /root/"name of the file that was created when we get the handshake"-01.c. the last stage of this process is to wait until the program find a match. If there is no result found try other list and wider lists to try and figure out the password. Here is a statistics on the time it take to break the wifi vs the length of the password.



Auxilio: A Semi-Autonomous Firefighting Drone

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Electrical and Computer Engineering Department

ABSTRACT

Fire is a critical problem that has been widely addressed due to its disastrous consequences. Besides property damage, a major intolerable consequence of fire is the loss of human lives. In hope of minimizing the problem, a drone (Auxilio, the Latin word for assist) is designed to assist firemen in their mission. The project aims to supersede other existing firefighting technologies such as humanoids and ground robots. The speed of drones, their ability to provide a bird's eye view of a fire site, and their ability to fly over obstacles, are some of the advantages that distinguish them from other technologies in such situations.

The drone is designed to accommodate the needs of firemen in indoor and outdoor environments. Oil fire disasters and outside burning buildings are outdoor targeted environments in Kuwait. Indoor environments vary widely, but the project excels the most in assisting firemen in high-rise buildings and storage buildings or warehouses.

The drone performs several of its functions autonomously. Firstly, the drone has an autonomous anti-collision system (by the use of sonar sensors) to protect it from any obstacles in indoor or outdoor environments. This is essential to avoid crashing the drone, or even worse, hurting firemen or civilians. Secondly, due to the conditions in which the drone operates in, it is necessary to use a cooling system to protect the drone's components from the high temperature of the environment. The developed thermoelectric cooling system is activated automatically, when high temperature is detected.

In order to control the drone indoor remotely, a communication system is needed. The main features of the developed radio control communication system are low latency, good penetration, and high reliability. A 433MHz and 500mW transmitter and receiver are utilized, in order to maximize signal penetration through obstacles and smoke.

For the drone to be able to help firemen see the environment before entering, a first person view (FPV) system is required. In the case when the environment is not filled with smoke, a digital camera (GoPro Hero 4) can provide a good quality FPV of the environment. On the other hand, when the environment is filled with smoke, the feed is switched to the thermal camera (FLIR Tau 2 324). The video from the cameras is transmitted to the firemen through a radio control communication system consisting of a 1.3GHz, 600mW, and 8-channel transmitter and receiver.

Hence, the project provides a more practical method of tackling fire disasters. Since the drone can quickly provide firemen with an overview of the fire site due to its speed and altitude, firemen can use this information to assess the fire site and to proceed with their mission accordingly. Without the use of drones, inspection of the site will require a lot of time.

Dimension	101.6(W) x 90.1(L) x 30(H) cm
UAV Weight	6400g
Payload	3700g
Operating Temperature	≤ 1300°C
Maximum Flight Time	44 minutes
Recommended Flight Time	17.6 to 30.8 minutes
Range of Communication	Tested up to 500m
Distance to Obstacles	≤ 3.5m

Table 1: Drone Specifications



Figure 1: A view of the project

Oman Smart Health Care System

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Supervisor
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ABSTRACT

SHC(Smart Health Care System) is a local intelligent system that have all the patients' medical report in sultan of Oman in one place. The developed system will help to maintain all health information about patients that is collected from the concerned hospital during patient visit. The collected information in SHC could be used in the future for preventive care, fast access to patient's data and accurate transmission of electronic health data between doctors, hospitals, emergency rooms, labs, and patients themselves. In fact, SHC is an revolutionary system in health sector in which doctors and other healthcare practitioners such as dietitians, physical therapists, diabetes educators, specialists, as well as hospitals, clinics, and nursing homes work together to coordinate the best care possible for each patients. In addition, SHC integrates mobile technology and smart devices in its engine in which patient's data will be collected either by recording the patient's vital-sign generated by the wearable devises or by entering data by the patient themselves through using an installed mobile application in their mobile. The concept of collecting data by this new technology would help to improve care system.

As mentioned earlier, SHC will use mobile technologies and internet in the area of health industry which has good impact nowadays. The main reason of the proposed system is to improve, help and assist patients' and to provide continuous information about the patient for making better healthcare decisions in critical situation. In addition, SHC would seek to use the concept of Internet of things which allowed integrating smart devices that are connected to the network, which can be managed from the web to monitor and record the patient's condition. In addition, SHC will be designed to be a self-service and user-friendly system where intelligent paradigm will be integrated in its components. The proposed system will consist from four main units working in an integrated manner to provide quality services to the SHC beneficiaries. The thematic suggested units of SHC are:

- Patients' unit: this unit provide many of different services to patients as well as to the doctors. However, the engine of this unit is process the data that are registered either manually by the patients or it's collected by using sensors for disabled patients. The collected data will used by the concerned doctor to monitor his patients at any time apart from their consulting hours. Moreover, the main benefit of this unit is to facilities home care and regular health updates to clinicians. Moreover, this unit will reduce the chances of redundant or inappropriate care as well as costs for care will be less.

- Visitor unit: The search engine unit of SHC designs to include all hospitals in Sultanate of Oman. The reason of using such a unit is to help patients to scans hospitals sites for their services, labs, prices, and patient's feedback within seconds. When users choose a hospital, SHC are redirected to a partner website to complete their request. In addition to the hospital search feature, SHC provides interactive maps and displays all analytics information about hospitals rates in Oman.

- Analysis unit: Because of the huge amounts of data generated by healthcare transactions from the hospital in Sultanate of Oman are too voluminous to be processed and analyzed by traditional methods. Therefore in this project we suggest to use Data mining techniques. The suggested techniques can improve decision-making by discovering solutions in large amounts of complex data. However the main advantages of using this unit in SHC are :

    1. Managing the process of generating daily and weekly reports which serve decision makers to make the right decisions about the possibilities of enhancing the healthcare processes and services.

    2. Identify and track chronic disease states and high-risk patients, design appropriate interventions, and reduce the number of hospital admissions and claims to aid healthcare management.

While preserving the tradition of health care system, adding the mentioned flavor of technology would create the best convenient solutions to the health sector. SHC is considering an alternative solution to the current health care system that can be used to help patients with chronic diseases. Generally speaking, SHC aims to improve the quality of life of patients, not just monitoring them and direct them to improve their life.

I Can Help You : An Arabic Sign Language Interpreter for Hospital Reception

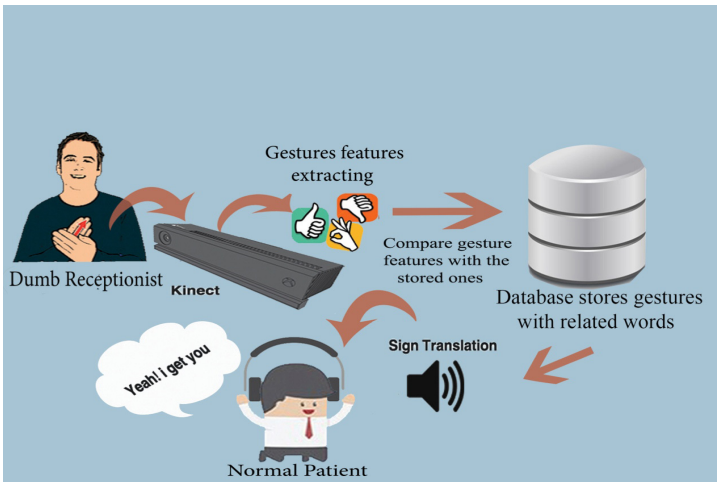
Wejdan Bin Thabet, Bayan Alzhrani, Abeer Ba'odah, Doaa Dambous, Haneen Al-Maramhei, Elaf Zaker
King Abdulaziz University, Jeddah, Saudi Arabia

Supervised by:
Dr. Maysoon Abulkhair

ABSTRACT

Special needs people strongly need to be integerated in our society. Deaf and dumb people are samples of special needs people, who present a large number of people in Arab society. We aim to facilitate their lives, remove some of the bariers, and make them feel more comfortable in communicating and working with other people. Because of that, we had decided to work on developing a system that converts the sign language to voice to facilitate the communication with other people.

"I Can Help You" is a desktop application that facilitates communication. We selected the hospital receptionist as a special case since it is prime position which needs to communicate with a variety of people. It interprets Arabic sign language to voice to be heard by normal people. The application integrates some components which are Kinect camera connected to a PC and a database. The camera captures the getures that made by the dumb receptionist and extracts the features of those gestures. The getures features then will be compared with the ones that are already stored in the database to find a best match for the exact translation. After comparing gestures features, the correct meaning of the gesture will be converted to voice. The figure on the right shows the architecture of the system.



There are some similar applications but some of them have some limitations according to our scope. One of them is a device to convert sign language into a text and voice using sensors placed on gloves that consists of many hardware. Furthermore, it might be annoying to put on the gloves while working. Another device is the UNI tablet application which enables two-way communication between the dumb and normal people. It depends on leap motion and consists of a couple of cameras to track the user's gestures. The app translates those gestures into speech or text displayed on the screen .The app also translates spoken words into written text for the dumb person to read. UNI is a good technology but if something happened to the tablet or the tablet battery finished, the communication will stop. Since our scope is the hospital reception, so we need to use something that is always available during the communication. The last related application is a Leap Motion controller which is a small device connected to a computer using a USB. It translates the Australian sign language into actions for the computer to perform. The leap motion technique has more limited data description in two situations, which are: when the hands rotate and it is perpendicular to the controller, and when two fingers are brought together.

It is clear that the current similar applications have limitations in the integrated devises utilization and lack in translating Arabic sign language. Therefore, we decided on using Kinect technique, which overcome the leap motion limitations in figuring out some situations, and provides ease of use for the dumb receptionist.

Based on our scope, we had selected some main questions that usually asked by the receptionist and stored them in a database. Then, we had started recording the gestures of these chosen questions and stored them in the software to compare them later with the gesture that will be captured by the Kinect. We are working on an algorithm to detect the finger gestures captured by the Kinect to get an accurate mapping to the related questions.

Face Recognition using Kinect: Application to Authentication and Suspect Detection

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ABSTRACT

Identity, the defining quality of a person, is an important trait that is acquired to maintain a system of order. The face recognition concept of classifying various subjects to their respective identities is adopted as the primary task of this system as it is the most effortless method of biometric data acquisition, in regards to user intervention.

Firstly, for the system to detect a certain face, it has to be enrolled in the system's database. The enrolment of a subject is done by recording their face image, extracting the features that identify this person and saving them according to their name and ID. After the subject has been enrolled, the saved face signature can be used to identify them. Secondly, the authentication mode is used to grant or deny permission to a user based on their name, pin code, and face. The system captures the face image and extracts the features to compare it with the known face images, based on a classifier. If a match is found, the system grants access to the user. Otherwise the user will be denied access. This can be a way to authorize a user and give them access to information and services. This mode is called **Authentication mode** (see Figure 1),. The system is also capable of live recognition. This means that, given a live video feed of a scene, the system is able to immediately detect and recognize a particular face, a suspect for example. In this mode, which we called a **suspect detection mode** (see Figure 2), an alarm can be triggered if the suspect is recognized. Hence, this mode is appropriate for security surveillance such as in airports.

For enrollment system operates as follows: sequence of image of a subject's face is obtained via a Kinect II sensor then a face signatures is extracted from the image using the Local Binary Pattern (LBP). These signatures are used to train a support vector machine classifier associate to the enrolled person. One the subject is enrolled its information (ID, SVM classifier) can then be used to in either authentication or suspect detection modes. The system has been tested over 15 subjects and achieved 100% accuracy rate.

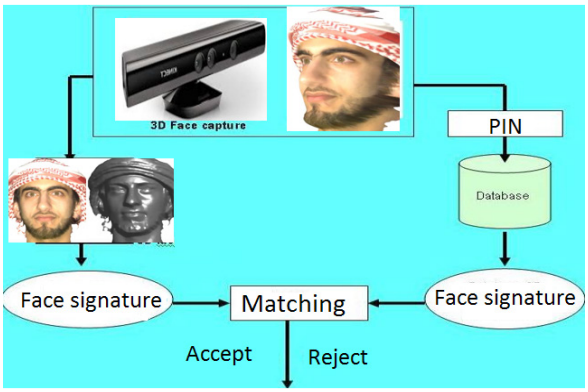


Figure 1 Authentication Mode

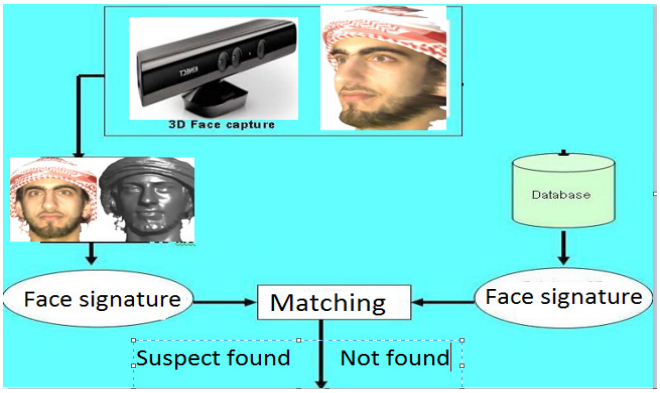


Figure 2 Suspect Detection Mode

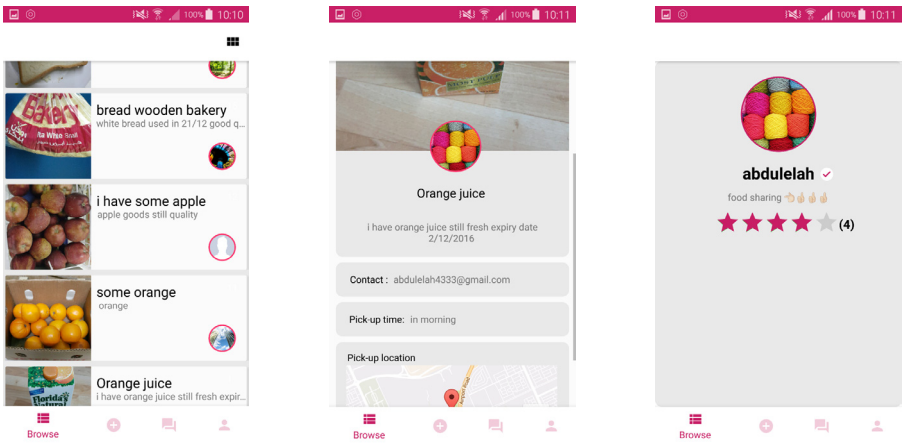
Food Sharing Mobile Application

Abdulelah Al Shimimry, Bandar Alshareef

Supervised by:
Dr. Raad Alturki
Al Imam Mohammad Ibn Saud Islamic University, Riyadh, Saudi Arabia

ABSTRACT

Food is a basic necessity of life, it gives the strength and energy needed for the human body that cannot be replicated by dietary supplements. A lot of people take food for granted, which leads to the food waste issue that our society suffers from. Unfortunately, a lot of people don't realize that we have a food waste issue, or they don't realize the extent of it, and it affects us around the globe. One statistic shows that in 2013 around half the food in the world is wasted. [1] Another static shows that every year in EU about 100 million tons of food wasted and if the problem is not solved, it could rise to over 120 million tons by 2020. [2]. Other source shows that 1.3 billion tons around the world every year of food produced for human is either wasted or discarded. [3] A Recent study by King Saud University shows that about 4,500 tons of food wasted each day during Ramadan, which amounts to approximately 1.2 million Saudi Riyal. Food waste is clearly a big issue in Saudi Arabia [4] and probably the Gulf region. It is expected that the Gulf would reach a rate of 49.1 million metric tons of food waste with around 35 percent of the household waste being food products [5]. To Tackle this problem, we have developed a mobile application that makes the most of people and use the crowd of individuals to solve this problem. The Idea of allowing individuals to share resources have receive tremendous focus in recent years and it is known as Shared economy.



view the list of items offered | view Specific Item | Verified User with his rating

Figure 1: Some screenshot of the interface

Shared economy is the economy of sharing goods and services between individuals, either for a price or completely for free. Good examples for shared economy is Airbnb, a popular services designed for travellers to find and rent holiday accommodation. Another example is Uber, a popular mobile application for users to easily find a ride rather than wait for a taxi, and in most cases, even cheaper. Our mobile application was insoired by the shared econmy concept and thus we implemented mobile application that provides platform for individuals to share their food with people around them in help to fight food waste. In fact, there are few applications that introduced food sharing idea and implemented the shared economy concept like (Olio, Sharing dais, LeftoverSwap) but all of them have some limitations that can be adapted to our society. The mobile application that we have developed allow users to post the food they're willing to offer by providing a picture and a brief description, include address and contact information, and let users exchange messages right through the application to make the process easier.

Keywords: food sharing, mobile app, shared economy

LingOcean: An M-Learning Platform for Language Learning

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ABSTRACT

Since new generation learners are obsessed with new technologies, why not leverage this for learning purposes? Traditional learning techniques are not attractive for young students seeking an entertaining learning experience. Teachers need to adopt modern ways to encourage and support students learning. Moreover, due to their busy schedule, teachers appreciate tools that would help them prepare and deliver the learning content. This project aims to address these requirements by designing and developing a semi-automated tool that assists the teacher to prepare and deliver learning packages.

The teacher provides a list of vocabulary and the system provides assistance to generate learning content around the entered words, such as; example sentences, word definitions, and sentence pronunciation. Then the student can use a mobile App to download desired learning material and use interactive learning games and activities to study and practice the content of the learning package.

This application targets different people categories. First, native and non-native speakers; it is meant for native speakers, as it will not provide any kind of translations for the learner. Whereas, non-native speakers who have already a background about the Arabic language can use this application to enlarge their knowledge and enrich their vocabulary. Second, this application will enable the teacher to specify the level of the content (basic, intermediate or advanced); which will give the opportunity to anyone to use the application by choosing adequate packages according to their levels.

The proposed system provides several benefits and has the potential to significantly assist language learning. First, encouraging independent learning of vocabulary and its usage through engaging game-like interactive learning activities where listening, speaking and reading skills can be significantly improved. This, in turn, encourages learners to explore on their own and enrich their linguistic skills. Second, accessing learning content in a flexible way from anywhere, anytime and from a variety of devices (the web, iOS, Android, Windows, etc.), allowing learners to use their idle time for extra learning activities outside the classroom. This enables self-directed learning as students can choose content appropriate to their differing interests, needs, and skill levels. Third, facilitating learning content authoring by providing a range of natural language processing (NLP) services to semi-automatically generate content based on the provided vocabularies by the teacher. Example NLP services to be provided include stemming, dictionary lookups, and other services. Finally, facilitating sharing and reusing learning content by making them accessible and exchangeable among teachers in a community.

The application is portable to multiple mobile platforms and it is built using Node.js, Angular and Ionic platforms. These technologies all combined together allow us to develop an application that runs both on the web and on mobile devices. The main aim of this project is to facilitate the authoring of the learning material for the teacher; meanwhile providing an entertaining learning experience for the pupils.

Reading Projector

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Supervised by:
Dr.Iyad Jafar

ABSTRACT

Books are being published now in swarming volumes. The shelves of books-stalls are being crowded with the volumes in attractive get-ups. But, unfortunately, good books are not always ready at hand, or maybe our budgets don't always help.

The PDF e-books idea came out inspired from these issues, and it became very popular because it solved lots of problems. Yet it missed one thing, it missed the flexibility of reading a paper book, the ability to flip to the page you want easily and go back and forth, especially if you are studying from that book. Also, it missed the essence feeling you get from flipping the page, from reading an actual volume between your hands, to feel the rush while reading an interesting subject and the familiarity of it.

Reading Projector aims to combine the advantages of an e-book without losing the sensation of an actual physical book. It will occupy less space compared to paper books. Also, the cost will be paid once for the system itself, then you can read as much books as you want with no costs added.

It focuses on developing a Raspberry Pi Application that utilizes real-time image processing and number recognition, using Python programming language and OpenCV library integrated together, in order to provide the user with the joy of reading PDF books with the real page flipping sensation by projecting this e-book on a physical plain book.

This system should accept any given e-book, do some processing on it, capture by an attached Raspberry pi camera the desired page number you want the e-book to be opened at and then project it using a mini projector, which is connected to the system, on a blank physical page.

This prototype setup, as seen in Figure 1, was built by hand to demonstrate the feasibility and applicability of the idea. The setup that holds the system will be later changed to be more compact, flexible and portable.

The application was tested in multiple lightening conditions, and the results were impressive except for the processing speed which depends on the Raspberry Pi's specifications along with the speed of the PDF viewer itself.



Figure 1: Final prototype of the reading projector

Uemoji: Classroom Emotion Detection System

Latifa Mohammed Aldukhi, Saja Mohammed Aldabban, and Manar Abdulaziz Buhliqa

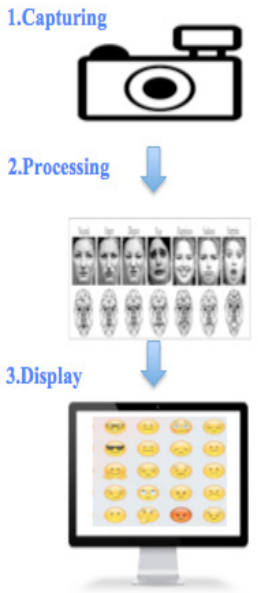
Supervised by:
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ABSTRACT

Communication is an important aspect of our daily lives, in the sense that we need to interact with other people to bond with them. Although verbal interaction plays the key role in communication, other factors such as facial expressions, tone, body language etc. also form an important part of a conversation. These factors play an important role in expressing our emotions and intentions. And when it comes to education, communication forms an integral part.

In various universities of Saudi Arabia, male teachers teach female students without having any direct eye contact with the students. However, for an effective teaching-learning process it is important to have such a contact. The teachers generally depend on verbal replies of the students (if any) otherwise they just assume that the objectives of the class are being achieved. The problem needs to be addressed in a manner such that the sentiments of the people who follow the local traditions are not hurt, and Uemoji is one such solution.

Uemoji's goal is to make the teacher interact with his students through emotion icons (emoticons) displayed on a screen. Since facial expressions of the students act as a real-time feedback for the teacher, Uemoji uses emoticons to simulate the expressions of the students, which are displayed on the screen.



Uemoji has three major processes. 1) Capture: An optical sensor, typically a camera, captures the facial expressions of the students that are to be simulated.

2) Process: An algorithm then processes and interprets the expression, by identifying various groups of facial muscles, called action units. The interpretation is done by mapping the combination of action unit activity to different emotions.3) Display: Finally, the response part converts the data of facial expression to an equivalent emoji, which is displayed on the screen in real-time so the emoji can be seen moment-by-moment.

As a result, both male teachers and female students can benefit from using Uemoji system, as it would simulate barrier-less classroom environment to some extent, thus enhancing the effectiveness of the teaching-learning process.

For male teachers, the system helps to understand the behavior and state of mind of their female students. Also, based on the emoji feedback, the teachers would be able improve accordingly for an effective teaching process. Uemoji system puts the correct emoji of students in teacher's screen it is the best solution to achieve better results of education development and interaction. Uemoji system adds an emotional intelligence to our daily life and our digital world. Uemoji developed especially to interact with other people not just with technology itself that is how artificial intelligence be part of our life.

Ibn Battuta: An Intelligent Traveler Guidance

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Supervised by:
T.Alaa Menshawi

ABSTRACT

A good planning is a major factor that makes a trip more enjoyable and less stressful nor frustrating. Planning a perfect trip can be a daunting task and consume a lot of time for searching and selecting the best choice among huge resources of information. The process is considered costly as well when a customer consults a travel agent to do this task for him/her. Accordingly, some existing systems have solved these problems by constructing a standard daily trip schedules for popular tourist destinations and suggest them to users when needed. However, by this standard suggestion all users will have the same schedule despite their preferences, needs, and circumstances. Therefore, this characteristic is not considered an efficient solution since no customization is given for people's different preferences and requirements.

To address this weakness, the idea of an intelligent system in a form of mobile application has been inspired. This application helps travelers to customize their trip schedule to match their needs as well as gets involved with them during their journey. The outstanding feature provided by Ibn Battuta, which addresses the gap in current systems, is the ability to construct a customized trip schedule for each day of the travel journey in short time. This is achieved by developing an intelligent, creative and unique algorithm that matches traveler's needs and preferences. There are many factors considered during the construction of the trip schedule to make it as efficient and effective as possible. Saving traveller's time is the first important aspect to be considered in the plan. The application takes advantage of building the daily schedule for the traveler based on the shortest distance between tourist attractions. It uses Mashup technology to integrate some Google map's features in order to measure the shortest distance between attractions, and display the trip on the map for easy user tracking.

Budget is another important aspect taken into account when building the trip program. In order to have a cost-effective plan; attractions with discounted offers have the highest priority in selecting places for the journey. Moreover, type of attractions preferred by travellers (e.g. countryside, seaside and city centers), time dedicated for each type are deemed in the building process. The most recommended places and landmarks are given high priority as well. A traveler can exclude some previously visited places from the trip schedule. Number of travellers including kids and adults, budget available, activities preferred (nature, shopping and etc.), number of hours spends in touring are included while constructing the trip schedule. Another interesting feature that is embedded in this application to make it more interactive and intelligent is the ubiquity. Ibn Battuta is ubiquitous with the traveller; it applies the idea of ubiquitous computing by tracking traveller's location and informing him/her when they are surrounded by some recommended and popular attractions, landmarks or highly recommended restaurants with the use of "Geofences" feature on Android studio.

In addition, Ibn Battuta offers additional feature that enable travelers to communicate, ask questions, get answers, and search for up-to-date information. It also saves traveller time and effort when searching for specific information. These requirements are addressed by designing a customized page for a number of famous cities in each country. This page encompasses the most famous attraction in each city, weather forecast, all necessary information about a given place (e.g. contact information, and location), and the highly recommended restaurants.

All information provided within the page is authentic and creditable. It is important for the application to encompass a realistic and reliable information and recommendation for all the sightseeing places. Therefore, the application allows the travelers to interact and give their own feedback about the attractions upon the completion of each day activities. Moreover, owners of the attractions such as: restaurants, shopping centers, and other attractions can modify the page and response to visitors' concerns.

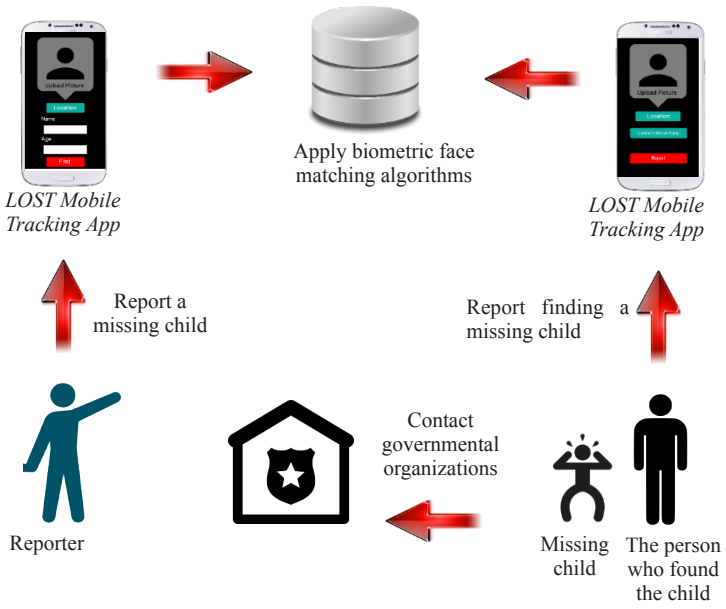
LOST: Mobile Tracking App to Track Lost Cases Using Facial Feature Matching

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Supervised by:
Dr Evi Indriasari Mansor

ABSTRACT

This project presents an early design of a mobile tracking app to track lost cases using facial based matching by applying crowdsourcing framework. Around the world, disappearances cases are daily reported. These cases include, missing children, elderly Alzheimer's and separated children from their refugee families. But with the significant growing of technology that accentuates crowdsourcing which might contribute in reducing missing cases. This contribution of technology indispensably provides the ability of accomplishing different tasks including analyzing of location-based data and facial images. This research aims to invest smartphones as mechanisms for reporting missing cases, tracking registered requests and notifying searching results. By developing a shared database that stores missing cases reports, a biometric face matching algorithms are preformed to identikit face features. In case of successful identification, a notification message will be sent to the reporter. The project uses Microsoft Face API cognitive service that provides advanced facial feature matching algorithms. Several Face API functions are used including face grouping, face identification and face matching. The process starts by creating a database, Person Group, which contains the people's faces. To improve the performance of face identification and matching, three face images are required for each person object. Once the Person Group is created, a face identification can be performed to find a matching result with a detected face. To increase the collaboration with governmental organizations, different police centers location are provided to the reporter. This research is based on crowdsourcing which urging public to contribute with government organizations to find the lost cases. This will prompt the search space and speed. Testing is critically important to this project. Testing will be applied into two levels, front-end and back-end sides of the project. For the front-end testing, usability testing evaluation sessions will be conducted with a group of potential users. Whilst the back-end side of the project will be evaluated based on a face matching tests that will be applied on a testing database. The following figure shows the concept of the initial idea of LOST mobile app (Figure 1).



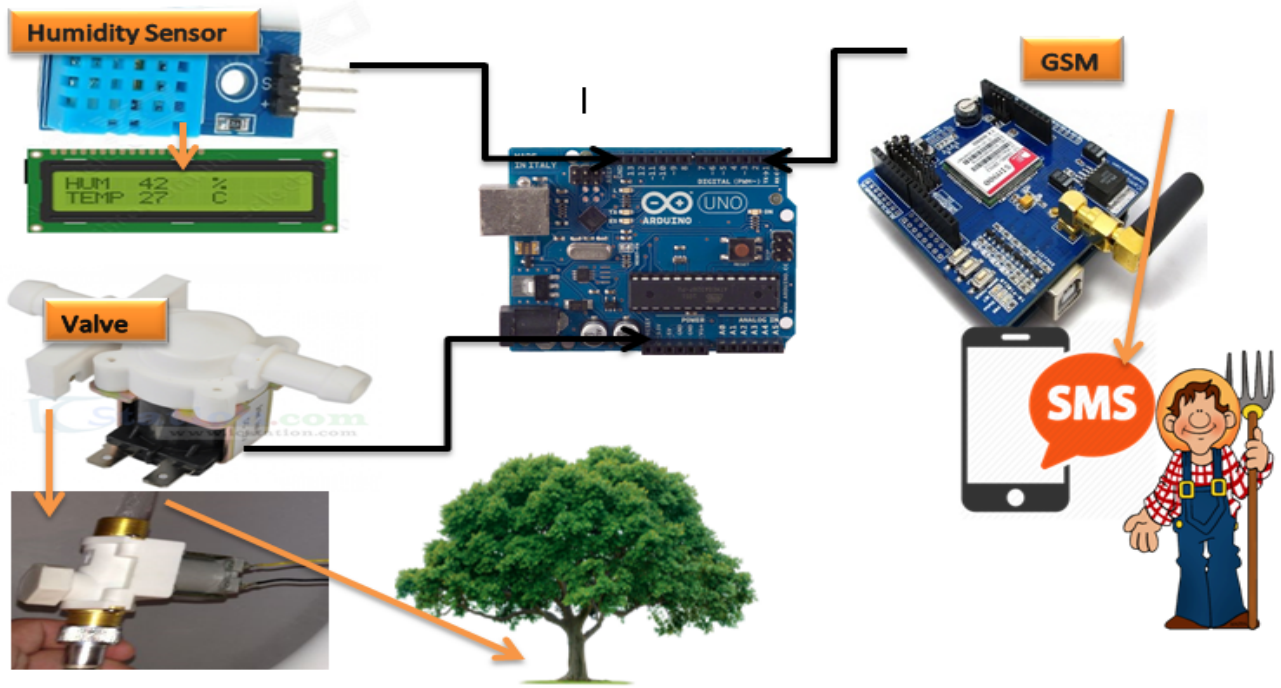
Conserving the Nature Resources through New Age Smart Farming

Authers: Shorouq Hassan Al-Hashmi, Entesar Abdullah Al-Shukaili, Basma Said Al-Hosni Aisha Ali Al-Shibli, and Wasan Aiman Al-Kashri.
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College of Applied Sciences – Sohar, Oman

Supervised by:
Mr. Faizal Hajamohideen

ABSTRACT

Nowadays the technology has been developed in different fields like education, manufacturing, economy and agriculture. The Technology has become one of the most important parts in our lives. It makes interacting and communicating with surroundings and things much easier and flexible. Therefore we have come with an idea that is concerned in agriculture field. This idea is illustrated on how to conserve water in a good manner and how to control different farms remotely by informing farmers about soil and water details. The system will be programed by Arduino "C language". This system follows different processes; firstly it will measure humidity and temperature of the soil. Secondly, after receiving details from humidity sensor, the valve will start watering. Finally it will inform the farmer about humidity, temperature degree and water level. In the first stage we will put humidity sensor in the soil to measure humidity degree and program it using Arduino. At the same time we will connect the Arduino to valve. The valve is used to control the passage of fluid through pipe and used to control the level of water. It can be programed by either ON/OFF or according to a specific level of water. Later on the Arduino will be connected to GSM to send SMS messages to farmers informing them about water level, humidity and temperature degree. The benefit of this system is to guarantee that plants have enough amount of water yet not more than it needs. Furthermore, it saves effort, time and water consuming. Besides it will improve in agriculture and water sector.



Mobile Application for Surplus Food Donation

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Supervised by: **Dr. Shaheen Khatoon**

ABSTRACT

Every year tons of food daily wasted by families, hotels, forms, restaurants and grocery stores in different countries. In Saudi Arabia alone 4,300 tons of food is wasted according to study conducted by King Saud University.Throwing food away deprives someone else from being nourished by it and is a sheer waste of resources. To reduce food wastage a mobile application is developed which allow users to share their surplus food with those who are in greatest need. The app offers safe and efficient service to manage surplus food and benefit local community. The seamless redistribution is done with the help of donors, recipient and volunteers. The application allows donors (companies/families or restaurants) who have surplus food to post their food by providing details of their excess food along with their location, whereas, recipient is the registered user that could be a individual or charity organization who can request for food. Volunteer or drivers are responsible to pick the food from donor and deliver to the recipient.

This mobile application allows each donor to post food by providing food detail such as food type, amount, expiry date and food picture. Recipient or any qualified charity by the government can select what they need from the posted list of food and wait till the system sends a notification that the volunteer/driver is on the way to deliver the food. Once food is requested by recipient, App will identify nearest volunteer and send them notification to collect food from donor and deliver to recipient. Once volunteer confirms to pick up the food, App will notify others that food has been taken and also send notification to recipient that food is on the way. In case there is no response from volunteer with in maximum time threshold of thirty minutes App. will send notification to paid drivers and wait for confirmation. The process will repeat every thirty minutes until food is not delivered successfully or expiry date reached. To pay the drivers, application also allows donors to donate money other than surplus food. System will automatically keeps a track of payment detail of driver. The process of information flow among main users is shown in figure 1.

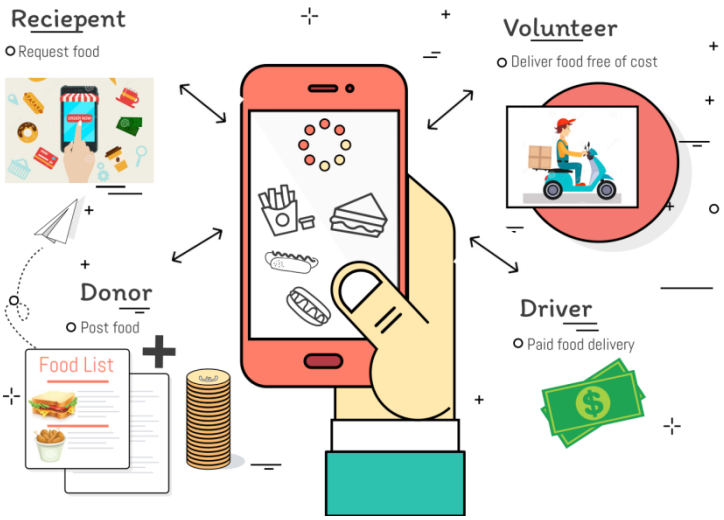


Figure 1: Illustration of all users' involvement in the system.

So far, app is providing redistribution facility completely relying on volunteer and not owned by any organization. However, in future service will be ran by charity organization to make sure that food is not going to waste due to unavailability of volunteer or driver. Once service will be owned by charity organization, member of their team will contact donor to pick food and store in food bank if it is not taken.

Safe Data Manager Application

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Supervised by:
Farid Bourennani

ABSTRACT

Nowadays, cyber-security is a critical field as most companies and individuals do store sensitive information in computers and computing systems. Protecting such information is increasingly important as the number of cybercrimes is expending drastically. Ten years ago, already every Fortune 500 American company reported a cybercrime which is synonym to the affected entity of money loss, reputation damage, and other inconveniences. One of the most common types of cybercrimes is *password cracking* where the credentials to access a system such as emails, banking accounts, or others are stolen or cracked. One of the fundamental way to protect ourselves is to have complex passwords which are at least eight mixed alphanumerical characters with numbers and/or symbols in the middle such as "onE54?Two" and change them regularly. Doing so with so many accounts that we have nowadays is not humanly possible.

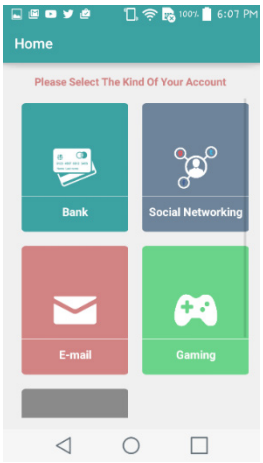


Fig.1.a Types of account

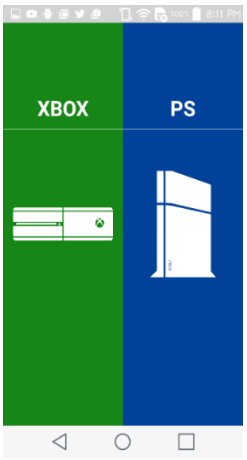


Fig.1.b Types of account

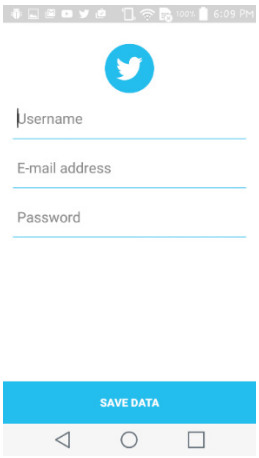


Fig.1.c Credential generation for twitter

Fig. 1: A screen shot of the proposed application.

So, in this work, we propose a secure data manager application (SDMA) which serves to protect the credentials (usernames and passwords) by generating complex passwords for various accounts, saving them, and protecting them from being stolen via encryption, central password, serial number of the mobile, and finger prints. The SDMA reminds the user to change passwords every certain period. The developed application is practical, user-friendly, and secure. It is practical as users always have it handy and accessible on their mobile phones. Therefore, they can generate more complex passwords difficult to guess as they don't need to remember them anymore. As show in Fig.1.a, the app is user friendly, the accounts are by default of four types: banking, social networking, emails, and gaming. Also, it is possible to customize or add categories. Under every category, it is possible to add accounts; for example as shown in Fig.1.b, under gaming category, we added XBOX and PS accounts. The SDMA protects the credentials in safe manner via a central password to login to the app. Also, it is possible to add finger print authentication which works only on specific mobile devices. Furthermore, all the credentials, and added data such as images or files are encrypted. Even if the data is stolen and copied into another device, it won't be decrypted because it works only with that specific serial number of the original device. Furthermore, to avoid the loss of the data in the event of damage or loss of the mobile, the data is regularly and safely saved on the cloud as encrypted data associated with the serial number of the mobile. So, if restoration of the data is needed on another device, the cloud will send an email message and SMS to the account holder to confirm the restoration of the data into the new device. Finally, SDMA can be configured into *risk* mode during travelling for example so that if the mobile is lost, all the data becomes invisible to the user unless the real owner enters the central password and confirms ownership via internet after receiving and authentication vea email or SMS.

GoWoman: A New Opportunity for Women with Low Education Qualifications to Get Involved in Society Effectively

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Rana Nofal
Berzeit University, Nablus, Palestine

Amal Yousef
Bethlehem University, Bethlehem, Palestine

ABSTRACT

In our website GoWoman we serve a segment of women with ordinary skills, who may be uneducated, may be sustaining their families, who have free time and want to invest it by opening the doors for them to get paid for the services they offer. That because the known websites target professional people with degrees and CVs to help publishing themselves but not this segment.

All they need is to sign up in the website with their personal information and skills they want to use by uploading photos or videos to show their work in some fields.

Therefore, any customer who is looking for such qualification to satisfy his/her need like, cooking for him/her, doing housekeeping, taking care of his/her babies or ironing clothes…etc. All he/she needs is to sign up in our website or application and ask for his/her need from the woman he/she choose based on the rating which is available and also see her skills and we will do the rest. We will send a notification for the trustful woman who already had subscribed to make an appointment between them Our Logo

The customer will pay online and we will deliver that for the woman who did the service. Also, the customer can give feedback on the website about the service and rating for the woman who already served him/her.
There is an option on the website which announces events which are going to happen related to women like workshops and their locations which will also help those women to be involved in the community.

By that, GoWoman will serve both sides, satisfying the need of customers who are in need for such services and sustenance for women who need it to go up, save their right of getting paid for the service they offer and being doers.

We started with Palestine as a pilot site and we predict spreading out to the whole Arab world.
The website will be in Arabic basically to help the women to interact. Also, an English version will be available.



Intelligent Crib

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Supervised by:
Dr. Yousef Awwad Daraghmi

ABSTRACT

The main challenge represented in this project is that the baby cribs which are recently used cannot move at all or at most moves in one direction only. Therefore, the idea of our project is to address a solution for this challenge by designing a crib that moves in two directions (X and Y). The crib is to be controlled remotely using an application built by the Android software on smart phones.

This application mainly consists of four interfaces. The first interface gives the ability to choose one of the selected movements. The second interface enables the mother to draw any suitable movement for the baby, and then it will be saved as a picture on the smart phone with an appropriate name. That particular name will be added to the previous list of movements as an array of coordinates in the first interface (using SQLite database) in order to be received by the Arduino then the device will move according to the drawn movement. The third interface displays notifications sent by a sound sensor that is settled on the crib itself. This is to alert the mother if her baby is awake or there is any unusual sound released beside him. The last interface displays the body temperature of the baby using a temperature sensor settled on the crib.

For the mechanical part, DC motors are used to run the slider crank which in turn moves the whole crib as shown in the attached photo. The mechanical part will be wirelessly connected with the Android application using the Bluetooth.
The project falls under the robot section and artificial intelligence section which contributes to provide comfort to the mother and safety to her baby. The baby crib is remotely controlled without the need to move it by hand. The mother can check up the safety and health of the baby as well.

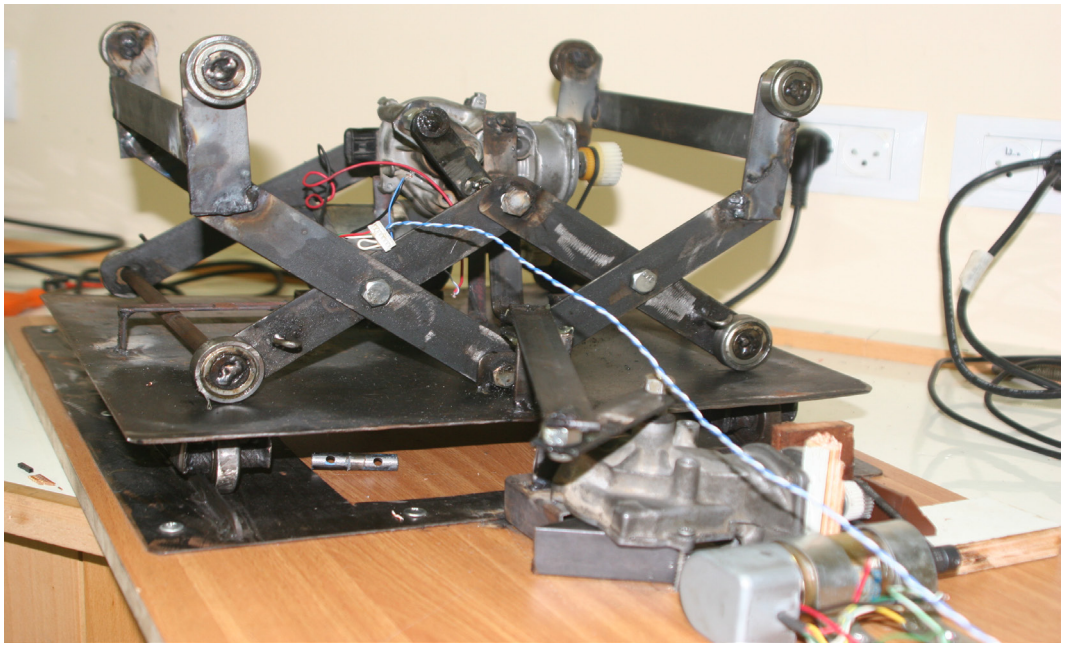


Photo 1: Mechanical part of the project

Landmine Detector Robot

Bashayer Falah, Rasha Al Harthi, Duha Al Qurashi,
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Taif University, Taif, Saudi Arabia

Supervised by:
Dr. Karim Saadaoui

ABSTRACT

Landmines are easy-to-make, cheap and effective weapons that can be deployed easily over large areas to prevent enemy movements. Moreover, it plays a dangerous role in civilian life, in and around the post combat areas with approximately 78 countries spotting an estimate of 42 human lives killed every day.

The aim of this project is to develop and implement a detection algorithm that can solve the socially challenging issue of landmine detection and mapping, using a remotely controlled robot. It discusses the strategies that can enable the robot to detect mines by sensors. This project also deals with the ways of sending each landmine location with an initiating alarm.
The proposed system is to detect mines as metal objects in the ground with an electrical robot. The system is composed of a tank robot that moves around a specified area to detect metal objects. The tank is connected to computer software which is responsible of directing the tank to the right area by sending the GPS (global positioning system) location then the robot moves according to the received location. The GPS is also used to locate the tank in case it is lost in the desert. In addition, the tank is provided by a Wi-Fi Shield, which is used to connect directly to the software and to send the GPS points via GPS module. When a metal is discovered, the tank sends the GPS location of the metal. The robot uses a microcontroller (Arduino-Uno) with GPS and Wi-Fi modules to connect to the computer software via access points or routers.

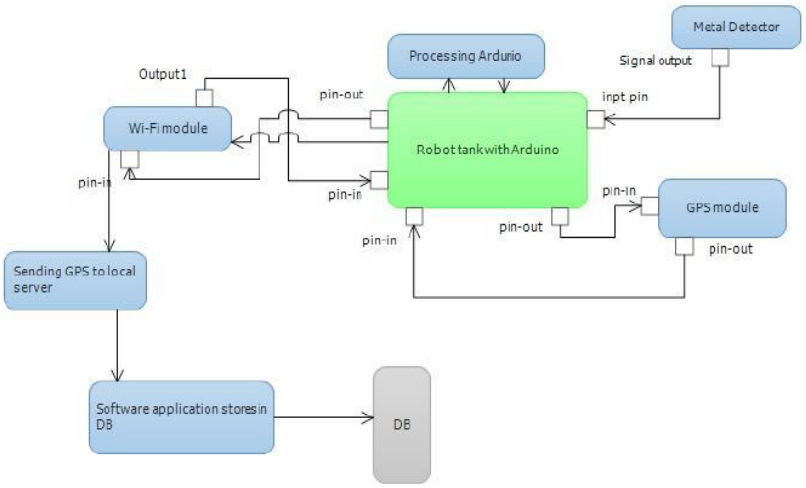


Figure 1: Block Diagram of the system

The software application is responsible for controlling the robot direction and guiding it to the working area. In addition, the software application will receive the GPS locations from the robot when a metal is detected and will send new GPS locations to drive the robot to new areas. The application is a web based application that is hosted on a local laptop. An SQL server database is used to store all data that comes from the robot. The user interface is developed using HTML, CSS, and JavaScript. The server-side is developed in C++ to be fast and high performance and to be compatible with Arduino processing language. The software will be connected online with the robot through a Wi-Fi network and will receive all information the robot sends such as GPS information and metal detection points.

Privacy of Social Media Effects on Children

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ABSTRACT

Social networking is one of newest methods of communication that allows you to share your personal life publicly on various sites. Social media can be defined as participation with others by sharing videos, photos and ideas using applications such as Snapchat, YouTube, Facebook, Instagram and Twitter. Evan Spiegel, Founder of Snapchat, said once at the Code Conference on 2015 "Snapchat has close to 100 million daily active users in developed countries."

Nowadays, children become a part of social media users; most of them are spending their time on social media. Parents are occupied that can't be monitoring of their children when they are spending overtime on the social media. It is very important to have recognition of the risk of social media that especially impact on children privacy. Our goal is to show children what is the disadvantage of using social media especially snapshot by this type of age, which is from 8 to 11. Raise the awareness about the problems associated with social media like importance of the online privacy and digital footprint, peer-to-peer and sharing too much personal information, online harassment and sexting.

For this reason, we have designed a series of workshops to be delivered in local schools that will teach Emirati children between the ages of 8 – 11 about using social media safely. That's will be done using the following procedure:

1. Choose children who have accounts in Snapchat (social Media).
2. Know how long they spend using social media.
3. Create cartoon videos and characters that will help children to understand problems such as privacy and digital footprint connected to social media.
4. Explain the idea of Safe Social Media Use and show that people can hide their identity.
5. Guidelines of how to control and limit time of using Snapchat.



Children have very little knowledge about the risks of security issues on social networking so this research that we going to write about is very important. They should have awareness of the problem, and would be beneficial for parents to read the research in order to learn how to ensure safe online practices. One important point for parents would be to understand the importance of monitoring online activity.

We made a survey by online that most of children have iPad and cell phones and sending to their family to make our survey. We made the survey four times to make it easy for these ages from 8-15. Results from the survey will be presented at the conference.

A Smart Stick for Assisting Blind People

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ABSTRACT

Visually impaired people find difficulties in detecting obstacles in front of them, during walking which makes it dangerous. The smart stick comes as a proposed solution to enable them to identify the world around. The project presents a system to provide a smart stick for the blind people. The system is designed to act like an artificial vision. The system consists of two ultrasonic sensors in the top and bottom of stick to detect obstacles and to measure their distances, microcontroller (Arduino Uno R3) to receive the ultrasonic sensor signals and process them to short pulses to the Arduino pins where buzzer alarm is connected. GPS navigation in the Mobile can be used to guide the blind for new places and unfamiliar places. The blind man uses an earphone to listen to the navigation directions that are coming from the GPS and buzzer alarm to warn by sound. We seek in our project to provide a smart stick affordable and suitable for most blind people, and also it is light in weight. It can be made available to all segments of the society and their families who need them.

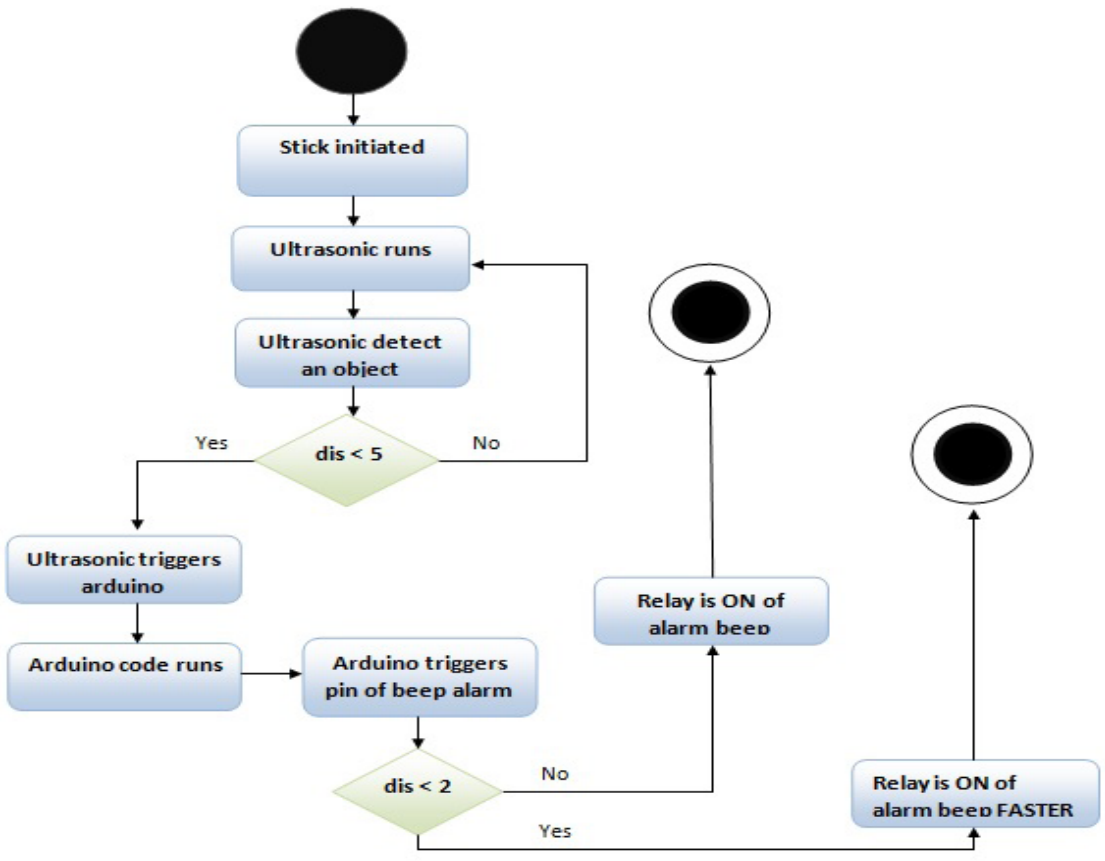


Figure 1 : Workflow

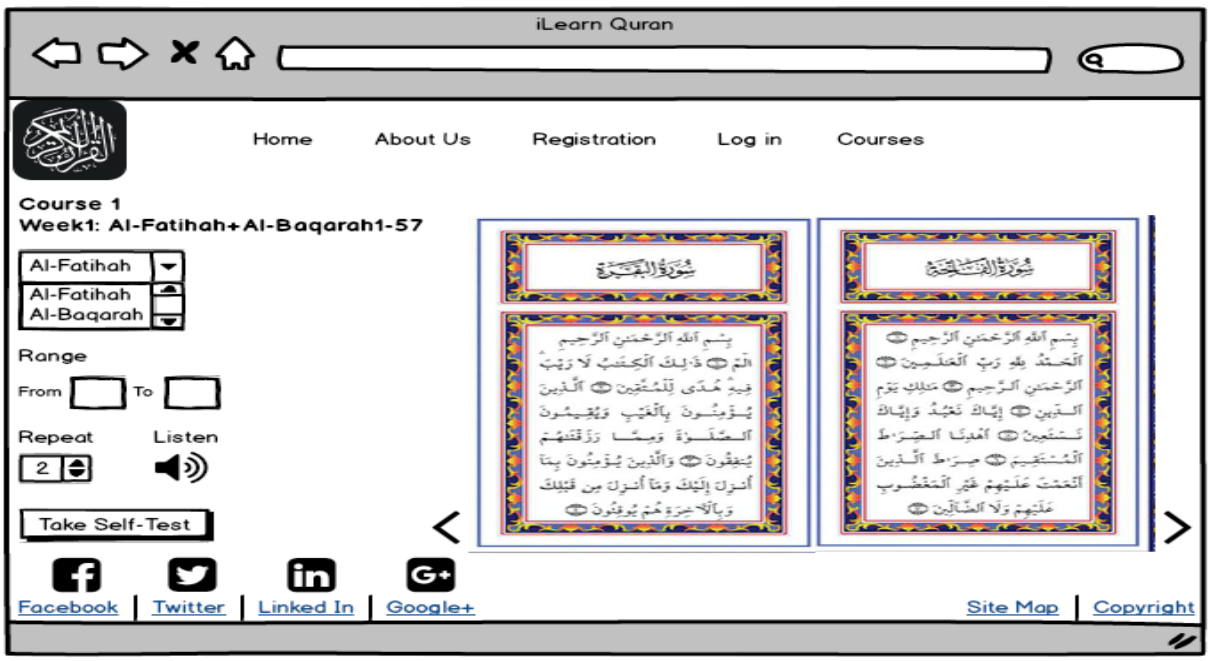
ILearnQuran: A Quran Learning Management System Designed for Holy Quran Memorization

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King Faisal University, AL-Ahasaa, Saudi Arabia

Supervised by:
Ms.Kauser Hameed

ABSTRACT

A learning management system (LMS) is a software application for the administration, documentation, tracking, reporting and delivery of educational courses or training programs.[1] LMSs support a range of uses, from supporting classes that meet in physical classrooms to acting as a platform for fully online courses, as well as several hybrid forms, such as blended learning and flipped classrooms.[2]. More over the spread of Massive Online Open Courses often termed as MOOC have brought a new edge with both perspectives from teaching and learning from benefit of creating and authoring teaching content to accessing content and acquiring knowledge with an effort of click over internet. The project under discussion tries to bring the above trends in making an Open Online Quran Learning Management system to help an individual with Memorizing Quran. ILearnQuran will help the instructor develop the content, deliver, assess and give assignments while keep track of each student's progress and facilitating with personalized feedback electronically. As manual efforts employed takes a lot of time with tracking and recording students' performance with a risk of losing students record. This system can help institutes that teach Quran with making the job of managing courses and students easier. Vivid types of courses can be designed using IlearnQuran like fully online, blended; ILT and flipped class rooms along with different curriculums ranging from including partial or complete chapters of Holy Quran with the flexibility to add customize courses as needed. Each Course would be associated with number of days to complete it course and there will be exam to assess the performance of the students enrolled in it with an option of self-test for each chapter. The website is developed to provide the Quran in different languages with features such as translation, commentary, number of repetitions of Quran Recitations, selection of resisters. The system has two end users Learner and Teacher. Learner must create an account to be able to add courses, system will set deadline in the calendar for completing each chapter and send reminders. The Learner can update his page whenever he completes a chapter. ILearnQuran contains courses designed for large numbers of participants that can be accessed by anyone and anywhere, it just required an internet connection, open to everyone and offer a full/complete course experience online for free. This website will be created using PHP, HTML, and MYSQL, the website will work in any browser.

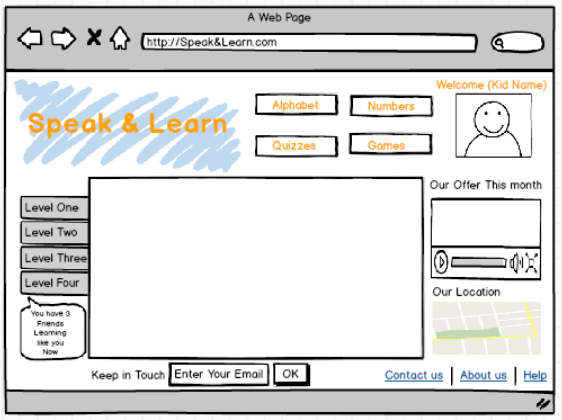


Speak & Learn: An Intelligent Learning Website to Aid Autistic Kids in Learning the English Alphabet

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King Faisal University, Al-Ahsaa,

Supervised by:
Ms.Kauser Hameed

ABSTRACT



Prototype of the website

Learning a new language is a journey every human goes through, they may be children learning their native language or adults learning a language for a job purposes or just interest in a culture. Learning a new language can vary in difficulty. It all depends on the way you learn the language (i.e. books, teachers, etc.). Surely learning with a class and a native teacher is more efficient than self-learning with a book or some audios, because they will live the experience, that some other learning ways won't provide. Some aspects cannot be met while self-learning a language, for example: pronunciations, you may think you are pronouncing correctly but you may be saying a different word in some languages.

We are developing a website that teaches English for autistic and normal kids, it has two sections: learning, and testing. The learning section has different ways of teaching the kids, to make it more beneficial, interesting, and fun, we will provide pictures, sound clips and examples related to each letter or number. On the other hand, testing section has four ways to make sure the kids have properly learned the letters and numbers. One of the main ways for testing which we are focusing on is voice recognition using artificial intelligent (AI), the user records a letter or a number and the program gives him/her a massage showing if he/she have pronounced the letter or the number correctly, another way is a test which shows different picture and the user should choose from a drop down list. The last approach in the test section will provide sound clips the user should listen and try to guess the letter or number.

The challenge we faced is trying to find the right algorithm and way to compare the recorded sound wave with the data base voice waves we have.

For pronunciation aspect it does not have a digital solution yet, we hope our website will be a major aid. It saves time and cost compared to hiring a native teacher. Previous solutions didn't target the pronunciation in learning the language, it concentrated mainly on learning the vocabulary.

The proposed solution will help the whole humanity in learning and exploring different languages easily especially autistic kids. It will fill the gap and need to learn in lack of will power or finance may stand in the way. Speak and learn will help to learn in a correct and efficient way.

Visual Dictionary

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Supervised by:
Ms.Kauser Hameed

ABSTRACT

Many learners of English language confront difficulties in using words properly, as many words have similar meaning often called as synonyms A vocabulary learner needs to understand its inflectional, derivational, and compound forms. With the advancement of information technology, understanding and visualizing such a problem can be solved in a simple way that uses visual intelligence. The project under discussion focus on the solution to provide of all possible form of words with single click along with the grammatical references, by displaying all related words in one page so the user can benefit from visualizing it (please refer figure1) as understanding it becomes faster and easier.

Visual Dictionary is a web based system that aims to improve the process of learning English vocabulary easier for nonnative speaker with less efforts by searching the meaning of a specific word and exploring its possible synonyms forms. The Visual Dictionary is interactive dictionary and thesaurus which creates word maps that spans with meanings and branch of related words. for instance, a word "happy" The VD would help you find related words, from "cheerful" to "euphoric". It will display the meaning of it, all words related to this word and have the same meaning, audio and transcript of proper pronunciation to the words, the opposite of this word, and some images. The best part is the VD works like your brain, not a paper-bound book. You'll want to explore just to see what might happen. You'll discover -- and learn -- naturally and intuitively. Its innovative display will encourage exploration and learning. You'll understand the language in a powerful new way, and gain a more precise understanding of the English language. The most challenge that we must to do is provide a feature for blind people which is when the pointer stop over any word there will be a sound for it so the blind people will know what is that and they can use it. In future, the work can be expanded for other languages as well.

The potential applications for this work is to ease the process of learning vocabulary visually and in descriptive way. Currently products have the similar idea but it's paid, and does not support pictures which makes the meaning more clear and easy to remember. Learning by using visualize technique and pictures is more efficient and attractive than displaying the words as a text and enhance learning process using visual aids can improve in memorizing it very quickly and for a long time. when people learn, and improve their language this will help them in communicating with each other and our duty as a programmer students to help them to learn easily, faster, and in a sufficient way. Our idea will help to learn, study, and connect the words in your brain faster and in a good way because we display the words in such a way that help people to memorize, and connect the related and opposite word together so they can easily remember it.

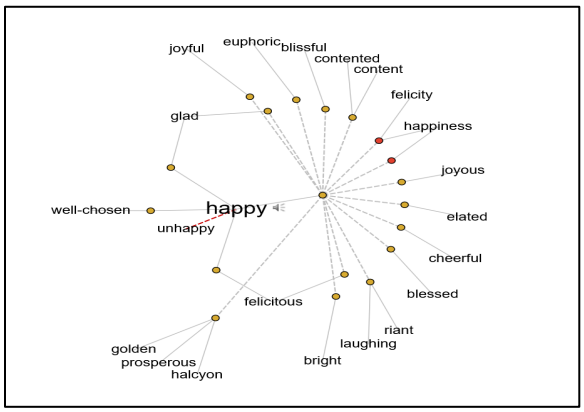


Figure1: visualizing a word "happy"

Automated Aneurysm Segmentation on Reconfigurable System on Chip

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Supervised by:
Prof. Abbes Amira

ABSTRACT

Aneurysms are caused by dilation in the walls of a blood vessel, becoming so thin, such that blood flow to it can lead to rupture. Hence, *early and accurate* diagnosis of aneurysm is highly required. Knowing some parameters about the aneurysm, such as size and location, helps in deciding the right treatment.



Figure 1: Segmentation result using MATLAB

This project aims to implement a real-time automated segmentation technique for cerebral aneurysm on the ZYNQ system on chip (SoC) Zedboard, and realizing the results in a 3D plane, utilizing Virtual Reality facilities, such as Oculus Rift, to create an interactive environment for training purposes. Figure 2 illustrates the system design. The significance of the project is presented in the need for an automated system to segment cerebral aneurysms. Since medical images have high resolution, they require a high computational power. This can be provided through a ZYNQ SoC, which provides an accelerated computation that is needed for this system.

In comparison to existing solutions, the proposed system can perform real-time automated segmentation and visualization using virtual reality devices. Preliminary software simulation of the proposed segmentation technique using multiresolution analysis and DICOM image obtained from Qatar Robotic Surgery Center (QRSC) has shown promising results. Figure 1 shows the results of simulating the proposed segmentation algorithm using MATLAB.

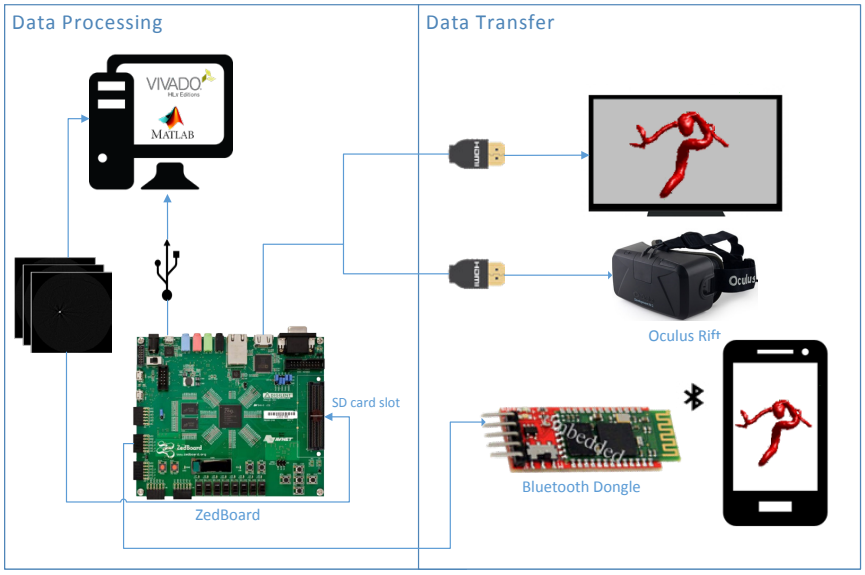


Figure 2: High level architecture for automated Aneurysm segmentation and visualization

Brain Controlled Bionic Arm

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Ajman University, Ajman, UAE

Mohamed Abdalla Mohamed Agam,
Ajman University, Ajman, UAE

ABSTRACT

According to the United Nations, only 10 out of 196 countries are safe, rest of them are either in war or have high crime or accident rates. In recent years, life style diseases such as diabetics, obesity, cancer etc. are increasing at an alarming rate. UAE is said to have the highest rate of diabetics along with cancer being the major cause of death. Many become handicapped due to diabetes, cancer or accidents. Occasionally, children are born without arms or legs. There are about 3.3 million arm amputees in the world, of which some have active muscle functions and some do not have. Bionic arm is an artificial arm which can be controlled by EMG signals from muscles. The current technology of Bionic arm usually requires invasive procedures to configure the system with muscle fibers, which are expensive and tedious. This paper discusses design and development of a brain controlled bionic arm, which requires minimal procedures. The funds were provided by Ajman University and Innovation Center Ajman.
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Figure 1 : Proposed 3D printed bionic arm



Figure 2 : Emotiv headset

The project consists of mainly two parts, the EEG headset and the 3D printed Bionic arm. Function of the EEG headset is to acquire EEG signals from the brain. This recorded EEG raw data is then processed by microcontroller to activate the bionic arm. The Bionic arm consists of several servo motors attached to individual fingers, which enable the finger movements. The connectivity between these two modules is accomplished by blue tooth technology. The bionic arm is prepared according to the specification of the amputee and uses biocompatible materials. The EEG headset used in this project, is manufactured by Emotiv, which can acquire EEG data simultaneously through its 16 input channels.

Prototype of the bionic arm have been made for custom specifications using biocompatible materials. Control circuits of the bionic arm, which includes servo motors, Arduino board, associated circuits etc., have been carefully designed, implemented and perfectly embedded in the bionic arm. The system is designed to operate using rechargeable batteries, to run the device for 4 to 6 hours without failure. Figure 1 shows the 3D printed bionic arm and figure 2 shows the Emotiv headset. The developed bionic arm is capable of making four basic motions corresponding to mental status of the subject. It takes some time for the first time users for training.

Further enhancement of the bionic arm will be by adding haptic sensors and temperatures sensors. Haptic sensors will give the amputee to hold various objects heavy or light, plastic or elastic. Temperature sensor will alert presence of hot objects in the vicinity of the amputee.

An RFID-based Automatic Attendance System for Students

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Supervised by
Prof. Jihad Mohamad ALJAAM
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ABSTRACT

Many educational institutions all over the world including elementary schools and universities are extremely concerned about taking students attendance regularly. The academic performance of students is highly affected by their absence. Rigid rules and policies have been set up and enforced in every institution to request the regular attendance of students that should not exceed a certain limit to acquire the degree or pass the examination. Keeping track of students' attendance is mainly the instructor responsibility, who spends a lot of time to perform this task in every lecture. The traditional method of taking attendance is by calling the students names or asking them to sign an attendance sheet. These procedures are time consuming and inefficient. We are looking for a simple solution that uses information technology to take students attendance in an optimal time. Consequently, this project consists of a smart attendance system for students in a university setting. The technology that is used in the system implementation is Radio Frequency Identification (RFID) based on cheap tags. As shown in figure 2, RFID technology saves considerable amount of time and greatly improves the operation efficiency. Every student will be given a simple and tiny tag to be carried on with his/her university student card. The tag is passive and don't transmit any signal that may affect the students' health. Once the student enters the classroom the RFID reader will identify the tag automatically without any physical contact by the student with the reader. A signal will then be sent to the system which recognize the student and mark his/her attendance. The application is a web-based that is accessible by instructors and students securely. Users can login to the system using their university credentials (i.e., login and password). Every student can track his/her attendance with dates and time of absence. Figure 1 give an overview about our system.

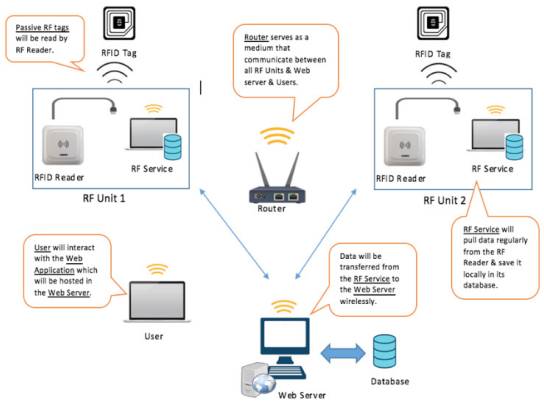


Fig-1: Students Attendance System Architecture Overview

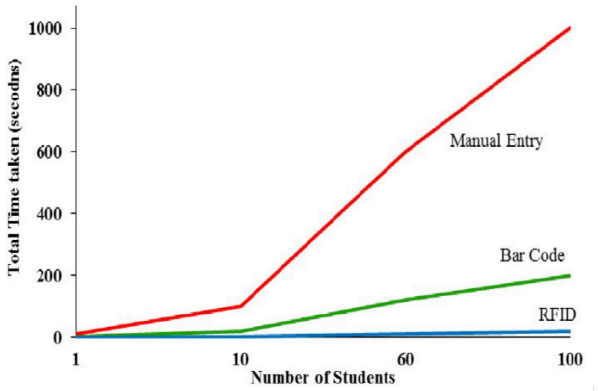


Fig-2: Time taken to record the attendance using different techniques

Fig-1: Students Attendance System Architecture Overview

The system will also send automatic alerts to students informing them about the percentage of their absence in a class. The last alert will be after the student is breaking the rules of the university in term of absence and cannot then pass the final examination. In fact, a student can pass his/her card with the tag to a friend who can then get in the classroom to trick the system and the instructor. Therefore, our system allows the instructor to see the attendees with their photographs on his/her computer monitor. This feature allows the instructor to avoid any misuse of the student's tag. The system also double check the presence of the attendees at several periods of time fixed by the instructors like for instance at the beginning of the lecture, in the middle and at the end. This will ensure that that student has attended the whole lecture. The system also allows the instructor to generate reports about the students and send them automatically to the department chairman for potential actions. The system helps also the instructor to comments on his/her results on the failed students and link that data with their absence in the course. We are currently in the implementation phase of the hardware and the software part of our project. After the implementation is done the system will be tested and evaluated to verify that our prototype satisfies the desired functional requirements while meeting the design constraints.

InNavi Disabled People Guidance Application

Hadeel Almusallam , Alaa Almotairy, Hanan Alsunidi
Imam Mohammed bin Saud University, Riyadh, Saudi Arabia

Figure 2: the InNavi architecture

Supervised by:
Alaa Menshawi

ABSTRACT

Disability is an important humanitarian issue. People suffer from physical disabilities have the right to have an effective role in the society. Each of them must be able to live independently without waiting assist from others. They need to have some tool to facilitate their indoor movement within buildings.

InNavi is an application that designed for this purpose. It is a mobile application runs on an Android operating system and using an Ibeacon technology. InNavi application acts as a router and mentor within the building to serve the user who suffers from physical disabilities. It will guide the user to the desired location with the minimal time, effort ,and it will make moving around for the person with a disability faster, accurate and easier. I also reduce dependence on others and increase self-reliance for disabled person and affect positively on the psychological aspects which is the intended goal of this project.

InNavi application will give its users the ability to determine their desired locations using interactive map and search for different places to get the directions. the search result will eliminate any place not accessible for physically disabled person.

The techniques used for outdoor navigation cannot used with indoor navigation. In outdoor navigation objects are located by electromagnetic signals from the satellite, but inside buildings, these signals scattered by walls and roofs , because that InNavi established by using Ibeacons which are placed in multiple points in a building with distance of max 70 m between each of them, The underlying communication technology is Bluetooth Low Energy (BLE) is a wireless personal area network technology used for transmitting data over short distances The second element is the mobile devices used by the users. This mobile device receives the radio signals from the nearest Ibeacon and specifies the initial position of the user to navigate him to desired destination. Each Ibeacon has an identification number and name that allows the developer to link it to a specific location. Figure 2 represents the InNavi system architecture.

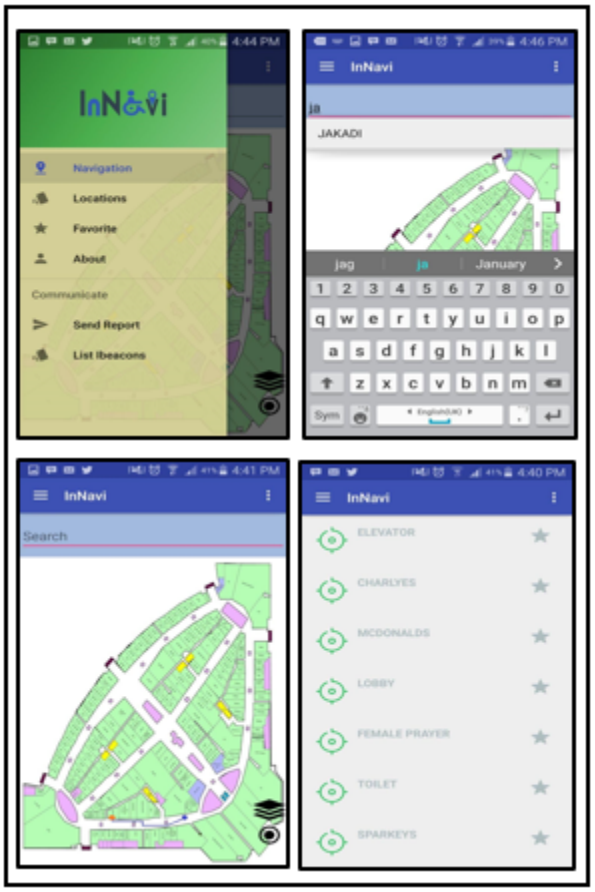


Figure 1: the InNavi screenshot

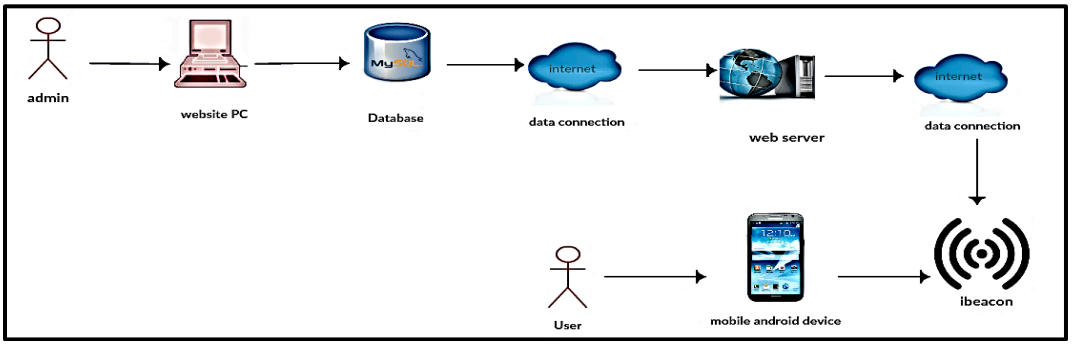


Figure 2: the InNavi architecture

Lattice Boltzmann on Zynq SoC for Blood Flow Measurements

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Supervised by:
Dr. Noor Al-Maadeed, Prof. Abbes Amira,
Dr. Sarada Dakua, Dr. Julien Abi Nahed

ABSTRACT

A cerebral aneurysm is defined as localized enlargement of a brain artery, which is one of the vital diseases that have considerable impacts including brain stroke. Studies in the USA have proved that more than 1.5 -5% of their population may get/have cerebral aneurysms. A major solution for the cerebral aneurysm is the clipping surgery, which is placing a tiny clip across the neck of the aneurysm to prevent it from bleeding. This paper aims to apply the clipping surgery using a robotic arm. The critical factors for the application of the surgery are to determine the desired location and measurements (velocity and blood pressure) precisely and efficiently. The paper involves the application and implementation of a computational algorithm for fluid dynamics called Lattice Boltzmann. The system provides accurate hemodynamic estimates for the simulation of blood flow in the cerebral arteries, specifically to identify the location of the cerebral aneurysm and decide a precise position of the clip. The simulation of the algorithm is performed using Zynq SoC (System-on-Chip) board which has ideal characteristics such as low power consumption and low latency between receiving an input and viewing it. These characteristics make it a desired platform to serve the design. Nevertheless, the progression of the proposed design is being in cooperation with Qatar robotic surgery center and virtual reality lab at Qatar University. The progress is branched into three sections as illustrated in figure 1: software, hardware and visualization. The software section examines Lattice Boltzmann algorithm and develops an improved implementation that is dedicated to process the desired computations (Pressure and Velocity) of blood flow. In particular, the input is two dimensional DICOM (Digital Imaging and Communications in Medicine) images that are reconstructed into three-dimensional models. Also, the system considers the conversion of STL (contains data describing the layout of a three-dimensional object) files into MESH (composed of vertices, edges and faces that define the shape of a polyhedral object in 3D computer graphics) files since the STL format is not the most memory and computationally efficient method for data analysis. Moreover, the hardware section is intended to simulate the lattice Boltzmann algorithm on Zynq SoC board for data processing and analysis. Finally, the output measurements (velocity and blood pressure) will be visualized through several visualization techniques, particularly visualizing 3D images through virtual reality system for dynamic clipping surgery, and visualizing the data analysis through AVNET touch screen.

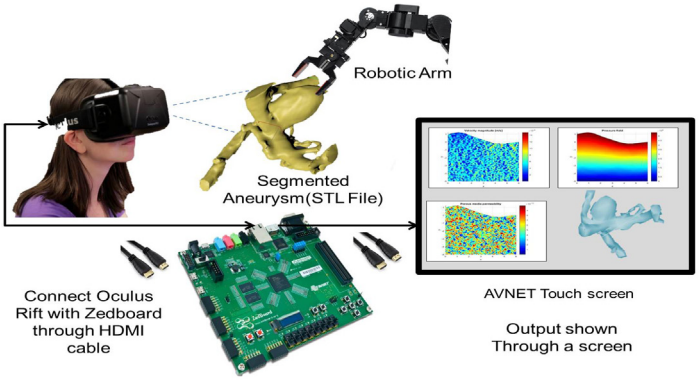


Figure 1: Suggested prototype

The recent work is achieved shown in the figure as follows: for the software section 90% is attained including reconstruction of two-dimensional DICOM images into three-dimensional model and converting STL files into MESH files for the required analysis using MATLAB. Moreover, 10% of the hardware section is accomplished which is booting SD card that includes Linux operating system on the Zedboard. Finally, the achieved part of the visualization section is envisioning STL file in virtual reality lab which is considered to be 50% of the desired work for this section.

Nateq: Reading Arabic Text for Visually Impaired People

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Supervised by:
Dr. Omaimah Bamasag

ABSTRACT

It is considered impossible for visually impaired people to read a text on objects around them without the help of another sighted person who may not be available when needed. Although there are several applications in reading assistance field, there is a lack of Arabic supported applications. This motivated us in devising a solution that will serve the blind people in our community. Developing a device-based application as an assistance guide with Arabic language support will significantly reduce such a problem. The developed application will read, in Arabic speech, the text written on objects such as papers, signboards, bank cards, door plates, …etc.

For further accessibility, edge detection technique is used to detect the full boundaries of the objects, especially quaternary objects in real-time. Since visually impaired people face a problem when directing the camera to the object which results in capturing part of it, extracting text from the partially captured object will result in uncompleted and not understandable sentences. To achieve this functionality, several image processing algorithms were used including median filter, canny edge detection, morphological transformations, find contours, polygon approximation and convexity checking.
The proposed solution goes through several stages to accomplish the goal. First, boundary detection technique will run in real time to inform the user if the whole object appears inside the camera region. Second, the printed text is captured using the mobile camera. Third, the scanned image is then fed to the OCR (Optical Character Recognition) engine, which outputs a text file. Finally, this text file is then entered the TTS (Text to Speech) system, which processes it to produce the corresponding Arabic speech equiv-.alent of the text and read it aloud for the user

The primary results from comparing between text extracted from] Figure).1 a [(and] Figure).1 b [(shows the effectiveness of our approach .It indicates that the approach of finding boundaries before OCR processing helps visually impaired to ensure that text extracted from the image is complete with minimum unstructured sentences and meaningless words.



(a) OCR result from an incomplete image of an object has meaningless sentence.



(b) OCR result from a complete image of an object has meaningful sentence.

Figure1

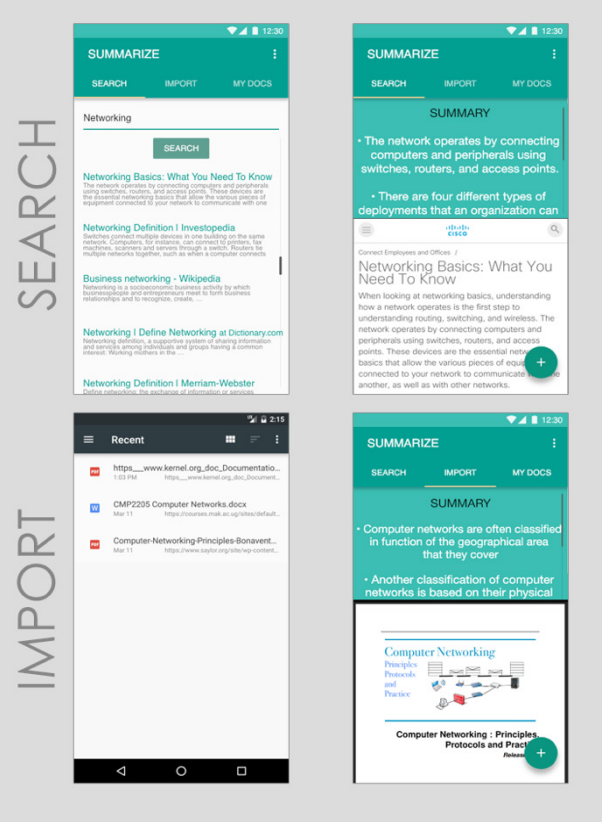
Incremental Text Summarization for Multiple Languages in Mobile Devices

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ABSTRACT

Although mobile devices have made searching the internet and accessing information much easier and convenient, it still comes with some obstacles. One of the major problems with browsing documents or articles using mobile phones is the small screens that limit the user's ability to find the desired information easily. Therefore, the process will require more time and effort from the user. Moreover, other researches show that a lot of people with visual difficulties complain about reading long texts on small screens. Therefore, this project will tackle these issues by providing a summarized text in a way that satisfies the user either by .reading the summary or hearing it using some accessibility tools

Summarizing the whole document all at once might take a long time, especially if the document is long. To avoid making the user wait for a long time for the summary to be shown, in our project we are developing an android application that summarizes text incrementally. The document is divided into sections, where the algorithm runs on section after section in an incremental manner and each time the summary is updated accordingly to reflect the new concepts. This way the user would not have to wait for a long time before reading the results while the refined summary is generated. Additionally, we are proposing a method to rank the words in a document and use the ranking to summarize it into main ideas. This helps the user understand the main content of a document and hence save a lot of time. The main concepts of a document are shown in bullet points to the user instead of reading the whole .lengthy document



Our mobile application provides the user two ways to obtain documents that will be summarized. The first way is through searching the web. To make that possible, we are going to let the user search Google within the application layer of our project that enables the user to easily find new documents and articles about any topic they are interested in. The second way is accessing the device's storage which contains saved documents. After that, the application shows the summarized text and gives the user an option to save the result. To evaluate the result, different evaluation metrics will be used including the ROUGE method that evaluates the quality of the produced summary by checking whether an n-gram in a .human summary has occurred in the produced summary

The summarization application is compatible with more than one language and can handle multiple file formats. It is developed for the Android platform since devices that deploy the Android .operating system target a wide market

ACKNOWLEDGEMENT

This contribution was made possible by NPRP grant #7-794-1-145 from the Qatar National Research Fund (a member of Qatar Foundation). The statements made herein are solely the responsibility of the authors.

Smart Mobile Application for Female Student Housing

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Supervised by:
Dr.Hilal Al-Maqbali

ABSTRACT

Female students' housing campuses are one of the essential educational environments that have important issue to meet students and their parents' expectations. There are lots of difficulties in campus. For examples, only authorized drivers can take female students between the campus, the college and their home. These issues become as obstacles for both the management of the campuses as well as the female student daily life. Female students need to follow a traditional (paper work) and strict procedures to get permissions for going on trip, shopping or arriving late. On the other hand, these procedures are found to provide safe, quiet and comfortable environment for the female students. However, it consumes a huge time, effort and takes large spaces for all these papers works. Also, there is lack of security in keeping the personal information of the female students safe.

To solve this issue, we are developing an intelligent application that goes with the speed technology age instead of papers. The smartphone application will deploy electronic fingerprint system and GPS. The use of fingerprint is to identify the stakeholders. Furthermore, the use of GPS is to identify the location of the users.

The application consists of four main accounts: parent, management, drivers and students. The parent account is to keep records of their daughter's activities and also to give permission for some tasks. Driver's account is for authorized people to take students to their destinations, while the management is the student supervisors who are responsible for taking care of the students. On this smart application, we are using GPS services for number of purposes, such as: (1) the system will send notifications to students automatically once the drivers arrive at the campus, college or students home. Additionally, as part of daily task for the student campus supervisors, the students must sign in every night for taking their attendance (paper work), while this will be automatically by out application. GPS services will check if student really at the campus and the fingerprint is to have the signature of the authorized students. The use of fingerprint is to identify students, drivers, parents and supervisors. Furthermore, the student can use the application to register in the weekly trips which are organized by the campus by only using her fingerprint. In addition, students can easily send a request for transportation via our smart application. She can request that in from anywhere with no it to be in the campus, and straight forward the driver will get a notification about the time and place. Also, on regards to the authorized drivers, our application uses the fingerprint to allow the driver whether to continue acting for the request or to decline. Furthermore, the smart application keeps records about all the users, and parent can easily check that from the application. Additionally, the parent can check and approve any request or task sent by the students or their supervisors. This application will save lots of effort and will make female students life activities much easier to manage and to deal with.

An Improved Online Driver's Fatigue Detection Tool

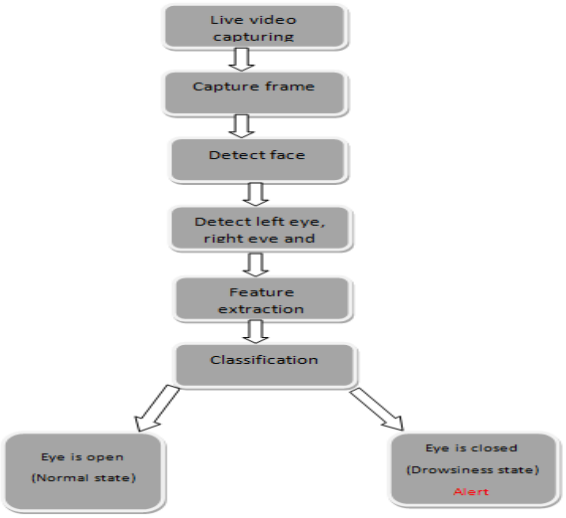
Remonda Mounir

Faculty of Informatics and Computer Science, the British University in Egypt

Supervised by:
Dr.-Ing. Walid Hussein

ABSTRACT

Driver drowsiness is the most critical cause of roadways accidents nowadays, thus fatigue and drowsiness detection play vital role in preventing road accidents. Over the last decade, many image processing based approaches were developed to detect driver fatigue and drowsiness. These approaches mainly focus on the extraction of the driver's face and predict the eye blinking rate from the eye region and the yawning rate from the mouth region. However, these features are not necessarily the best to describe the driver's fatigue, because from one side, some drivers may have imbalanced eye blinking rate due to medical reasons, and from the other side, some drivers may have high yawning rate while they have full driving attention.



In this paper, we use a list of features to detect driver's fatigue. Though source of these features yet remains eye and mouth, we try to combine several features to reach higher accuracy. For the eyes, we will detect the pupil movement through eye circularity and Fourier transformation. Pupil's wideness is also detected and compared to a threshold of eye's blackness. For the mouth, we examine the circular Hough transformation whether the mouth opens intentionally for yawning or unintentionally due to fatigue. These features will be detected through an online (and inline) face monitoring system that developed to detect driver fatigue using a digital camera placed within a suitable distance from the driver; to simultaneously collect his/her face images. The collected images are processed to extract driver's fatigue relative by these features. This information then feed into a correlation analysis and a classification model using support vector machine that is designed to relate the extracted features to the driver's fatigue level. The system then generates an alert to the driver at the appropriate time. This information then feed into a correlation analysis and a classification model using support vector machine is designed to relate the extracted features to the driver's fatigue level. Findings of this paper provide evidence that this combination of features detection can estimate driver's fatigue with higher accuracy level.

Driving Security: Mobile Application for Safe Driving in Crowd Roads

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ABSTRACT

In many high population countries, the traffic crowd became a speck that threatens not only people lives psychologically but also the country itself economically, making people asylum to illegal methods to get rid of congestion. As a result, it led to an increase in the rate of reckless driving and accidents. The two main reasons of illegal driving habits are that drivers mean to not follow the road laws, or they are not aware of the road law which should be followed. In both cases it will be an imbalance in the awareness of traffic laws or moral consciousness.

This issue has been widely solved by creating a mobile application that shows the congestion areas to be avoided, integrated with a GPS module to guide drivers to the shortest path to their destinations. However, while these solutions help to get rid of congestion, they do not consider the high tolerance of some drivers in traffic violation.
The main target for The driving security mobile application is protecting people from committing any crime by following the traffic lows which is cleared very well in the database and reducing the percentage of congestion which increased recently because of people ignorance and what people resort to shorten the time and way.

The proposed work will be a mobile application integrates the GPS of Google map with the database which will contains all roads laws, fines, and car dimensions. In addition to, a voice note to warn the driver of all consequences could be occurred if he/ she takes the wrong lane/turn includes possible accidents, killing innocent people and penalty to affect the driver's feelings to get his mental back and take the right decision. The accuracy to meet the expectation is higher than 85% when applied to real driving cases in the Egyptian highways.

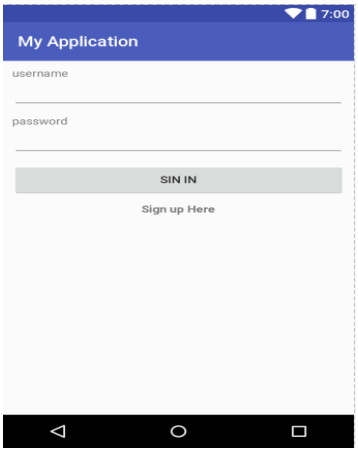


Figure 1

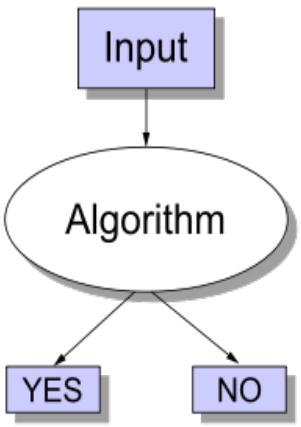


Figure 2

The project will ask the user for the username and password to sign in as it is cleared in (Figure 1) then, the user will write his/her destination and start navigate, it will detect the car location measuring the dimensions, turns and so on according to the database and then it will use the decision problem algorithm (Figure 2) and decide if where the user drive is legal (YES) so the user will drive safely or (NO) then the mobile application will start to alert warning the user for not taking that wrong decision and will keep doing that all way long till the user reach the destination.

A Reconfigurable Multipurpose SoC Platform using Terasic Spider Robot

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ABSTRACT

One of the key issues in mobile robotics is the ability to understand the surrounding environment efficiently and analyze it in a way that is useful for a specific application. Such issues highlight the importance of utilizing a reconfigurable system for different purposes. The proposed solution introduces a novel use of a six-legged spider robot (Altera Terasic Spider) as a reconfigurable platform that is used with two modules for two different applications. The first module is a camera that is used for face recognition application, and the second module is a metal detector circuit that is used for mine detection application. One module at a time is attached to the robot in order to implement its corresponding functionality. The user interacts with the robot through a Bluetooth enabled mobile application. The development of both modules is done on DE0-Nano-SoC board which is attached to the robot's body. The board represents a heterogeneous system that contains two main parts, a Field Programmable Gate Array (FPGA) which provides high-performance real-time implementation of parts of the algorithms, In addition to a Hard Processor System (HPS) on the same chip. The HPS can be used to easily interface the board with other computer systems and peripherals such as mobile phones and cameras. In the mine detection module, a metal detection circuit is interfaced with the board and its output is processed in real time in order to guarantee an instant and accurate feedback. The intended application for the metal detection circuit is mine detection, this is specifically useful in de-mining processes that can save a lot of lives. In the face recognition module, a Principal Component Analysis (PCA) based algorithm is implemented. This algorithm can be parallelized in an efficient way on a heterogeneous system such as the DE0-Nano board due to the matrix manipulation operations that is involved in such algorithm. The intended application for the face recognition algorithm is to make the robot interact differently according to the recognized face, this type of application proved useful in assisting social behavior for children with autism.

While the developed algorithms and their corresponding applications are not specifically related, they provide the ability for using the Altera Terasic Spider as a multipurpose platform that can be used with different modalities in different areas. Deploying the camera for face recognition application on the spider robot proves the feasibility of any computer vision based application on this platform. Likewise, deploying a metal detection circuit on the robot proves the ability to integrate any customized circuitry with this platform whether it was used for sensing or any other purpose. Accordingly, this project combines multiple fields of research which are robotics, computer vision, and sensing into a single platform that does not only provides two important applications, but also open the opportunities for, and demonstrates the viability of many other applications in the mentioned fields of research.

The metal detection module prototype can detect metals in an air medium with a maximum distance of an inch. This sensitivity can be increased by changing some parameters in the metal detection circuit. However, the initial prototype has the aforementioned specifications as a concept demonstrator. For the face recognition, the algorithm was simulated in MATLAB with the Yale faces database and achieved an accuracy of 80%. This accuracy is expected to be lower in the real prototype due to the camera position as well as the circumstances at which a picture is taken(e.g: lighting, exposure, distance …etc.) . More specific results will be reported at the time of the demo when the prototype will be finalized. For the evaluation of the metal detection module, a warning should be received on the mobile application upon a successful metal detection by the robot. For the second application (Face Recognition), the robot should perform specific action (e.g. move a specific leg up) based on the detected face. The action can be developed later into full pattern of motion.

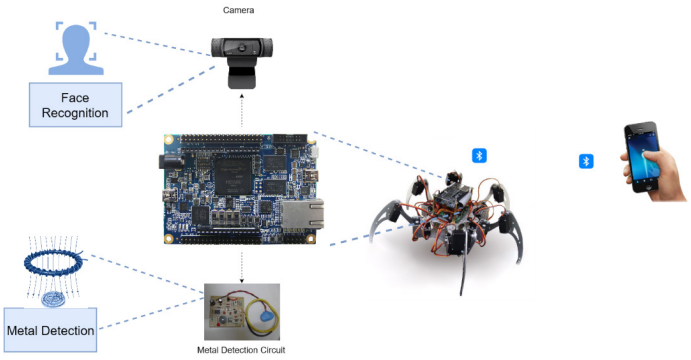


Figure 1: The Framework of the Proposed Project

Graduation Project Management System Based on Workflow Automation

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Supervisor:
Dr. Hanan Elazhary

ABSTRACT

Faculty of Computing and Information Technology (FCIT) final year students are required to take the graduation project course to apply what they have learned and gained. The graduation project course involves lots of tasks and phases to go through, which is overly cumbersome. Additionally, many documents, announcements, checkups and reviews have to be regularly exchanged typically through meetings and e-mail. Furthermore, with each new project, students and their supervisors typically have a hard time selecting a topic while avoiding repetitions. Since previous projects are not always available, it is not possible to build on a previous project and they have to start from scratch. Typically, assignments are exchanged in the form of PDF files to which supervisors add comments and highlights text to specify required modifications. Those annotations have to be extracted manually; which is a lot of work! Management systems for such tasks are usually developed without reusability and change in mind, which wastes time, money and effort.

Workflow automation is an easy way to streamline manual and paper-based processes, often comprised of unstructured tasks involving people, processes, and content. Workflow and Content Automation (WCA) presents the consolidation of traditional workflow and content generation into a new category to support the needs of a digital business. It is about working with content no matter what or where it is and routing it to the right recipients in the best way for them to use it. It is about straightforward processes. Workflow and content automation is a category unto itself.

The goal of this project is to help the senior students, supervisors and coordinators to manage the graduation project tasks easily and efficiently by providing features and tools based on the workflow automation techniques that anticipate future changes and allows making future modifications easy and smooth. Towards, those goals, this research study is concerned with building the Graduation Project Management System (GPMS), which is a Web-based system intended to improve the organization of graduation project tasks for senior students, supervisors and coordinators. GPMS allows students to get in touch with the supervisors of their projects and start to communicate with them sooner to schedule meeting time, discuss the project topic and manage their work with less effort. It allows supervisors and coordinators to make use of the previous projects and keep track of the students work and progress. GPMS provides an independent file sharing system for each group and allows automated extraction of annotations from PDF files. This is in addition to sending reminders to notify the users of important dates and deadlines.

Empirical evaluation of GPMS has shown high degree of satisfaction of students, supervisors and coordinators with the system. They believe it is conducive to save time for everyone and make contacting with each other a lot easier. They also believe its efficiency is in line with green IT technology, which is conducive to reduce the use of papers and ultimately reduce the production of carbon footprint. They believe that automated extraction of annotations from PDF files is a breakthrough that is conducive to save time and effort in addition to simplifying the task of tracing student work.

Nabdi: Heart Attack Detector Application

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Supervised by:
Dr. Wafaa Alsaggaf

ABSTRACT

In today's world, many technologies are used for entertainment and educational purposes, from social media, to online games and learning applications. Moreover, healthcare technology's role in society has a major impact on our lives. However, this area of research still needs a lot of studies andefforts to have innovations in healthcare that could lead to changing how people are impacted with the rise of disruptive technology. There are some disease conditions that are difficult to follow up remotely which lead to sudden escalation of the condition that could lead to very dangerous status. This project aims to introduce a modern technical solution for helping heart disease and elderly patients. The main problem is that people may lose their lives or expose it to risk without any awareness about the criticality of the situation. It takes only 9 minutes for someone who had a heart attack to suffer from coma, brain damage and even death. The project would prevent that and help save peoples' lives.

Currently, there are similar applications that measure the heart rate for fitness purposes. However, it is hard to find an application that detects the heart attack by measuring the ECG. This is could be mainly because of that the smart watches with ECG monitoring is new and not all operating systems support these watches.

Nabdi (نبضي) is the heart attack detector mobile phone application which will be developed for the purpose of this project. It provides constant heart monitoring and detects heart attacks as soon as it occurs and sends automatic messages for help. The main function behind the application is monitoring the heart ECG (Electrocardiograph) of the heart disease patients twenty four hours a day. It uses a smart watch for monitoring and sending the data to the application consistently. Once the application discovered a heart attack it will alarm the user with beeping sounds, play voice instructions to the patient to follow while help arrives. Then, it will send the user's location and status to the emergency contacts immediately. Figure 1 describes the architectural diagram of the application.

The benefits of Nabdi application would be tremendous to the patients and our society as heart attacks can happen when a patient is alone, asleep or even driving a car, which puts both their lives and others at risk. Heart Attack Detector Application (Nabdi) will be a stepping stone for patients and family members to get a warning sign in case of .an emergency

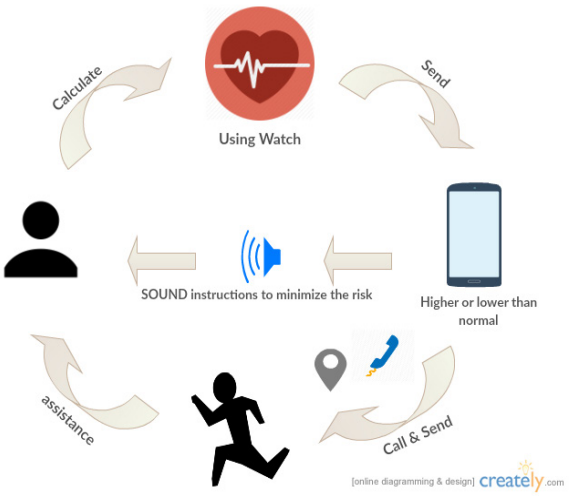


Figure 1:Architectural Diagram of Nabdi

Accident Revealing Sensor for Car

Reema Al-Ahmari and Munirah Al-Harbi
Imam bin Muhammad bin Saud University, Riyadh, Saudi Arabia

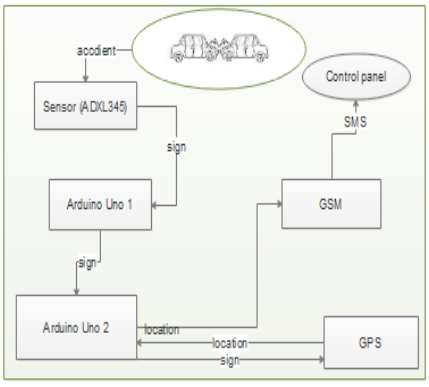
Supervised by:
T.Haifa Al-Dayel

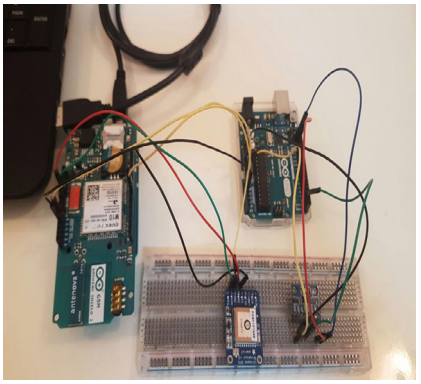
ABSTRACT

Most driver and passenger suffer from car accident, which actually may cause loss of life and effect on people. Furthermore, some car accident is hard to be notifying specially if the car accident happened on discontinuous road or the driver and his passengers fell unconscious or died. To overcome these problems and reduce the accident consequence, we propose this project to make sure the informing is receiving to the Concerned Authorities in a short time by let them know the exact location of the car accident on short time and that will speedup arrival to the location and help the infected from it.

First we put a sensor on a car from type Accelerometer (ADXL345) and it be controlled by Arduino from type (UNO). Moreover we choose (ADXL345) type because it can read many things like acceleration of objects, simplest measure change in temperature and detect if any change on power. So, we used (ADXL345) for measure the strength of the car accident. Then, UNO read the input from ADXL345 and turn it to into an output. After that we need to allocate the location of the car so we used Arduino GPS because it's a high-quality system on determining locations. Next the information of the location need to be saved and send so we used for that Arduino GSM. Since the GSM can make a voice call, send messages and receive it and connect to the internet because it has a SIM card. In conclusion Arduino GSM will send the location of the car accident via SMS message to the Concerned Authorities.

As a consequence after we connect all the hardware devices and programed them we gave the ADXL345 a small value which is 40 in hexadecimal. Then we test the system by gave it a small hit because it is difficult to apply it on reality with a real car. As a result a message has been sent successfully to the number we have been saved and the message indicates that there is a car accident followed by the accident location coordinates.





Monitor Patient Care Web Application

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Supervised by
Dr. Abdul Khader Jilani Saudagar

ABSTRACT

Monitoring the progress of patients who discharged from hospital is a global problem nowadays; especially when the patients are in their 70's. The elderly people who live alone also need medical assistance in times of emergency. The proposed project monitors and facilitates the elderly people by offering medical assistance. This project is based on an electronic system codes and the objective of the system is to monitor and follow up the patient's condition periodically. The system monitors and controls the patient's condition by placing a thermal camera to measure and monitor the patient's temperature. In case the patient is found to be in a very critical condition the machine will issue a sound alarms and generate messages alerts. These messages are communicated automatically to the emergency services and inform the ambulance for medical assistance. In the case of a call the system began to read the patient's condition vocally and directed the home address which allows the ambulance to break into the house as there is no medical assistance or family available at home. The scope of this project mainly focuses for the patients who cannot move, speak or cannot express what they feel and live their life individually in their old age. The following are the objectives of our graduation project.

1. Monitoring patient's progress, condition on a regular basis.

2. Developed a web application that offers medical assistance to patients in time of need.

Similar applications exist but have some disadvantages. IThermonitor is a wearable wireless thermometer developed especially for children but can be used by adults as well. One of the disadvantages of this app is that you have to be within 10 feet of the patient to pick the signal. Also the app is not available on many platforms. Another application Video Monitoring System (US patent US20120075464A1) is a monitoring system that includes a camera adapted to capture images and outputs the following: (a) whether a patient care protocol has been properly followed; (b) what condition a patient is in; (c) whether an infection control protocol has been properly followed. This application is only available in hospitals and can't be used in houses, and it's necessary to have devices and sensors on the patient body. Our application doesn't require devices to be placed on the patient. The advantage of this developed application is calling the ambulance automatically in case the patient is in a critical condition. The developed application has the following use cases as shown in Figure 1, the complete scenario of the process is presented in Figure 2 and the interface of the developed application is shown in Figure 3.

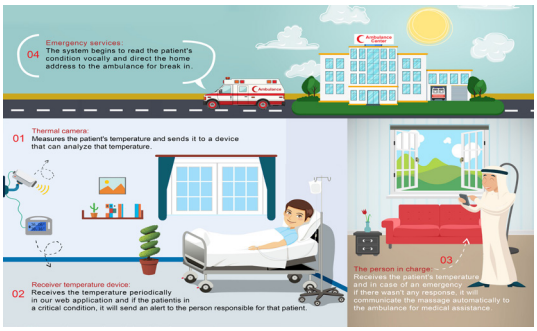


Figure 1: Use case diagram

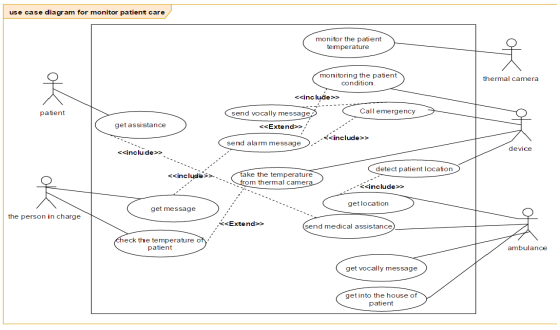


Figure 2: Complete scenario

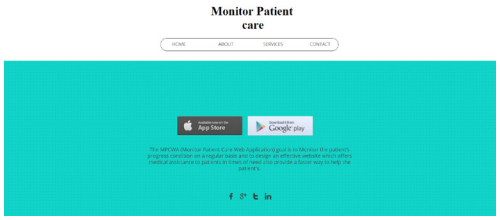


Figure 3: Developed interface

Interactive Trainer for Sport Application

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Qatar University, Doha, Qatar

Supervised by:
Dr. Somaya Al-Maadeed

ABSTRACT

Lack of doing exercises are the main reason that causes to obesity. By focusing on the reasons that led many people to do exercises regularly and according to our survey, feels bored and not interesting while doing exercise. Besides, preoccupation on stress works and lack of time conflicts with doing exercises. GCC countries invest in community and individual life, the interactive trainer for sport application will provide a visual trainer that teaches the user how to do correct exercises in an interesting and new way. In additional, it has the ability to provide burned calories of the user after each exercise, which encourages them to exercise more. Interactive trainer is appreciated trainer instead of going to the gym, besides wasting time, and money. In this project, the virtual trainer shows the exercises to the user and s/he is supposed to follow the movements in a correct manner. If there is any wrong movement, the trainer will notify the user and replay the movement in a slow motion. Moreover, it calculates the burned calories for each exercise, distance and the speed. The movement is calculated for each joint (25 joint) by adding the movement and distance from the center of the body for every thirty second. The same technique was used to compare the trainer joint movements with the trainee. Result is shown in the screen for the trainee to compare his movement realtime as shown in Figure1. The algorithm was implemented using C#, to connect virtual trainer with Kinect to display the movement to the. Data from the Kinect were extracted for analyzing each movement of the trainee in every frames. Different frame numbers were used and the 30 seconds frame gave good result in term of speed and accuracy for the ten users used the application. The analyzed data were used to compare it with the virtual trainer's movement, to repeat the incorrect movement to assists the trainees to repeat the movement correctly, to measure the trainee's burned calories after the exercise and gets fitness data -speed and distance, and to monitor the analyzed results of the exercises for the trainee. The user interface work as following: user stands in front of the Kinect, so it can recognize the user's face. After verifying the user recorded exercise start from the laptop. In the same time, Kinect send infrared to detect user motions (Figure 2). Our algorithm analyze the user motion and match it with visual trainer motions using a special formula. If there is any wrong mistake while follow the trainer motions, the system will notify the trainee to repeat the motion correctly. At the end of the session, data fitness and wrong followed motions appear in the screen of the trainee (Figure 1). The application can be used in personal fitness industry, health monitoring, and fall detection. These applications provide a diversity of activity monitoring for clinicians and medical cases to monitor and diagnose patients using activity data recorded at home or out of the clinic.

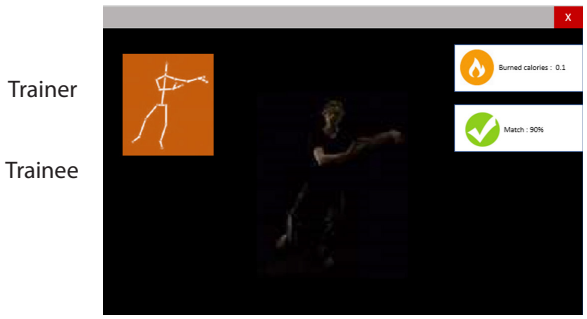


Figure 1. Screenshot of user interface, showing exercise accuracies

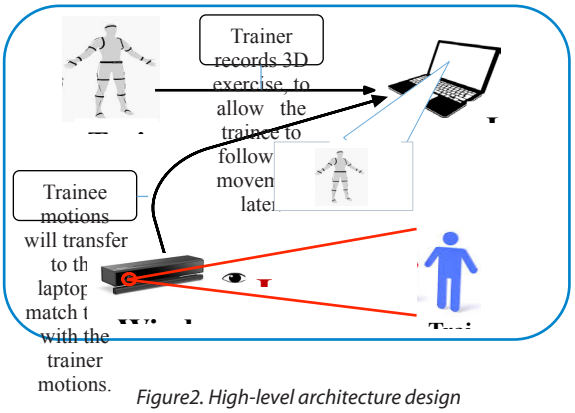


Figure2. High-level architecture design

Ma3ra9'i: Mobile Application for Reserving and Advertising in Exhibitions

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Supervised by:
T.Salha AlOtaibi

ABSTRACT

There is remarkably rapid growth in the exhibitions sector of Gulf Cooperation Council (GCC) countries, which has made these exhibitions highly interesting for participants and visitors. Many GCC countries view exhibitions as a key economic sector due to the economic and cultural renaissance taking place in those countries, as well as the availability of facilities, services, and appropriate infrastructure. Exhibitions are events organized for specific purposes that gather people together at one place and time; they can include many things (e.g., art; new products; services provided by industries, institutions, and merchants). Organizing institutions for exhibitions often use social media tools such as Instagram and Twitter, newspapers, and websites to advertise their exhibitions. Merchants and visitors do not know about exhibitions if they have not searched within those media types. Merchants must also take steps to reserve booths through communications with organizing institutions by phone or email, starting from initial queries and ending with confirmed reservations. If the current limited media resources continue, however, the advertising will not reach large numbers of visitors; thus, exhibitions will not be profitable for merchants and institutions. In addition, merchants lose time making many calls and waiting for responses from organizing institutions.

To address these problems and provide organizers of exhibitions in GCC countries a way to make reservations in just one step and to ensure advertising easily and quickly reaches all interested persons, we present Ma3ra9'I, which is a mobile application developed to run on the Android smartphone. This application is an intermediary between organizing institutions, merchants, and visitors; it aims to accumulate information on all exhibitions in GCC countries in one place to facilitate inquiries by those interested in the exhibitions. This application provides many features for different groups. It helps organizing institutions advertise their exhibitions with full details (i.e., date, time, location, category, regulations, sponsors, number of booths, and prices). Merchants can choose the appropriate exhibitions and reserve booths of the desired types and prices; merchant details will then be added in the application's exhibitor catalog to increase awareness about exhibition participants. Also, Ma3ra9'I facilitates searches for exhibitions by category (e.g., chocolate, jewellery, clothing) or by date. In addition, the application enables users to share advertisements of exhibitions with other people, add exhibitions to favorites list, and add the exhibition date to a calendar. Finally, the application provides evaluations of organizing institutions that help merchants and visitors choose appropriate exhibitions that are organized by the best institutions. This application saves time and effort because merchant may submit a reservation form at any time, from anywhere. Ma3ra9'I acts as a marketing tool to increase both the number of visitors at exhibitions and reservations of booths, which lead to increased profits for merchants and organizing institutions, and—more broadly—to globalization.

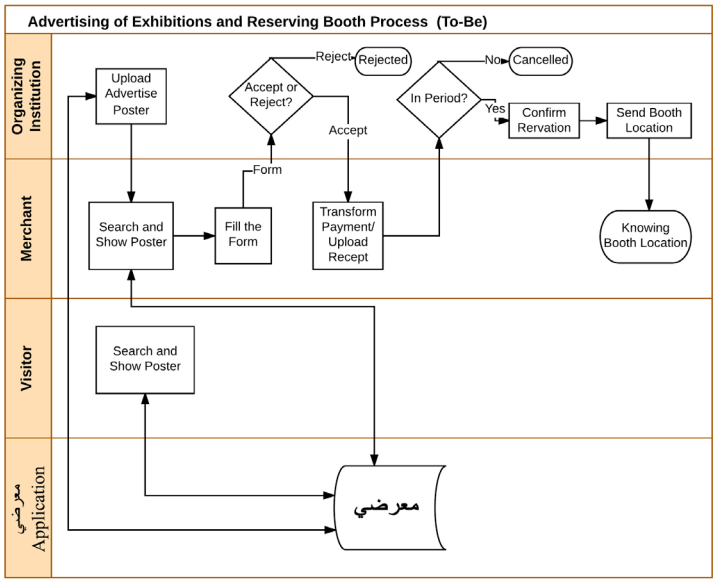


Figure 1: Advertising of Exhibitions and Reserving Booth Process (To-Be)

Emotion Classification System using Facial Expression Recognition

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Supervised by
Dr. Aalaa Mojahed

ABSTRACT

No one can deny that the human emotional facial expressions have an important role in communications between individuals. Although the humans can recognize facial expressions, reliable automatic expression recognition techniques remain a big challenge for machine learning community. To build a successful model that is able to recognize emotional facial expressions. Machines have to be taught to understand thesis expressions and gestures. In our project, we applied data mining techniques to identify and determine the emotional state of the individual through the gestures and expressions of the his/her face. Explicitly, we need to study the different emotional status such as the facial expressions and gestures of anger, disgusted, happiness. In our project, this process can be applied to people with different age, different situations, and from different cultures and backgrounds. However, the project is still in its early stages. We reviewed the literature and reported what has been recently done in this context. Also we have covered all the related aspects.
:The emotions classification process consists of four main stages as follows, shown in the figure

1.Image segmentation: For the process of image segmentation, we used region growing algorithm. [1]	2.Features selection: In the process of features selection, we will use Local Binary Patterns (LBP) Algorithm. [2]	3. Image classification: For the process of image classification we will use Support Vector Machines(SVM) Algorithm. [3]	4. Evaluation of classification performance: In the process of evaluation of classification performance we will use matrix algorithm classification confusion. [4]

In the experiment work, we created our dataset, manually. The images are classified into four predefined groups happy, sad, surprise and angry. Each class contains 125 images, with a resolution of 256x256 pixels and in the JPEG format. All images are in colored and contain only one face with frontal views. The amendment to the images was to make them fit within the specified size. Moreover, we don't have restrictions on the gender, background or age so we have images for males, females, old people, kids and people from different cultures such as: Arabs, Asians, Indians, Europeans and Americans.

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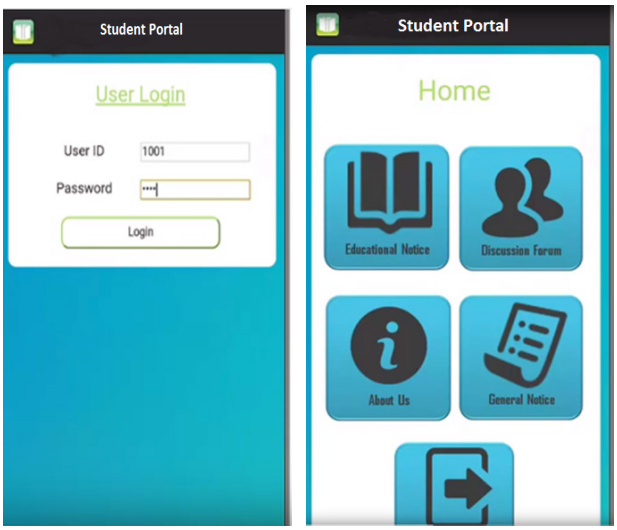
Student Portal Mobile Application

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Supervised by:
Dr. Hanan Elazhary

ABSTRACT

One of the biggest problems that face students at University is how to communicate with students in other levels to exchange experience .Students have to search for resource in each course by themselves, which wastes considerable time and requires too much effort. Students must buy books or ask friends. The main cause of this problem is students can't communicate with other students and exchange books and resource.



The research study is mobile application for university students to solve this problem and making communicate and exchange experiences easier. The main function for this application is to exchange files, experiences and documents between students from any level. Also there is chatting between students. Each student has a special account .he can adding semester schedule, adding tasks, lectures notifications and counting absence. After every semester each student can making his books available to borrow. The mobile application is created mainly using java and android platform. This app will be very helpful to students and saving a lot of time.

Order foods online from restaurants and delivery it for normal people and with special needs

Nada Abdullah AL-Jahwari, Mashail Mohsen AL-Ghafri,
Badriya Suror AL-Mamari , Shamsa Abdullah AL-Nakali

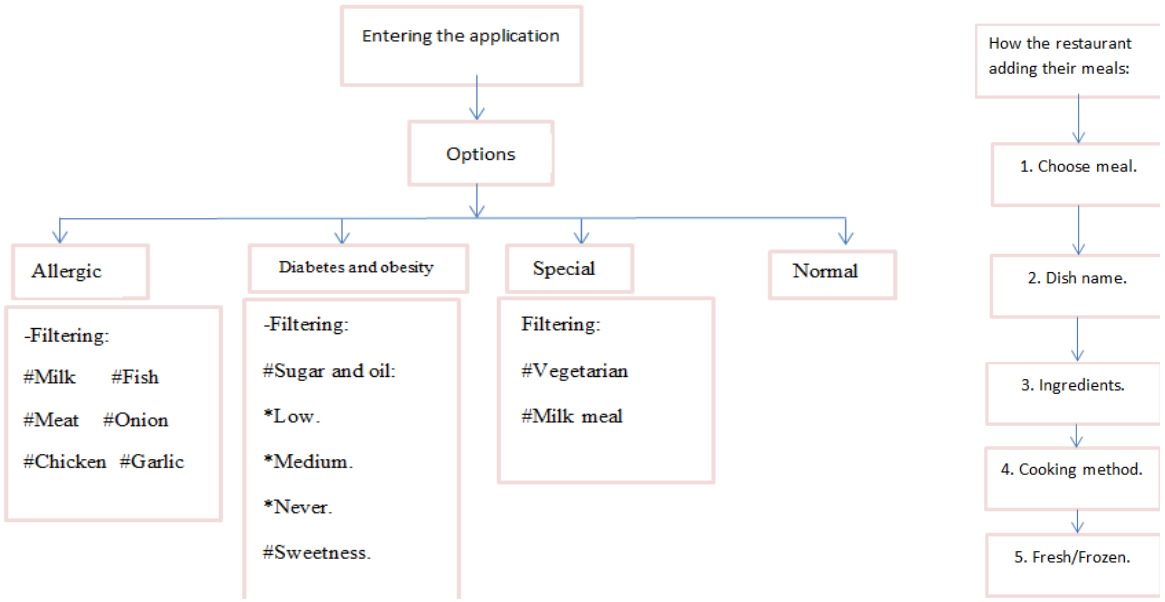
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Supervised by:
Dr.Hilal AL-Maqbali

ABSTRACT

Our project is a smart mobile application that supports people who suffers from allergies to certain foods or have some diseases, such as diabetes and obesity. These people cannot order any suitable food for him/her from the restaurant. We believe that those people supposed to have an easy way to order food, similar to talabat.com (mobile application to order food from restaurants), but these sort of applications do not provide any information about allergies or suitability of the food for people with some diseases.

People who suffer from allergies to certain foods or have diseases, such as high blood pressure, Cholesterol, dieting and sensitivity of certain foods will be easy for them to order their food or desired dishes by our proposed mobile application. Also, people who follow particular system in nutrition find it difficult to get healthy food from their favorite restaurants, but this will be easy via our smart application. Furthermore, they are wasting lots of time to know the components of each meal to avoid any health issues or not recommended meal. So, our mobile application will sort this problem.



We are using a number of different languages and scripts to build this application. The most difficult part of this project is to collect information of restaurants which provide meals and to analyze their ingredients. In order to collect the meals description data, we are creating a web page to ask restaurant's staff to enter their meals description on a form. All entered data is stored on a database so, we are able to link the restaurant meals with their content. Additionally, we are having meetings with a number of nutrition specialists, and by so we managed to get a database with recommended food for number of different diseases and those who want to follow particular system in nutrition. So that when the user orders his/her meals, the system will show only the suitable meals and dishes. By so, users can easily manage to select their meals. Additionally, our smart application is suitable for all age groups in particular elderly people because our smart application has a friendly and attractive interface. The mobile application allows users to easily navigate and so finding their choices quickly. This application is important for a number of people because it helps them to get healthy meals.

Accident Detection

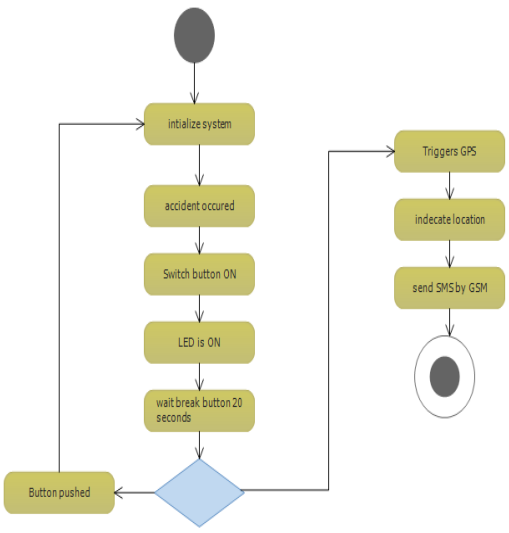
Abeer Saad Altowarqi, Rahaf Saud Alqurashi, Anwar Amer Alqurashi, Sarah kahlid Alqurashi
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ABSTRACT

With the rapid development of society, there are some side-effects including the increasing number of vehicle accidents. On average one out of every three motor vehicle accidents results in some type of injury. Security in travel is a primary concern for everyone in the world. Unfortunately, many lives are lost due to improper post-accident signaling and tracing out the exact location. The main problem is that accidents are not reported as soon as possible to avoid the deterioration of the situation which may lead to death. Reporting accidents depends on the presence of witnesses when the incident occurs, or one passenger vehicle or pedestrians to inform the ambulance with the injured. But what it would be, if one person inside the vehicle in a place without witnesses for instance, there is no way to report the incident? From here comes our project.

Our objective in this project is to find a solution to design an effective warning system that can monitor vehicle accidents on the roads and can report it to family members of people traveling or to ambulances and police. This system uses a number of sensors on the sides, front and back position of the vehicle to detect an accident. Then determines the location by GPS (Global Positioning Systems) device and sends messages through GSM (Global System for Mobile communication) device. The recipients of the message can verify the safety of the driver and deal with them in terms of calling an ambulance or the police, or going directly to the site of the accident.

The GPS based accident identification module contains a Micro Electro Mechanical System(MEMS), vibrating sensor, fire sensor, infrared sensor and a GPS module connected to the processor unit. At the moment of accident, the vibration sensor or MEMS or fire sensor detects the accident gives the information to the microcontroller, which will display the information on LCD, switch on the buzzer unit and sends the information to the ambulance, police and owner/parents through GSM network. Here the position of the vehicle is also sent to the mobile in terms of latitude and longitude. The main objective of this project is to detect the vehicle accident and transmit the location of the accident with the information of victim and type of accident to the medical help center and police control room. So medical help center and police control room will get the exact location by the geographical co-ordinates transmitted via message with the help of map.



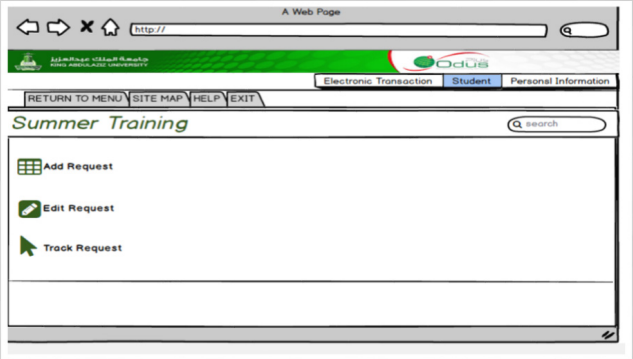
An Automated System for Management of Summer Training for KAU Students

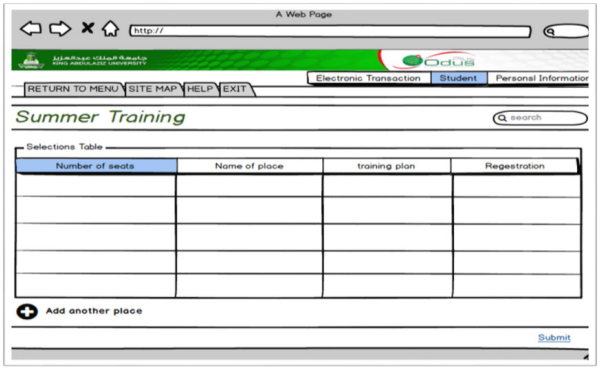
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Supervised by:
Dr. Hanan Elazhary

ABSTRACT

One of the biggest problems that face senior students at King Abdulaziz University (KAU) is how to select the location where they can get their required summer training. Students should search manually probably by searching through the Internet or by asking friends and relatives, which wastes considerable time and requires too much effort. What complicates the problem further is that the university places conditions on locations where students can get their training. The main cause of this problem is that process for training and assigning students to companies and organizations is manual.





The research study is concerned with building an automated system for organizing and managing the flow of all the processes involved in summer training. A view is developed for each of the involved parties (university supervisors, students, and organizations). For the supervisors at the university, it provides information concerning all available organizations and companies that meet the university's standards in addition to information of all eligible students for the training. This helps in assigning eligible students to valid organizations. For the organizations, the system allows them to view information about the trainees and new organizations can add their information. For the students, they are able to view organization information including all corresponding rules and the training plan. They can send requests to the supervisor requesting training at one or more organizations ordered according to priority. A search feature enables searching for a specific organization. The website is created mainly using HTML (Hypertext Markup Language), JavaScript and PHP. Empirical evaluation has shown the satisfaction of students, supervisors and organizations with the features provided by the system and we hope that it will be applied in summer training next summer and will be of ultimate benefit for everyone.

United Hospital System

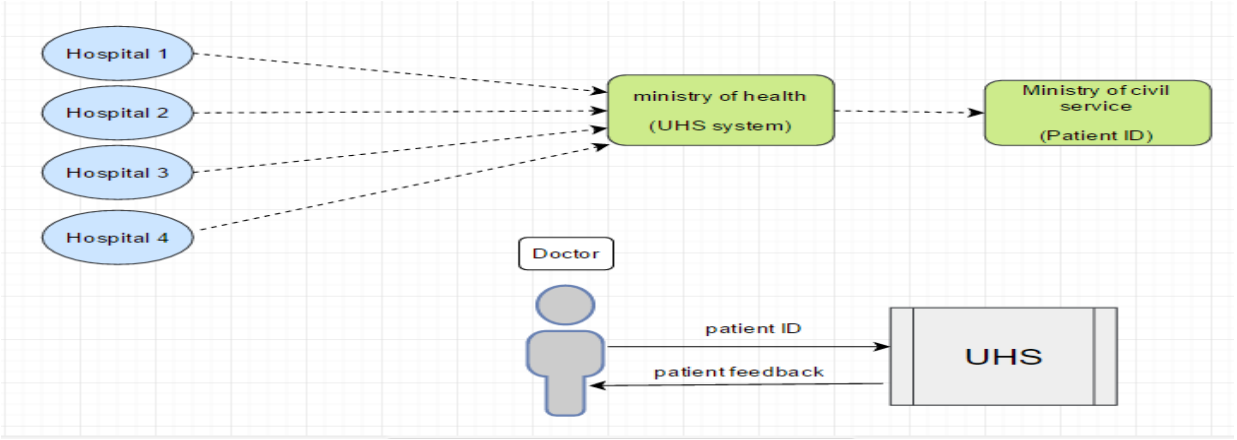
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Supervised by:
Raghdah Zumai

ABSTRACT

With the increasing number of hospitals and clinics in our country, it becomes easier for the patients to get the help and treatment when and where they need. However, missing the patients' medical histories may lead to wrong doctor prescription, which cause severe impact on patients' health. Although usually doctors ask their new patients about their medical histories, a patient may not remember all medications' names that he/she have had.

In this project, we propose a United Hospital System (UHS) as a solution to solve this current problem that most people in our society suffer from. UHS is a system for the ministry of health that communicate all the Saudi hospitals together in one system that can increase the efficiency of medical field by reducing the medical mistakes and simplifying information sharing among hospitals. The UHS system is an online web-based system that accumulate all the patients' information from all hospitals and allowing the doctors to access only their patients' information to protect the privacy of the patient information. The UHS will also connect the ministry of health with ministry of civil service to check the patient national ID, which will be used by our system to verify the patients' identity.



To describe the design of the system in more details we collected the requirements from the users of the system. The expected users of the UHS system are: Doctors, Pharmacies & Medics, each of them will have a different authority and perhaps, doctors will have the most authority in using the UHS system.

Based on the collected requirement, we drew all the necessary diagrams such as -DFD, Use Case, Activity, Sequence, Class diagrams in order to represent the system in different aspects to understand its work flow. Also, we built a high fidelity prototype so to simplify the whole idea of the final design of the system

Finally, we wish that this system will help in saving lots of people lives, helping the doctors to perform their work efficiently, saving doctors and patients times and efforts and finally in improving the efficiency of the medical field in our country.

PopMR: Pop Medical Record

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ABSTRACT

Healthcare facilities face important and critical issues in our community. Healthcare staff are always on the run, following up with patients, attend meetings, perform surgeries and much more. Consequently, the chance of making mistakes and accidents are increasing as healthcare becomes more complex. Despite the growth of technologies in healthcare, many of the medical documents are still documented and reserved on papers. Unfortunately, patient medical files are one of these documents which may face many problems. They can cause patient-identification to be mixed up which can lead in worst case scenarios to deadly consequences, they can be used only in one place at a time, they are vulnerable to be accessed by unauthorized people, and they can cause medication errors and duplicates. Therefore, it will be more efficient and easier to have electronic medical records that can be accessed by staffs' smart phone or tablets that allows them retrieve information quickly, easily, and it would be more secured and organized.

There are some solutions that have been developed to handle all patients' records electronically. However, in this project a new feature of automatic records pop up into staffs' application once they are in the patient's room has been defined. Moreover, considering the entire hospital staff in the application design has been also added.

The project (PopMR) will save the staffs' time by smoothing their movements as they enter a patient's room. The patient's records will be automatically uploaded (pop) into the staffs' application, then they can view or update that patient's records. Figure 1 describes the high-level design of PopMR. This project will consist of three main parts: user application, database server, and iBeacon device. The iBeacon device must be placed in hospital's rooms and it will be connected to the hospital's database to achieve the automation of displaying the records into staffs' application as they walk into a patient's room. The main features that will be included in this project are shown in Figure 2. Once the staff members are in a patient's room the records will pop up into their application automatically. Then, they can start to do their tasks such as updating patient's records, sending records to other consultants, printing the records, and/or ordering for lab tests and many other tasks.

The benefits of PopMR project include efficiency of follow-up process, accuracy of giving orders, speed-up the procedures that are being applied for patients admitted in hospital, and better communication and process management between hospital staff.

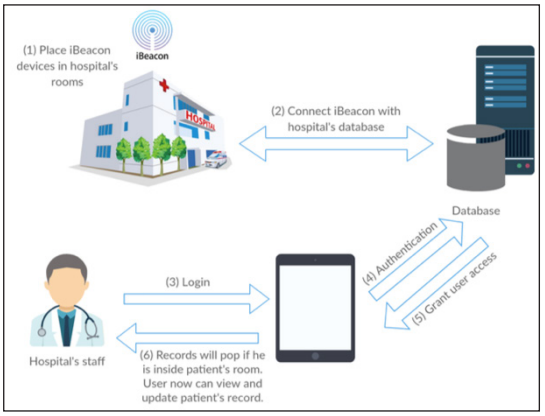


Figure 1: PopMR high-level design

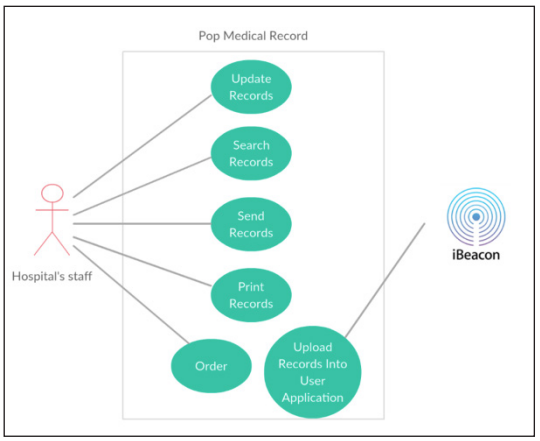


Figure 2: PopMR use case diagram

Phrase Finder in Arabic Audio files

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Supervised by:
Haifa Aldayel, Lamia Alabdulkarim

ABSTRACT

In real life to search for a particular phrase in an audio file, it requires to listen attentively until the end of that audio file and not to miss any part, because if you pass some parts without listening to it, it might be the part that you are looking for. Due to the increases of Arabic audio libraries and audio contents, to search for specific information manually can lead to waste the time and efforts, taking into account the value of time in human life where it cannot be compensated or retrieved. All these reasons have led to the need of the technical alternative that must be available for every individual. Moreover, the problem is not limited to a specific category it can extend to cover more than a segment of society.

Phrase finder in Arabic audio files is an application that searches in audio files to help the user to find and retrieve a specific part in the audio file. The user can record an audio file that he/she wants to search on it. Then, writes the word or phrase and clicks the Search button. After that, the application will provide all the parts and the time streams where the word has been mentioned. Therefore, the user can listen to the audio from the part that he/she wants with minimal time and effort.

Phrase Finder team aims to develop an application that helps the variety of users to search for keyword or phrase in the audio file. To achieve the aim, we will apply the following objective: Convert audio files into a textual representation by Microsoft Speech API. Build N-gram models in order to describe text. Develop a search algorithm to search for the keyword in the text in N-gram form. Provide to the user all the time streams where the keyword has been mentioned in the audio file without showing the text. Since the application will search in a text file the accuracy of the search result going to be definitely high.

The authors have done from the audio record and convert recorded audio into text by using Microsoft Speech API as it shown below in Figure 1 and Figure 2. Currently, we are working on segmentation the record by time. The current work has shown very satisfying results, the accuracy of converting the MSA (Modern Standard Arabic) into text is very good.

We present a new application that expects to be a step forward in NLP in the Arabic language that is going to help the society. The application is going to use a search algorithm that decreases the time and efforts to search as much as possible. Therefore, this project contributes to adding value to the technology revolution.



Figure 1



Figure 2

Developing a Benchmark for Mining Negation from Electronic Narrative Medical Documents

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Supervised by:
Dr. Amani Tariq Jamal

ABSTRACT

Negation detection is one on the most important data mining applications. Since the negation is hard to detect many developers tend to invent and develop new algorithms that may solves this issue. The problem appears when the developer need to test the algorithm's efficiency, quality and performance they have to compare the algorithms with an available one, so they create a datastore of medical sentences then apply it on their algorithms to compare the results, this operation is not fair because some algorithms works well in some kind of sentences than other algorithms. The propose of this project is to create a benchmark datastore that contains a classified sentences to make the operation of the comparison more fairly. This project is important because the efforts that put to create a classified datastore for medical documents are really poor.

The creation of the datastore was passed through several steps. First, collect the medical sentences from multiple resources such as papers, XML file and txt file. Second, preprocess the sentences by remove all the UMLS term in the sentence and replace it with the code <UMLS_000>, note that the number parts will increment with the UMLS term, if the UMLS term appear more than one time in the same sentence it must take the same UMLS code. Then, write the negation phrase in pre-negation sentences in boldface format and in post-negation sentences in italic format and underline all the stop words. Finally, classify the sentences under five classes, first class is for sentences that include more than one occurrences of the same <UMLS_Term>, the second is for sentences that contains single negation and it divided into two sub-classes one for pre-negation sentences and other one for post-negation sentences, the third is for sentences that contains double negation and it also divided into two sub-classes one for double pre-negation sentences and other one for double post-negation sentences, the fourth is for sentences that contain pre-negation phrase and the post-negation phrase in the same sentence, and the last one is for positive sentences, the reason of why we have to include it in a datastore of negation detection's algorithms is to find out the algorithm accuracy that mean if the sentence is positive the algorithm should inform that the sentence is not negated.

After preprocess and classify the sentences we implemented two of the negation detection algorithms NegEx and NegMiner then applied the datastore on it and because the datastore is classified we can determine the weaknesses and strengths of each algorithm that mean determine in which kind of sentences the algorithm will work best.

In conclusion, this project is really important because it'll solve the problem that cause because the differences in the datastores that used to compare between the algorithms. For the future work, we'll search for new sentences to add it in the benchmark datastore, add new classes for the negation's classification, and publish the benchmark datastore more widely.

```
3- Negation : negated
<UMLS_006>       -  sentence : No <UMLS_006>is seen.
negation phrase :       negated [PREN].No[PREN]  [NEGATED]<UMLS 006>[NEGATED]is seen


4- Negation : negated
<UMLS_007>       -  sentence :  No <UMLS_007>.
negation phrase :       negated [PREN].No[PREN]  [NEGATED]<UMLS 007>[NEGATED]


5- Negation : negated
<UMLS_008>       -  sentence : No <UMLS_008> or <UMLS_009>.
negation phrase :       negated [PREN].No[PREN]  [NEGATED]<UMLS 008>[NEGATED] or <UMLS 009>


6- Negation : negated
<UMLS_010>       -  sentence : Denies <UMLS_010>, <UMLS_011>, or <UMLS_012>.
negation phrase :       negated [PREN].Denies[PREN]  [NEGATED]<UMLS 010>[NEGATED], <UMLS 011>, or <UMLS 012>


7- Negation : negated
<UMLS_013>       -  sentence : No <UMLS_013> or <UMLS_014>.
negation phrase :       negated [PREN].No[PREN]  [NEGATED]<UMLS 013>[NEGATED] or <UMLS 014>
```

Figure 1: The Benchmark Datastore

3- No <UMLS_006>is seen.
4- No <UMLS_007>.
5- No <UMLS_008> or <UMLS_009>.
6- Denies <UMLS_010>, <UMLS_011>, or <UMLS_012>.
7- No <UMLS_013> or <UMLS_014>.
8- Supple no <UMLS_015>,<UMLS_016>, or <UMLS_017>.
9- Does not give a history of <UMLS_018>and denies any recent<UMLS_019>, <UMLS_020> and <UMLS_021>.
10- No <UMLS_022>, <UMLS_023>or <UMLS_024>.
11- Intake and <UMLS_025> and ambulating independently.
12- She is not in any <UMLS_026>.
13- No <UMLS_027>or <UMLS_028>.

Figure 2: The Result after applied the datastore on NegEx

Elderly People Telemedicine Caring

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ABSTRACT

The use of telecommunication and information technology in providing clinical health care services take it to higher level of quality, reliability and accessibility from anywhere. Telemedicine applications also helps to save lives in critical care and emergency situations. Some patients just need to be observed continuously at home by a stay-in nurse, like elderly people or those who has chronic diseases. Elderly people also usually need to go to hospital periodically for regular follow up with their doctors. This process seems to be so difficult for them because of their ages, health conditions or because they being distance from hospitals. Therefore, using a telemedicine system to connect patients with their doctors could solve most of these problems. Telemedicine could be defined as the use of telecommunication and modern information technology to provide clinical health care from a distance. It helps eliminate distance barriers and can improve access to medical services that would often not be consistently available in distant rural communities. It is also used to save lives in critical care and emergency situations.

Most of the previous solutions are insufficient as they use only a mobile application for direct communication and the patient may enter his vital manually, but in our proposed potential solution the we use smart watch to measurements vital signals automatically from patient body and send to the doctor through our proposed system.

Our proposed solution is to develop a system, as shown in figure 1, consists of a smart watch that must be wear by the patient in order to measure his/her vital signals like heart rate then send it to IBeacon using Bluetooth to be collected and then send it to doctor through a mobile app. The doctor will receive the patient monitoring report periodically and he can send instructions, modify medicine or even communicate directly with patient. The system also can send alarms to patient relative or ask for emergency help if the level of vital signals goes below to a certain level such as in chronical diseases like bradycardia, supra ventricular tachycardia or arrhythmia.
Both the patients and the doctors will get benefits of Telemedicine such as:

1. Improved quality of care and increased patient
2. Increase satisfaction by enhanced decision making through collaborative efforts.
3. Reduced isolation of healthcare professionals by Peer and professional contacts for patient consultations and continuing education.
4. Reducing and saving money.
5. Improved clinical outcomes and reduction in emergency room utilization.

This project is so challenging for us because it focusing on elderly people and their disease.

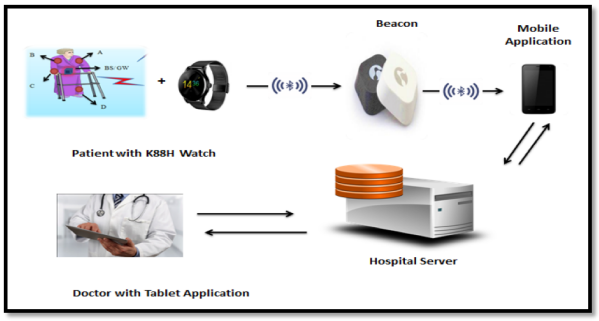


Figure 1. System high level archetecture.

We start to develop the system and till now we finished data gathering, system analysis and design stages and start developing interfaces server side and mobile app and currently we integrate our system with the IBeacon and the smart watch.

Smart Pediatric Clinic System

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Supervised by:
Dr. Wafaa Shalash

ABSTRACT

The use of telecommunication and information technology in providing clinical health care services take it to higher level of quality, reliability and accessibility from anywhere. Telemedicine applications also helps to save lives in critical care and emergency situations. Peoples especially mothers face many difficulties related to the traditional procedure of booking hospital appointment. It is exhausted and tired process especially for mothers who has sick babies as they visit the pediatric clinic frequently during the year either for inoculation, periodically check or when their children get sick. The main problems for mothers and babies are long waiting in clinic to see their doctor either for a new appointment, check-up appointment or vaccination appointment, unreadable prescription which makes mothers confused and finally when they need to contact doctor directly in emergency cases. Some mothers also get confused with medicine time and dose if they got more than one sick child at the same time.

Many systems have been developed to solve some of these problems but not all. They consist online booking hospital appointments and E-prescriptions or just a vaccination time reminder. But those systems are insufficient because they don't Ωsupport comprehensive system which solves all the previous issues.

Smart pediatric clinic system consists of two main parts as shown in figure 1. The first main one is Web-based system on clinic side to manage the clinic tasks such as assigning patient to doctor, organizing patients' appointments for different cases including regular child check, vaccination and for doctors it provides services like viewing and editing patient profile including E-prescription. The second part is a mobile application for both parents and doctors. For parents, it will provide the following services starting from booking an appointment with doctor, receiving E-prescription, adjusting alarm for different medicine doses for each child in case of having more than one sick child, providing communication with doctor in emergency cases, and finally asking for vaccination appointment automatically calculated based on child age and the web-based system will respond to this according to the child age and medical records.

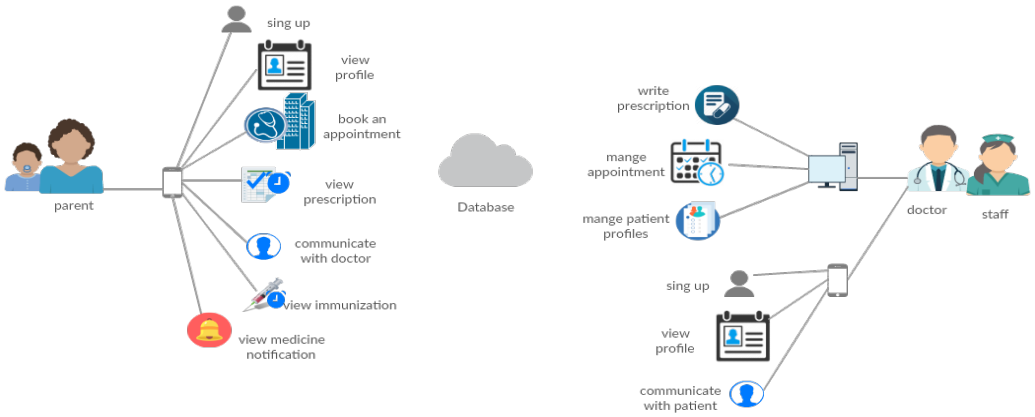


Figure 1: high level system design.

The software technologies used to implement the Smart Pediatric Clinic application include Android as Operating system, and developing a web application. Most of the system parts have been developed and currently we prepare for unit and usability tests. We also work on enhancing the vaccination module.

Advanced Driving Assistance System

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ABSTRACT

There are many accidents occur every day because of the careless of the drivers as a result of they did not drive in them lanes or they trying to change them lanes then they may cause collision with other vehicles. Some researcher and developer attend to perform system that make the vehicles intelligent to detect the lane, choose the fit lane for the car beside giving the driver alarm when there is a probability of occurring a collision with other cars. Moreover, they - researcher and developer – used a high and complicated techniques but these techniques not accurate in many situations such as: if there is a tree's shadow on the road the techniques here – such as Hough Transform- failed in detecting the lane either giving the driver results that are not accurate.

To overcome on this problem, we produce this work, an improved lane detection technique is developed by combining a Canny based flux-equilibrium edges extractor and a pre-trained lane's template matching approach. The preliminary results show the superior performance of developed technique over the traditionally employed lane detection approaches. The steps of algorithm to solve these problems are

1. Convert the image to HSV.
2. Applying a small Gaussian blur.
3. Filtering any color that is out from the lane.
4. Using Canny edge detection.
5. Defining the ROI -Region of the interest-.
6. Using HT -Hough Transform- to detect the lines on the images.
7. Filter the lines and make sure that data in left side is clean.
8. Differentiate between left lane and right lane.
9. Grouping the points by lane line
10. Add the detected lanes to the original image

Employee Attendance Monitoring System by Applying the Concept of Enterprise Resource Planning (ERP)

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Supervised by:
Dr. Nahla Aljojo

ABSTRACT

Enterprise Resource Planning (ERP) is a business process management system that integrates and automates the activities of an organization in terms of its technology, human resources and services. ERP provides an integrated environment that links the business processes of different departments of an organization as one unit such that departments benefit from each other in their transactions. This study applies the ERP concept to create an employee attendance monitoring system (EAMS). Three departments (faculty affairs, finance and director of administration) were linked using the EAMS. The traditional system of attendance monitoring was time consuming and required more effort. This is because the attendance report needed to be printed from the faculty affair department and then sent to the finance department for necessary actions (i.e. salary deduction). The EAMS will automate the whole process thus resulting in fair decisions in less time. In the traditional system, the calculation of delay in attendance can be unfair or the accuracy in time is hard to maintain as it is manually maintained. To solve these issues, a computer based monitoring system is required to maintain accuracy and fairness. For that purpose, we designed and developed the EAMS. The EAMS automatically calculates the delay in employee attendance using the concept of ERP systems. More precisely, this system will calculate the delay in the attendance with set rules as defined and applied by the different departments in the organization. The attendance time will be checked automatically in the system, if there is delay which violates the set rules of the organization, necessary action will be taken automatically against the employee in terms of salary deduction or other warning announcements. To apply the EAMS, we made a case study at the "Faculty of Economics and Business Administration at King Abdulaziz University, Female Section". Later on this system can be used in other organizations based on their needs and enhancement in the existing framework. Figure1: shows screenshot from the home page of Employee Attendance Monitoring System (EAMS).

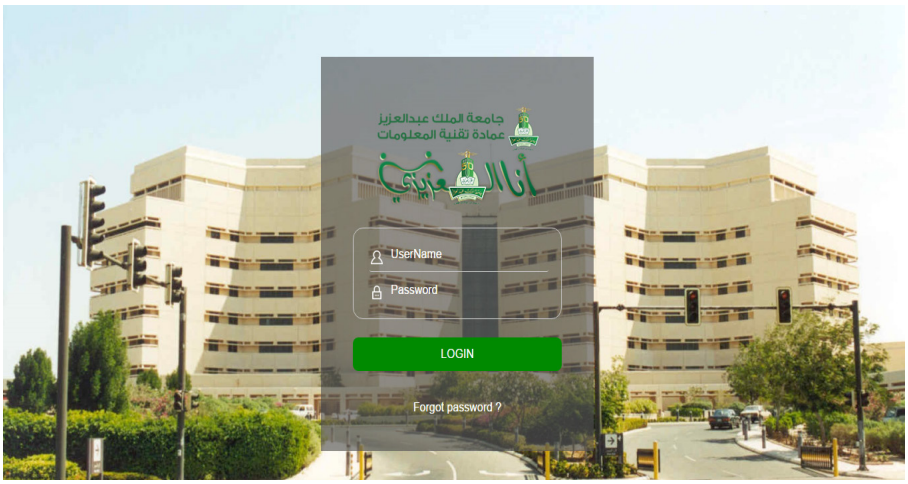


Figure 1: screenshot from the home page of Employee Attendance Monitoring System (EAMS).

The expected result of this system is that it will save time and effort for all employee at Faculty of Economics and administration. In addition, there will be a reduction of errors in the attendance reports.

Saudi Arabia Trade Balance Using Business Intelligence

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Supervised by:
Farid Bourennani

ABSTRACT

Recently, Saudi Arabia economy was affected by the significant drop of oil prices. Consequently, the Saudi government proposed a 2030 vision to have oil independent economy. In this paper, we propose to use business intelligence to find possible economical alternatives to oil dependency with concrete plans by analyzing public data published by the Saudi ministry of economy. The data is composed among others of import/export data, trade and balance, top exported and imported commodities, and the trade between Kingdom of Saudi Arabia (KSA) and other countries for the past 10 years. The analysis of the data and relation between data using tableau-based data analysis and visualization lead to interesting economical plans. These plans, if validated by economical experts, can lead by focusing on specific economic sectors to re-boost the Saudi economy, generate new jobs, increase exports, decrease imports, and develop key sectors in the country.

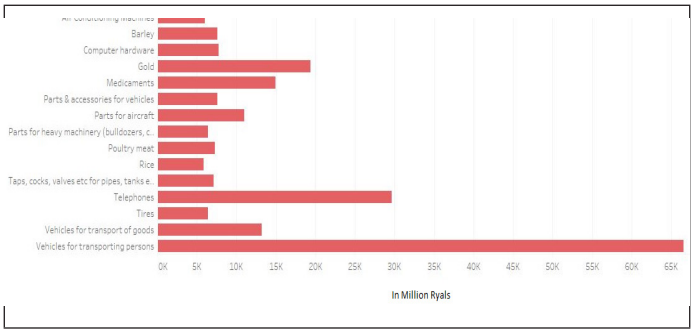


Fig 1: Top imported commodities in Million Ryals

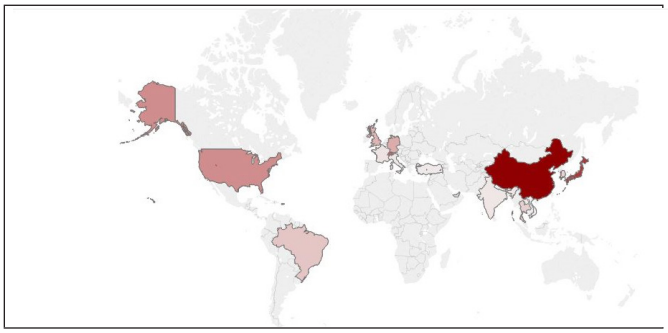


Fig 2: Top 15 countries by value of imports

As shown in Fig. 1, we started the work by examining the most imported commodities. The next step consisted in selecting the most appropriate commodities using common sense to be developed locally which means for example that they should not be too complex and require a long time for implementation such as aircrafts, or not be constraint by arid climate such as agriculture. This lead us to five key potential economic sectors which are, namely, air conditioning, medicaments, vehicles and parts, telephones, and tires.

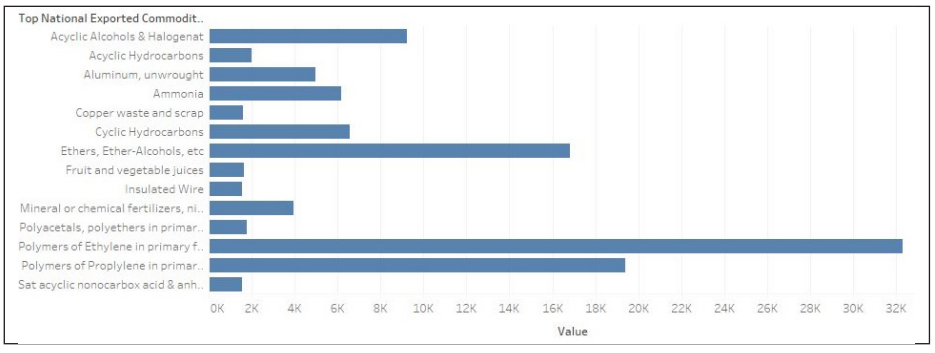


Fig 3: Top exported commodities in Million Ryals excluding oil

As shown in Fig. 3, the following step consists in examining the top exported commodities and try to match them for the establishment of a key economic sector rather than export them at reduced price as raw material. Furthermore, we briefly explored the current situation in KSA in these key sectors and top importing countries as shown in Fig. 2 for recommendations. For example, one recommendation is focus on tires production sector which is very promising as there is, to the best of our knowledge, only one company in the Saudi Arabia producing tires, the rubber which is the primary ingredient to make tires can be produced from crude oil and natural gas, and there has been strong economical recently between Japan and KSA which can be utilized in this direction. Further findings to be presented at the conference.

Arabic Pronunciation Application

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ABSTRACT

Learning is not limited to a certain age or a formal study environment. However, it is in the first eight years, and in particular the first three years, that are of great importance. That is because the effects of the care and attention meted to the child at this age continue along his / her life. The early learning process in children develops their educational abilities and skills as well as develops their academic achievement. This project aims to develop an educational application for children from the ages of 3 to 5 years old to help them improve their skills and abilities. The application will also prepare them for school by teaching them the Arabic letters, pronunciation and the short vowels (fatha, dama and kasra). The application also aims to help children communicate and interact more effectively with the world around them by using some theories about learning skills such as Piaget's theory of cognitive development, Edger dale's Cone of learning and Bloom's Taxonomy of cognitive goals. The application will be designed to help children in their Arabic pronunciation as well as helping them in their listening and speaking skills, and training and educating them so that they are ready to go to school. Figure1 shows a high level architectural diagram of the Arabic pronunciation application. As can be seen from the figure, the application will make use of making links between images and simple words.

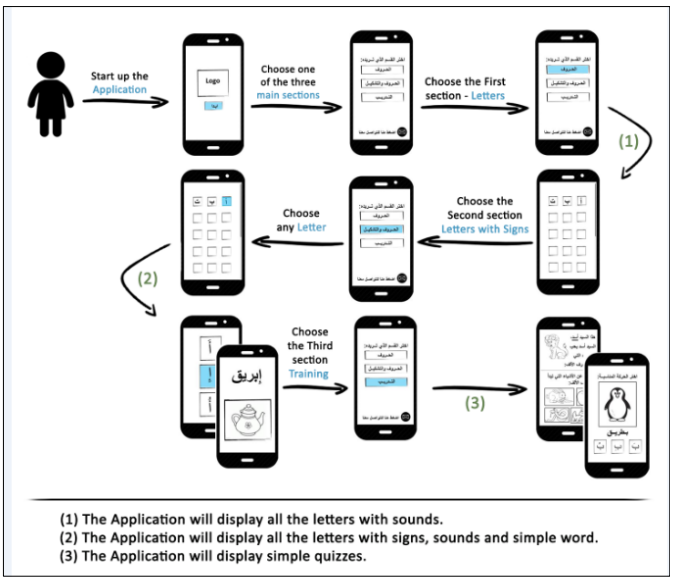


Figure 1: Architectural Diagram of Arabic Pronunciation Application

The expected results of this application is that it will consider better than educational books in children's education. Combining between education and playing in E-learning applications is an important way to attract the children, the appropriate age for teaching the children how to pronounce the letter is (3-5) years and helps to improve their levels in education at the elementary school.

Fleet Tracking Crowd-Sourcing App for Urban Mobility in Riyadh

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Supervised by:
Areej Al-Wabil, PhD

ABSTRACT

When people think about Smart Cities, they usually think about futuristic infrastructures and buildings that automatically adapt to citizens' needs. One of the most important urban infrastructures in Smart City Design is related to Mobility, since without it, we wouldn't be able to move around, goods wouldn't be delivered, and the city would grind to a halt.

In this project, we design and develop a **crowd-sourcing app** which involves a user-centric approach to urban planning and design. The project aims to capture and analyze massive amounts of urban data to better understand and predict how people interact with, and move around, the city of Riyadh. Specifically, we apply our application - Massari a Fleet Tracking Application - to track fleets of buses (300+) in morning and evening transportation routes for university campuses to provide insights into the multiplex transportation systems in the capital city of Riyadh.

Our project is motivated by the rapidly growing population demand for mobility in the city of Riyadh, Saudi Arabia which has witnessed a population growth that has doubled in the last 15 years.

The contribution of using location data to analyze mobility patterns is twofold; firstly, to inform the policies related to urban mobility and the deployment Riyadh's metro in our transportation infrastructure, and secondly to inform the design of technologies and services offered by the development authority in Riyadh to adapt to citizens' needs. The data-driven predictive models for traffic flow and congestion analytics is a novel contribution that is aligned with the need for insights on urban mobility trends and challenges in Saudi Arabian cities.

In this project, we develop algorithms to combine semantically enriched geo-location data on transportation to extract human daily urban activity and to identify potential transit demand and frequency. Following that, we use the derived understanding of human mobility activities and travel times to develop a coupled network approach for optimizing the interconnections of vehicle trips in the city of Riyadh.

Expected Deliverables

1. Application for tracking fleets of vehicles (Massari App) that is applied in a case study for Riyadh in this project, but will be made publicly available for use in other contexts.

2. Data analytics of urban mobility's rich data sets acquired from our recordings

3. Integration of the acquired routes and predictive models to the national interactive platform for Riyadh's City Dynamics - a national project funded by the King Abdulaziz City for Science and Technology (KACST) - as an information visualization layer.

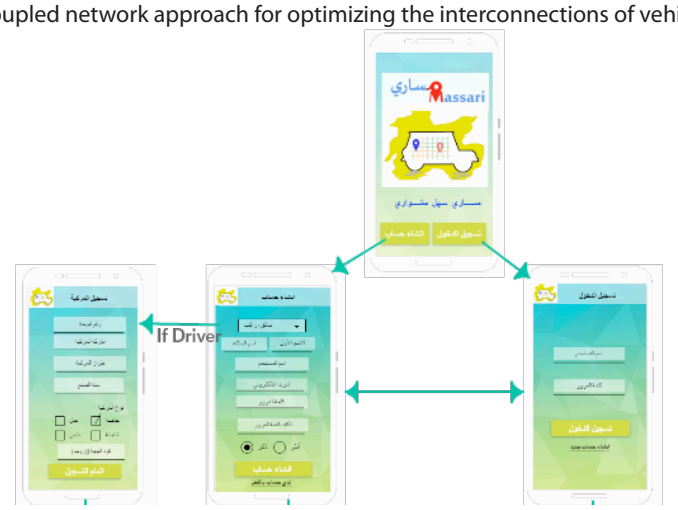


Figure 1: Massari Main Users Interfaces Design

The Effects of Social Networking on Kids Privacy

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Supervised by:
Haseena Al Katheeri
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ABSTRACT

It can be said that the social networking is became the social identity of young people because they find it hard to communicate with their own age.

We live in social networking world where most young people connecting digitally instead of interact face to face. In addition, they are having more than one social networking account such as Facebook, Snapchat, YouTube, Instagram and twitter including the video games chat room.
They do not even know how to manage their privacy settings online. They post photos and comments and receive comments from friend's family and even strangers without questioning whether it is safe to do so; it has become normal because everybody does it. Sharing personal information online such as photos or videos and that can be an easy way for predators to reach them or potential victims, or to elicit unwanted attention. social networking sites can take advantage of location- based service, which lets people share their location with others it is often turned on by default in mobile applications, and they know some users may be unware of this. Sharing location can help contribute to crimes like identity theft or even worse.

A survey was sent to parents from family and friends. the question was about wither they let their kid use the social media and for how long, are they aware of the it risks and if the parents have put for their kids. some of the questions was about the parent's knowledge about who is following their kids or who their kids are following, do the kids receive or post bad comments, and do they adjust the setting of the social media account to agree with their need and usage. At is was shown in the survey 31.03% of the parents agree that their kids to use social media ,58.62% of the kids have 0-1 account,93.10% of the parents have the knowledge about the danger of the social networking, 68.97% of the kids are using the social media from two to four hours a day, 93.10% of the parents know how to use the setting on the account, 75.86% of the parent has put rules for their kids, 86.21% of the parents know who their kids is following and who is following them back, 24.14% of the kids received bad comments on the social media.

In conclusion, both parents and teens should grasp the negative impact of sharing their private information on social network services. There should be awareness that help them being correctly informed that will help them to minimize their social media usage and to protect their selves from the potential dangers of using it. By making an application that will help to motor the kids social network without they know, by receiving alert whenever they post or like and comment or receive comment and even can delete the photo or the video before it can be post.

Smart Attendance Follow-up Application

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Rawabi Saleh Alasraj, Taghreed Alfuraikh, Dalal Alotaibi, Nouf Alhumaidan and Rawan alhusaini
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ABSTRACT

The traditional way of recording the class Attendance is always consuming of time and is not accurate. On the other hand, it is vulnerable to lose and damage and cannot give us an explicit attendance status. From this context, the idea of our project has emerged. Our project is a mobile application and website for Smart attendance follow up by Bluetooth Technology. This system will serve the academic parties (faculty members, the staff, and students). The application will help instructors to record the attendance of students automatically in an efficient way without any additional effort and will allow mainly to save time, consecrate the whole lecture time to the course content and will increase accuracy and reliability in following-up the presence of students. Also, the system will produce statistics and reports that help future decision-making concerning both course content and student behavior. Moreover, the application helps the student to check permanently his/her absence status and alerts him/her if needed. The system helps administration staff to make decisions concerning absent students and to establish future corrective measurements depending on course absence rules through the website.

AMAL: Machine Learning Based Breast Cancer Recognition System

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ABSTRACT

The idea to create the AMAL project emerged from the need for such system in the medical field. Medical doctors who specialize in breast cancer diagnosis struggle with analyzing, managing, and discussing mammograms (X-Ray imagery of patients' breast areas) of some cases where the clear diagnosis is not determined. In such cases, the doctors will discuss the mammograms with each other's, depending on their expertise and own judgement, in order to make a decision regarding whether the case is considered to be cancerous, or not.

An extension to that problem would be the limitation of training & testing MD students on the analysis of mammograms, since they need to practice on real case studies which are already diagnosed, and report back their own judgement to their instructors.

Project Idea

Giving the problem discussed earlier, a new project's idea emerged to create a system that will simplify, enhance, and aid the analysis, diagnosis, categorization, and discussions of mammograms. Moreover, the idea enables teaching staff to train and test their students on real cases.

The system will provide an environment for medical doctors to upload and store mammograms, which is processed by the system. Which will use artificial intelligence and machine learning to categorize the mammograms according to their fat density (which is a major factor in the diagnosis of breast cancer), and provide diagnose the case whether it's malignant, benign, or non-cancerous. Moreover, doctors can query the system for solved cases with similar features, in order to help them make decisions about the case.

Furthermore, the doctor can post the image for public discussions, where any registered doctor can contribute, or to private discussions for invitation-only contributions. Each doctor can annotate the posted image, highlight any ROI (region of interest), browse any previous mammograms of the same case, display the medical history of the patient, and discuss the case trying to reach for a diagnosis. The system will keep track of cases, and feedback/statistics are provided on the accuracy of diagnosis.

The system also enables medical teaching staff to create case studies. Students can be added to be trained and tested on the diagnosis of real cases, and feedback will be provided for instructors about their students' performance.

A System for Assisting with ABET Accreditation

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Supervised by:
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ABSTRACT

The Accreditation Board for Engineering and Technology (**ABET**) is a non-governmental organization that accredits post-secondary education by setting global standards for programs in applied science, computing, engineering, and engineering technology. ABET accreditation is a process that evaluates academic departments via a universal periodic assessment of all academic activities. The ABET commission starts to evaluate a program by forming a work team made-up of scientists, specialists and highly experienced industry, academic, government and private entities. Staff in the evaluation focus on the curriculum and the efficiency of the teaching staff, the level of students' physical and human potential and the support provided by the university's science department; along with many elements that affect the quality and efficiency of the educational process.

ABET is a solution that facilitates the choice of the institution that provides good quality education. Any institution that wants to obtain ABET accreditation has to complete a lot of paperwork that costs time and money. n our project, we will create a computer application that can save users/teaching staff time and effort and be widely accessible to dispense the paperwork that is essential for obtaining ABET accreditation.

Based on our knowledge of the time and effort spent by the Faculty of computer and Information Technology in our university to get the accreditation, and to keep track of developments towards computing and electronic archiving to replace the paperwork, we decided to create a computer application that files and attaches the documents needed for accreditation, in order to save resources and reduce human effort and time.

The proposed website will achieve many objectives. It will provide an electronic paradigm to file and upload documents. It will have ease of data retrieval and maintenance, save time and effort of the user, provide a fun and easy way to work towards accreditation and provide the maximum amount of information needed by the user.

We know how much time and cost is involved in paperwork. However, it may be damaged or even lost; thus, all of this time and work can be wasted. ABET will facilitate the evaluation process, save teaching staff time and be accessible anytime and anywhere.

Our project can be summarized as follows: our graduation project is to create an ABET application that will enable users to fill a paradigm with related work (assignments, quizzes and exams). It will work anytime and anywhere in an easy way (translate the ABET manual to a computerized system). It will reduce time and cost, and save documents from loss or damage.

Jordan Carpooling Mobile Application

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Supervised by:
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ABSTRACT

The use of cars is a cheap and stress-free process to moving people at the lowest cost in terms of money and time. The use of cars, also known as car sharing, is an important technology as a convenient and efficient way to travel. When a person can travel to their destination, using a common car, with other passengers; this will reduce fuel costs, time and gas emissions. This method of using cars in this way is environmentally friendly because it helps reduce traffic congestion, toxic emissions and other gasses, and helps in reducing parking congestion. During times of higher fuel prices and higher rates of contamination, using a car assembly system is an intelligent decision for all involved. We aim to help passengers use an easy-application interface for them to plan their trips together, which will reduce both cost and time of gathering passengers together and preserving the environment. A carpool mail system depends on two things; the driver (who is going to make his car available) to be assembled and informing passengers who want to make use of that car. Economic development in cities and the people who need to travel between cities, leads to traffic congestion. The idea of using carpooling did not originate in Jordan, but has been applied in many countries worldwide. Google Inc. began this idea by using the car service to Google Louise. However, it was limited to "a select group of employees." In the San Francisco Bay area, Germany, France, and Britain have also been applied. The number of users rose from car sharing services in Europe, at the beginning of 2015, to 10 million users in 14 countries within the European Union. The number of active users is equivalent to almost two million users monthly. This system has also been applied in a number of Arab countries, such as Egypt, where it was both successful and widely accepted. We have a strong hope that applying this idea in Jordan will help to solve every day problems that people are exposed to with regards to transportation. When a passenger wants to go somewhere, after creating an account, he/she will open the application and enter a destination and the time that they want to arrive. Next, the application will produce a list of all of the nearest drivers who are going to the same destination. Each driver in the list has a starting time of moving. The model of the car, the price you will pay for the trip and more information will be available. This application should help to reduce wasted time and costs by contributing passengers. Finally, this application will help to solve traffic congestion problems and its consequences.

Zee: A Mobile Application for Clothes Recognition

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Supervised by:
Lahouari Ghouti

ABSTRACT

Zee is a mobile application that uses machine learning techniques to detect clothing items in a photo, recognize their styles and retrieve their closest matches. The application will allow the user to select or take a photo and send it to our server(s), which will then compare the photo to items in our database.

Fashion is one of the biggest industries in the world. People wear clothes to express themselves. A person sees several types of clothing styles during their day, worn on other people. A friend, or even a stranger, might be wearing clothes that you desire to get for yourself. You might find a shirt or a dress in a store that you like the look of, but is too expensive, or is not in the right color. Zee will allow you to find the most similar looking dresses.

Currently, our database consists of the DeepFashion dataset, which is a collection of around 800,000 clothes images with various useful attributes provided by the The Chinese University of Hong Kong. The dataset is well annotated. There is a possibility of expanding the dataset in the future using crawlers on online fashion stores, which would increase the accuracy of our application.

Several applications for general product recognition exist. These include Amazon's mobile application and Alibaba Express. However, due to the generality of their image retrieval algorithms, the special properties of clothes are not taken into account. Our aim is to develop an application that is specific to clothing, and will thus produce better results in retrieving images in that category. Regardless, our application is not the first to attempt clothes recognition. For example, ASAP54 is a mobile application that does just that. However, its poor performance and limited data make it a sub-par application.

Deep learning algorithms, specifically Convolutional Neural Networks (CNNs), have shown themselves to be the best performing algorithms in regards to the image recognition problem. Additionally, a model could be developed atop a well-tested general model. Various models exist for image recognition, many as submissions to the ImageNet competition, where submitters ranging from amateur learners to industry giants such as Google, must submit a model that learns on the ImageNet dataset (consisting of a more than a million images) to create the most accurate general image recognition model. Two of the most popular models in that competition are VGG-16 and InceptionV3 (Google). By leveraging "base models" in our application, we can take advantage of the power of those models and fine-tune them to solve our own specific problem in clothes recognition.

Self-Adaptive Software in Mobile Devices: Opportunities and Challenges

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Supervised by:
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ABSTRACT

Nawadays, the growing number and diversity of available networks contributes to the increasing difficulty in modifying settings for the end software such as smartphone technologies. Mobile devices have become more complicated with different modes of configurations. Therefore, the engineering community should focus on developing software platforms that employ autonomic computing to support routine daily tasks. Self-adaptive software in mobile devices is comprehensive range of modification for the user.For example, this software enables a mobile device to both send and receive data from devices in the surrounding environment that can be used to adapt the phone settings.

This study explores the opportunities and challenges available in the applicative of self-adaaptive software in mobile devices. In order to identifying these, we analyzed research in the field of autonomic computing and self adaptive systems. The findings are as follows:

- Self-adaptive software provides the user with a satisfied experience by eliminating various distractions and automating much of the configuration based on received data from the environments as well as behavior.

- The major challenges facing the development of self-adaptive software is the heterogeneous nature of network platform, software and hardware.

The study mainly focuses on how self-adaptive software can shift the way human- technology interaction behavior. Self-adaptive software is able to expand properties and computations based on data received from the environment. It can support the user anywhere and anytime, using functional abilities that consume less time. This software able to predict is changes in the environment to deliver significant advantages to end-users. For example, technologies will be able to automate solutions via internal operators that can manage a variety of settings, adjusting them when needed. On the other hand, there are different challenges that will face implementation of self-adaptive software regards to the complexity of different networks and platforms. The self-adaptive software can manage different configuration, optimization, and recovering, which is incompatible with current systems and difficult to adjust the IT environment in a short period of time. Indeed, designing this type of software will consume high effort, time, and cost, which will limit program developers to conquer the field and only large companies that are able to put an effort to develop software.

In the following table you can see the comparison between a non-adaptive calender application and an adaptive application that will help end-user to modify the device settings automatically.

Capabilities	Self-adaptive calender	Non-adaptive calender
Silent Mode	Can shift the silent mode on whenever appointments are valid and turn the silent mode off when the appointment finish.	Can only remind the user of appointments.
Notifications	Can manage notifications whenever the user have an appointment and reduce the amount of notification and organize them after the appointment is finish based on higher priorities and user behavior	Can't manage the amount of the notification.

The self-adaptive software can increase the computing possibilities of our devices. By using data from the surrounding environments, this software can adapt setting harnessing the devices capabilities for the users benefit.

Crowd Detection Management System

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Supervisor:
Dr. Wafaa Shalash
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ABSTRACT

Many countries all over the world are currently experiencing problems caused by rapidly growing populations of urban areas, the population growth rate of human beings is quite worrying in the meantime. Towns, streets, and schools have been overcrowded due to rapid population growth.

The crowd could be defined as a mass gathering of people or group of people. The crowd may result in pushing, mass panic, stampede, crowd-crush and causing an overall loss of control. The crowd could be categorized into diffused crowd where individuals couldn't be recognized or tracked and the diffuse crowd where individuals and groups could be recognized and tracked. The last decade has seen a great advance in crowd analysis techniques including people counting by using either pixel-level, texture-level or object-level analysis. People counting used to determine the level of crowd and send an alarm if this level exceeds a certain level to avoided crowd impact. Finally, crowd analysis also includes people tracking. The mechanics of human crowds are complex because a crowd exhibits both dynamics and psychological characteristics, which are often goal directed. This makes it very challenging to figure out an appropriate level of granularity to model the dynamics of a crowd. Research on the crowded scene analysis could lead to a lot of critical applications such as Visual Surveillance and intelligent environmental. The current project concerned with abnormal behavior analysis to avoid accidents in crowded public places, like what happened in Angola-Africa the football accident and also Al-hajj disaster on 2015 if we could detect the abnormal behavior in crowd places such as stadium, malls even the holy places, we can prevent tragic accident from happening.

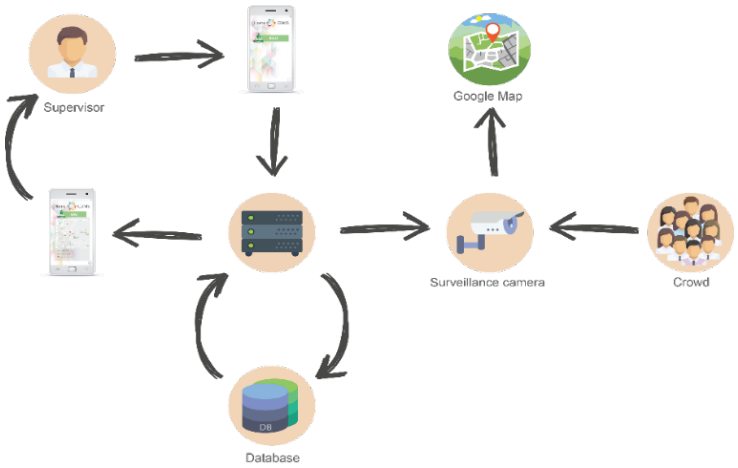


Figure 1 High-Level System Architectural Diagram

For that reason, the proposed solution is to develop an Android application connected to the server application and surveillance cameras that detect crowd movement behavior using Social Force Model(SFM). In the case of sudden movement, it will send an alert to the application supervisor about abnormal behaved. Also, it provides a people counting function to detect the level of the crowd. Figure 1 shows the high-level architecture of the proposed system. If crowd reduced, it would reduce the negative impact too, saving time & effort of which faculty will use it, Increase the level of safety in an efficient manner.

The current system consists mainly of two parts the first is a server application connected to surveillance camera, that application receive a stream of images from the camera and according to the programmed abnormal behavior detection algorithm, which is based on SFM, the server will send and alert to the other part of the system which is an Android app to the security responsible. In normal cases, users can send requests to the server to detect the level of crowd on any of the selected areas. Till now we finished the server side app and connect it with the mobile app and the crowd level algorithm also finished. We are currently completing the SFM algorithm, some of the mobile app interfaces and preparing for the testing.

Human Safety System: Aan Arduino Based System for Detecting Risk Factors Leading to Death

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ABSTRACT

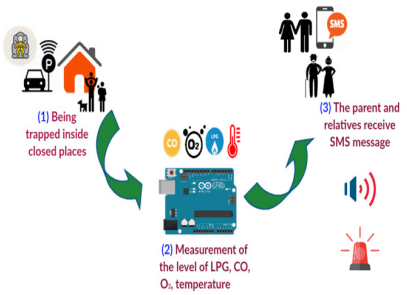
Decreased level of Oxygen ($O_{2)}$ in any closed space have been an incessant issue affecting human lives all over the world. Many accidents of deaths due to suffocation in closed spaces have been reported since years. In fact, the decreased level of Oxygen is not the only reason for deaths due to suffocation. Deaths due to excess temperature and existence of certain gases, like Liquefied Petroleum Gas (LPG) or Carbon Monoxide (CO), in a closed room or space, beyond the tolerance levels have also been reported.

Up to recent times, there were various attempts to solve the issue to prevent deaths in closed spaces, due to suffocation or increase in temperature. However, most of them have certain technical limitations. Generally, various sensors are installed to detect the level of gases and temperature. And in case, the levels are beyond a certain limit, the system initiates local alarms only. In certain cases, human presence is detected only if there is a movement, however, if a person is sleeping, sensors fail to detect the presence of humans and initiate an alarm. In addition, notification process in these devices are not suitable to all types of peoples such as blinds, deaf, children, etc. Furthermore, most of these products are used in a certain dedicated places only, such as a car or a room and not covering all kinds of places. This emphasizes the need for a response system to prevent all causes of the death, due to suffocation or gas leakage or rise in temperature, in any closed place like kitchen, car or a room.

Human Safety System is the solution that prevents human deaths inside various closed spaces. The system senses the presence of human and measures the level of temperature, O_2, CO and LPG. When the measurement reaches a dangerous level, initiates both visual and aural alarms locally. In addition, the parents or caregivers receive an SMS message, which informs them about the danger including the location of the system.

What distinguishes Human Safety System from other devices is that it can be used inside any closed area with no ventilation outlet. The main objective of the system is to prevent deaths caused by the increased temperature, decreased O_2 levels or existence of LPG or CO.

Figure 1. depicts a general architecture of the Human Safety System. The system checks the presence of a human in the closed space, using a motion sensor. In case, the human is sleeping and there is no motion, the system will track the level of CO_2, if the level is gradually increasing, the system resolves that a human being is present and exhaling CO_2. Meanwhile, the temperature and O_2 levels are also measured. In some situations, the system works even if there is no human inside the place. In this case, the system detects some gases after leakage like LPG and CO. If the temperature reaches 36°, and/or the level of O_2 becomes below 20% and/or it senses the presence of LPG or CO, the system's LED and speaker will be turned on and an alert SMS message will be sent to the caregivers. This SMS message will contain information regarding the danger along with the location of the place.



Wireless Power Monitoring System

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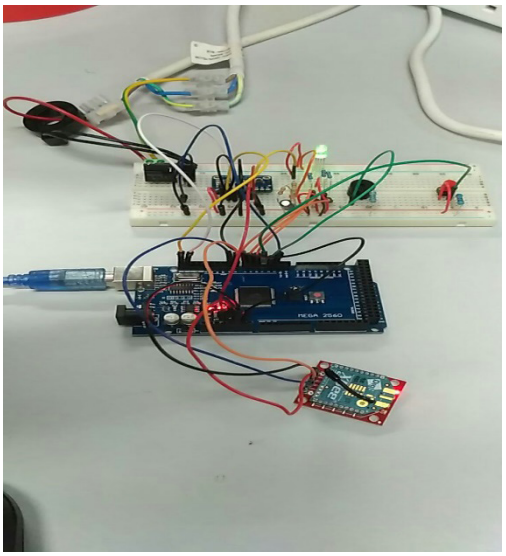
ABSTRACT

Smart metering is a very wide research area with a prime interest in promoting the reduction of power consumption. The most recent and reliable data show that people are spending increasing amounts of money on electric power to run their home appliances. Great evidence show that a substantial portion of electricity is being wasted by devices plugged into electrical outlets. Unfortunately, consumers are often unaware of where and how much energy they are consuming on their home appliances. Nowadays, energy meters and smart meters are designed to only provide the total power consumption of all devices connected to a network. However, they do not provide the power consumption of each device.

In order to address the above issue, we aim to create a miniature, low cost adapter that will provide the consumers with accurate and detailed information about when and where the power is being used. This will help them in adjusting their usage patterns and hence, reduce his personal energy costs and problematic greenhouse gas emissions. We called it Wireless Power Monitoring System (WPMS). Our project is different from existing solutions because it combines all the different features as well as extra features:

1. Central HUB, so you don't need to control each socket separately
2. Controls remotely or manually the power supply to a connected device
3. Has hardware and software protection
4. High accuracy current measuring tools
5. Low manufacturing cost
6. Low power consumption
7. Monitors the power consumption
8. Reduces power usage by having automation systems
9. Small in size
10. Uses web based application which can be accessed from the internet, therefore no need to install extra applications
11. ZigBee communication that is suitable for smart homes, and better than Wi-Fi for such applications

Our adapter for the socket will track the current passing to the device using the current transformer (CT) sensor. This value of the current will be sent and stored (SQL database) in the Raspberry Pi (hub) by means of wireless communication using ZigBee standards. The hub will calculate and provide the power consumption on each adapter through a web based application. The application can control the power supply manually or through a scheduler that will automatically turn on or off the relay inside the adapter.



Also, we will be adding some additional features to our project in which the user can specify the power limit which will be also used to turn off the adapters and notify the user when the power limit has been reached. Additionally, there will be a motion sensor that will be wirelessly connected to the hub and it will either turn on or off specific adapters based on any motion in the room.

The picture on the right (Figure 1) depicts the combination of all our features. Our example has a load, a small heater, which has a current flowing to it. This current is being measured by our system. The current transformer produces a secondary current based on the primary which is different by transformer ratio. The CT is connected to a resistor which transforms the secondary current into voltage. Our analog to digital converter of 15-bits reads this voltage and sends it to microcontroller (Arduino). Finally, the current flowing through the device will be transmitted from the adapter to the hub through XBee; .hence, the power consumption of the device can be calculated



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