



# The 2<sup>nd</sup> Annual Undergraduate Research Conference on Applied Computing (URC 2010)

COLLEGE OF INFORMATION TECHNOLOGY  
ZAYED UNIVERSITY  
DUBAI, UNITED ARAB EMIRATES

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## Message from Vice President, Zayed University

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Welcome to Zayed University and the 2nd Annual Undergraduate Research Conference on Applied Computing! I am pleased by the conference theme focusing on undergraduate research, since Zayed University future plans for further development of its research agenda were laid out in our university planning document "Destined to Lead" in May 2009.

With the launch of the second edition of this successful conference, Zayed University has set out on an exciting path that provides students from Zayed University as well as universities in the region with an exceptional opportunity to capitalize on our solid research capacity and on our ability to organize unique collaborations to help in mobilizing research for maximum impact in the region.

Universities in the area have a great potential for collaborative research with each other and with companies in the technology sector. I expect this conference will serve as a forum for encouraging collaborative research. We need to accelerate the research engine in the region and this conference is a step in the right direction to encourage young researchers to get involved in research projects.

Research is important not only to advance the state of knowledge, but also to engage with the wider community in order to apply that knowledge so that we can solve social, cultural, and economic challenges facing societies today. University research, indeed, touches every aspect of human life.

I thank the College of Information Technology for taking the initiative to organize this conference, and a special thanks to all the students for their contributions. If last year's conference is any indication, I expect this year's conference to be a great success.

Dr. Sulaiman Al Jassim  
Vice President, Zayed University

## Message from Provost, Zayed University

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Dear Students, Colleagues, and Friends,

I am pleased to support the College of Information Technology and its second Annual Conference on Undergraduate Research on Applied Computing. This conference reflects the growing importance of the role of undergraduate students in the research enterprise. We ourselves at Zayed University have recently invigorated our commitment to fostering, sustaining, and supporting our undergraduates who are performing faculty-mentored research in their major field of study.

Our belief in the critical value of student research is, I'm sure, no stronger than yours. Your dedication to such activity has brought you 300 registered participants together at this exemplary conference. In its second year, the conference has attracted immense scholarly interest, and over 100 papers will be presented in your crowded two days. Undergraduate participants represent twenty-four distinguished universities in Saudi Arabia, Qatar, Oman, Bahrain, and the U.A.E.

As you all listen to one another and engage in stimulating discussions, you will inevitably find grounds for research collaboration. Reaching across national borders to form research teams on applied computing will, of course, be personally rewarding. Such collaboration will as well strengthen the entire GCC region and emphasize the vital importance of IT as an integral component of the GCC economy.

I wish you well in your scholarly endeavors here at Zayed University and in your collaborative research in the future. Thank you for participating in this splendid conference.

Sincerely,

Dan Johnson  
Provost, Zayed University

## Message from Conference Chairs

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Welcome to the 2nd Annual Undergraduate Research Conference on Applied Computing (URC 2010) whose objective is to provide a forum for undergraduate students to present their research ideas and prototypes and to interact with other young researchers, faculty members, and technology leaders from the UAE and other Gulf countries.

In addition to students from local institutions, this year we are particularly excited to welcome student researchers and their faculty advisors from other educational institutions in the Gulf region, namely from Bahrain, Oman, Qatar, and Saudi Arabia.

Contained within this booklet, you'll find over one hundred abstracts presenting undergraduate student research projects from many Gulf universities. The abstracts reflect the multidisciplinary character and wide spectrum of emerging technologies.

The program contains a wide selection of events, including keynote speeches, oral and poster presentations, a panel discussion, and an evening reception. We will also present a total of six awards for the best three oral and poster presentations.

We would like to thank everyone involved in this conference. Without your paper submissions, and the volunteers who reviewed them, this conference would not have been possible. We would also like to extend our special thanks to the keynote speakers for taking the time out of their busy schedules to participate in this conference.

We are grateful to our sponsor, Emirates Foundation, for their commitment to make this event possible. Your generous contribution helped make the conference a reality. Thank you.

Our thanks go to everyone who has contributed in making this conference extraordinary. We would like to extend a heart-felt thank you for the rest of our team: Azzedine Lansari, Maha Shakir, Gregory Skulmoski, Abdallah Tubaishat, Ibrahim Baggili, Bradley Young, May AlTaei, Mona Bader, Enas AlAgami, Huwida Said, Hind Al Dosari, Shaima AlHaj, and Nadhera Naser; we couldn't have done it without you.

Finally, we take this opportunity to thank Zayed University for providing the needed resources.

We hope you enjoy the conference.

General Chair  
Leon Jololian

Conference Co-Chairs  
Qusay Mahmoud and Manar Abu Talib

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## URC 2010 Conference Organizers

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The conference is organized by the College of Information Technology at Zayed University.

### **General Chair**

Leon Jololian

### **Conference Co-Chairs**

Qusay Mahmoud

Manar Abu Talib

### **Program Co-Chairs**

Maha Shakir

Azzedine Lansari

### **Publications Co-Chairs**

Gregory Skulmoski

Abdallah Tubaishat

### **Awards Co-Chairs**

Ibrahim Baggili

Bradley Young

### **Social Program Co-Chairs**

May AlTaei

Mona Bader

### **Sponsorship Chair**

Enas Al Agami

### **Local Arrangements Co-Chairs**

Huwida Said

Hind Al Dosari

Shaima AlHaj

Nadhera Naser

## URC 2010 Reviewers

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We're grateful to the following people for their help with the review process:

Abdallah Tubaishat, Zayed University, UAE

Adel Khelifi, Al-Hosn University, UAE

Aftab Haider Rizvi, Manipal University, UAE

Ahmed Bentiba, Khalifa University, UAE

Azzedine Lansari, Zayed University, UAE

Bradley Young, Zayed University, UAE

Emad Bataineh, Zayed University, UAE

Fahim Akhter, Zayed University, UAE

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Heba Hassan, Dhofar University, Oman

Huwida Said, Zayed University, UAE

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Vishwesh L Akre, Manipal University, UAE

Zaheeruddin Ahmed, Manipal University, UAE

Zakaria Maamar, Zayed University, UAE

## Thoughts on Undergraduate Research

Dr. Abdulla Ismail Abdulla  
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Senior Executive Advisor, Science & Technology Programme  
Emirates Foundation for Philanthropy

### ABSTRACT

Research is the search for new knowledge to solve a problem, discover new frontiers, and invent or improve a process or a product. When you perform research, your goal is to add to human knowledge. Research experience or skills are transmitted from college professors to students as part of the learning process, which is intensely personal with extensive interaction. With current highly paced scientific development, more research-oriented elements are introduced in college undergraduate programs. In this short note, I will outline some advice and guidance based on my personal experience in conducting research with my colleagues and students at the UAE University and abroad.

### BIOGRAPHY

Dr. Abdulla Ismail Abdulla is a Professor of Electrical Engineering with 22 years' experience in teaching, research, management and community service. Has worked at UAE University as Vice-Dean of the College of Engineering, as advisor to the Vice-Chancellor and as a member of the Vice-Chancellor's technical board. Has been a member of the Ministry of Higher Education and Scientific Research's executive committee for university quality assurance and accreditation. Has consulted for several government institutions including the Armed Forces and the Ministry of Electricity and Water, and for private universities. Has published two books and over 64 technical papers in local and international journals and conferences. Is an active member of several local and international professional organizations and societies.



### EBTIC - A Centre of Research and Innovation for ICT

Prof. Nader Azarmi  
Director  
Etisalat BT Innovation Center  
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#### ABSTRACT

The Etisalat BT Innovation Centre (EBTIC) is a jointly established research and innovation centre in the UAE by ETISALAT, BT and Khalifa University of Science, Technology And Research (KUSTAR). Through collaboration with industry, universities and governmental organisations, EBTIC is expected to become a driving force for innovation in the field of network-enabled ICT applications and services, both within the Middle East region and beyond. In this talk we will introduce EBTIC and will present some of the research and innovation projects being carried out in the centre.

#### BIOGRAPHY

Prof. Nader Azarmi joined BT in 1989 and has since pioneered and led BT's highly successful international Intelligent Systems research and innovation programme. This programme has resulted in major scientific achievements including over 130 inventions, 450 scientific publications and 30 international and national IT awards, and has produced significant business benefits to the company, notably BT's world-class automated work and resource management systems currently supporting over 20000 BT service engineers.

Nader Azarmi has personally been awarded a number of prestigious international and national awards for his work in research and application of Artificial Intelligence technology in industry, notably the Royal Academy of Engineering medal, the IET achievement medal, INFORMS-Franz Edelman finalist medal, the British Computer Society IT medal, BT's Martlesham Medal and BT's Alan Rudge best patent prize.

## PhD Fellowship Grants in Science and Technology at the Emirates Foundation

Dr. Shayma Alkobaisi  
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Manager, Science and Technology Programme  
Emirates Foundation for Philanthropy

### ABSTRACT

One of the Emirates Foundation's principal objectives is to expand the number of qualified Emirati PhD holders in the UAE – creating a significant pool of accomplished professionals in higher education to teach as well as to conduct research of long-term benefit to the community. Although, pursuing a PhD offers an exciting challenge that help professionals excel throughout their careers, it is often a long process that needs planning prior to graduation.

This presentation will provide considerable background in PhD studies helpful for career decisions of outstanding Emirati students and will highlight the PhD Fellowship Grants project at the Science and Technology Programme of the Emirates Foundation.

### BIOGRAPHY

Dr. Shayma Alkobaisi is an Assistant Professor at the College of Information Technology (CIT) in the United Arab Emirates University. She received her Ph.D. degree in Computer Science from the University of Denver in June 2008. Dr. Alkobaisi's current research interests include Uncertainty Management in Spatiotemporal Databases, Online Query Processing in Spatial Databases, Geographic Information Systems and Computational Geometry.

## Challenges Faced by E-Commerce and E-Governance in Cyberspace

Mr. George J. Jason  
Vice-President  
EC Council  
Dubai, UAE

### ABSTRACT

One E-commerce would essentially mean conducting any form of business activity over electronic medium. Similarly, E-governance is utilizing information technology for accessing and delivering government services to the mass population. Information technology being the core of both these functions; is prone to heavy risk in cyber space. *E-commerce* and *E-governance* face ample amount of challenges both in developing solutions and implementing them successfully. Some of them are, Development of low cost solutions, lack of trust by citizen, privacy and security, connectivity and citizen participation. Security being the most challenging and aggressive dilemma faced by E-commerce and E-governance; it has become the primary concern of technology experts and government leaders. The most common threats in cyber space today are Botnets, Fastflux, Disturbed denial of service, phishing, Vishing, virus, spam, Malware, Crimeware, and Ransomware. Most of these malicious programs would cause mass destruction to even well protected data assets and electronic functioning systems.

Some of the less spoken forms of technological threats involve *Internal Threat* and *Insider Attacks*. Internal threat primarily originate from employees, contractors and other stakeholders who have access to an organizations network and they accidentally infect the corporate network with infected machines, USB sticks and other storage devices, or by browsing infected Web sites . On the other hand, Insider attack happens when a competitor wants to cause damage to your organization, steal critical secrets or put you out of business; all they have to do is find a key job post opening, train someone to pass through and get hired. It can also happen when an unhappy employee taking revenge by helping the competitor steal relevant information about an organization. Statistics show that 60 percent of the information stealing attempts happens behind the firewall and it is highly complicated to catch the perpetrator. Most of these hazards occur because of slight inaccuracies from the side of our security professionals. They include; lack of disaster recovery and backup plans, poor coding practices, lack of qualified professionals to handle mishaps, lack of centralized security systems t monitor the network, failure to test the network against hacks and finally and most importantly failure in educating end users.

### BIOGRAPHY

George J. Jason has 11 years experience in IT industry with expertise in Network Security and Services. In his current position as Vice-President, EC Council, he has made a major contribution in strategic planning having finger on the pulse for tactile IT operations. He has hands-on experience in analysis, installation, implementation and troubleshooting of WAN/ LAN and Wireless Products. George brings with him a rich corporate exposure in various roles of networking, and in fields of vulnerability and Penetration Testing. His core competency lies in Networking handling complex networks of Firewalls, SSLVPN, and Application Acceleration devices. He is certified in Juniper Networks, Wireless, CISCO and a Certified Ethical Hacker.

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### ABSTRACT

“Learning” is an infinite process that one experiences in life. One's everyday life is surrounded by objects that could contribute to increase in knowledge. Yet, the exploitation of these objects is not scaled up to an end that meets the learners' aspirations. The challenge is to maximize opportunities to match between learners' goals and pervasive instructional resources. For example, in an academic institution, where instruction is abundant, a learner could be dynamically prompted to participate in a scheduled seminar about a preferred topic held in a location that is of close proximity. Similarly, a laboratory could broadcast the facility of an experimental session to respond to practical learning needs. Such instructional and experiential learning resources remain largely under-utilized, as traditionally, they are proposed in a pull format, where learners have to figure out the sources of learning. Creating a push format of notifications system that seamlessly integrates learning object instances into learners' agenda based on personalized profiles and opportunistic locations will overcome the problems mentioned above and a scalable learning framework.

We propose an ambient learning environment that aims at combining physical components modeled following the Learning Object Metadata (LOM) model and instantiated as typical academic learning sessions, with personalized learner stereotypes modeled following the Learner Information Package (LIP) standard, to cooperatively guide learners through specific learning paths. Information about learners such as learning interests, goals, prior experiences, certificate credentials and level of education is exposed to ambient learning objects which proactively participate in building a personalized learning path to achieve LIP-specified goals. The adoption of standards aims at achieving interoperable solutions.

The proposed system creates a learning schedule in the learners' calendar to keep record of planned learning possibilities in the surrounding environment that matches the learners' profile attributes (like goals and prior competencies). A closed-loop learning optimization process is continuously engaged to achieve new goals and build new competencies. This flexible learning approach is an alternative to rigid pre-scheduled sessions or classes, which benefit only a predefined set of learners. We envision an open institution, where learners are admitted to running sessions without prior assignment. The companion provides the learner with the information about surrounding sessions that match his profile (competencies and objectives). Once selected, the session is entered into the learner calendar pending approval of a supervising unit. Once approved, the learning session is confirmed into the learner calendar. The learning process is validated by a biometric attendance application, based on which new skills are appended to the learner's profile.

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## Three Dimensional Visualization of Hydrogen and Carbon Production in a Vortex Solar Reactor

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### ABSTRACT

Over the past years, there has been increasing interest in creating and using three-dimensional visualization techniques for teaching and research. Three-dimensional visualization offers the ability to extract important information hidden within the data by taking advantage of the natural ability of the human visual perception and the brain to help understanding complex phenomenon.

This study is on the three-dimensional visualization of “solar thermal cracking of natural gas”, which is a promising technology that has attracted researchers in recent years for its potential to lead to the development of CO<sub>2</sub> free hydrogen and carbon production process. The basic mechanism of the solar cracking process is simple: concentrated solar energy is directed to a reactor chamber, where natural gas is injected and absorbs energy via convection and radiation. Solar energy is used to raise the temperature to the necessary dissociation temperature and start the intensive endothermic process of cracking natural gas into hydrogen and carbon.

However, there is a major problem affecting natural gas cracking solar reactors’ performance: reactor clogging due to carbon deposition during the course of two-phase solar thermo-chemical processing. This problem requires a thorough examination of flow conditions to control carbon particle deposition via flow dynamics and reactor design. In order to solve this problem, we have developed two-phase, three-dimensional CFD models including kinetics, heat transfer and incoming solar flux for a vortex flow reactor, and validated our CFD model against experimental results of Swiss Federal Institute of Technology.

Once we validated our numerical analysis, we merged our simulation code with visualization tool EnSight, which gave us a three-dimensional animation of this striking process on a 120o curved screen showing images as large as 3576 x 1024 pixels. The three-dimensional stereoscopic immersive visualization elaborated the phenomenon of cracking natural gas into carbon and hydrogen molecules when solar radiation hits the natural gas inside the reactor. The gas particle interaction and temperature variations inside the reactor simulated using FLUENT. With this animation, we were able to track the carbon particles and clearly observed temperature variation inside the reactor in a three-dimensional domain. This tremendously helped in our solar reactor design to effectively spot carbon deposition and to modify the reactor geometry using the three-dimensional technique.

The computational tasks were performed using the supercomputer facilities of Texas A&M University at Qatar (TAMU-Q). TAMU-Q supercomputing facilities have 512 cores cluster housed in 64 nodes, which are connected together through a 20 Gbps infiniband network that allows high-speed, low-latency communication. This is particularly very useful for scalable parallel applications.

We will present our results from this three-dimensional visualization study. Our presentation will show the different computing and three-dimensional visualization techniques used in developing our vortex solar reactor. Finally, we will demonstrate how important and helpful the three-dimensional computing and visualization techniques for our understanding and improvement of the reactor design.

## A Location-Aware Service for Finding Accommodation in Sharjah

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### ABSTRACT

The goal of this project is to design an application that allows mobile users to locate available nearby accommodation based on user search criteria. The application uses the location based service to reach the desired goal of this project. The application will determine the location of the user using a built in GPS receiver if found in the mobile. Else it will try to connect to any GPS receiver through Bluetooth. If both methods do not work the user can provide his location by setting the coordinates manually.

This is a user friendly application that runs on mobile phones and uses positioning techniques and retrieves information from a server through a communication link. This system consists of 2 main parts which are the server and the mobile application. The mobile application is developed and implemented using Java development tool. The server part is implemented using PHP and also includes database.

After getting the coordinates the user will choose between many options discussed below to search for the accommodation. The information given by the user will then be sent to a server which contains a database about the accommodation available and will do all the information analysis. After doing the analysis the result will be ready so the application will start retrieving the result and display it to the user on the mobile phone. This application is going to be very useful for the users who are new in Sharjah City and it will provide the need of these new comers to find an appropriate accommodation in the city. This application will save the users a lot of time and even money to find their desired place. The user of this application will save time and money because he no longer needs to roam the streets by the car or even wasting time looking for available newspaper advertisement about accommodations.

No doubt each individual user has some preferred criteria about the accommodation wanted that is why the application provides many options to choose from. He can specify the size of the accommodation, the price, or even the number of rooms.

The user also will have privilege to bookmark some locations for future needs. Also the application will be provided by a notification option chosen by the user about some accommodation if some updates happened during the offline mode. The result will be displayed on the mobile screen either by text based locations or map based locations. Depending on what the user will choose a number of results will be displayed and having some information about each result individually. These results may contain pictures, more description about the accommodation, calling the landlord, etc. Furthermore not only the new comers to Sharjah city are able to use this application, actually all of the UAE resident may benefit from this application.

## Praying Peacefully in Mosques: No More Ringing Mobile Phones

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### ABSTRACT

Long time ago when mobile phones weren't so common to the general Saudi public, there was a man who once said that the sound of music will enter the mosques one day. At the time, he was laughed at for thinking of something inconceivable at the time. But now, we hardly pray in a mosque without being disturbed by the ringing of the mobile phones. A simple solution would be to place a reminder poster outside the mosque's door. This does solve the problem partially as there are always people who will either tend not see it or forget to act on it. Another solution, though a costly one, is to shield EM signals from entering Mosques using Faraday cage. Signal jammers could also be used, though these are considered illegal in many countries.

With this in mind, we in this team bent to come up with a solution to this nagging problem that will almost eliminate it. The main idea of this solution is to have a device which sends signals to make mobile phones that enter certain places, e.g. a mosque, automatically switch to silent mode for as long as they are in the area. As the majority of modern mobile phones in the market come equipped with Bluetooth technology, our device will make use of that technology to help in silencing the mobile phones. Of course, an issue at hand is what if a person entering the mosque is using a mobile that has no built-in Bluetooth. This, a rare case, has yet to be resolved. To help make the solution autonomous, we will develop a client mobile application that will automatically handle the device's signals. The mobile's Bluetooth might not be On so the application will ensure the Bluetooth is forcibly turned on during prayer time. Other possible applications for this project include making mobile phones that enter a hospital or an airplane change to offline (flight) mode to avoid interfering with its devices, however it will have to be implemented in a way that avoids letting the device itself cause interference to said critical devices.

In the design phase we discussed the different ways the device will behave and how the client program will handle the device's signals. We favored using a dual directional antenna system. In the implementation phase, which is ongoing, we are confronting some challenges. It is not possible to come up with a universal client application that will control the Bluetooth. For example, there are five different editions of Symbian S60 with multiple releases per edition. Unfortunately these are incompatible. The same is true for other mobile OS. Also, we are looking into ways to automatically turn the Bluetooth On without seeking the approval of the owner of the mobile phone. The nature of our application requires software certificates. The certificates are expensive and available only to commercial entity. The project is still ongoing and may go through further changes before the final implementation

## Wireless Mesh Network Planning Tool

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### ABSTRACT

Mobile communication technologies have grown significantly in recent years. In order to satisfy the increasing number of users and their ever increasing requirements, there have been continuous enhancements in present-day wireless standards. As current needs are data intensive, low bit error rate and lower delay are very important factors for wireless networks. On the other hand the cost for installing cables in such cases makes the idea of wireless very important.

Wireless mesh networks can easily, effectively and wirelessly connect entire cities using inexpensive, existing technology. Traditional networks rely on a small number of wired access points or wireless hotspots to connect users. In a wireless mesh network, the network connection is spread out among dozens or even hundreds of wireless mesh nodes that "talk" to each other to share the network connection across a large area. Mesh nodes are small radio transmitters that function in the same way as a wireless router. Nodes use the common standards known as 802.11a, b and g to communicate wirelessly with users, and, more importantly, with each other.

The biggest advantage of wireless mesh networks -- as opposed to wired or fixed wireless networks -- is that they are truly wireless. Most traditional "wireless" access points still need to be wired to the Internet to broadcast their signal. For large wireless networks, Ethernet cables need to be buried in ceilings and walls and throughout public areas. In a wireless mesh network, only few nodes (called gateway) need to be physically wired to a network connection like a DSL Internet modem. These gateways then share their Internet connection wirelessly with all other base stations in their vicinity. Those base stations then share the connection wirelessly with the base stations closest to them, etc.

Depending on the position of the base stations, the network will have different performance characteristics like capacity and throughput. The goal of this project is to design and develop a WMN planning tool. The user should be able to put base stations and the tool will automatically show the links and compute the capacity of the network. The user should be also able to select a gateway or the tool may suggest the best gateway that will provide the maximum capacity.



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### ABSTRACT

The increasing amount of textual information stored in electronic form on the internet has prompted the need for retrieving this data. Moreover, the vast amount of document resources available requires the formation of standards to encode information. XML (eXtensible Markup Language), a subset of SGML (Standard Generalized Markup Language), emerged as a text-processing standard and has been rapidly accepted around the world. The XML model is a novel textual representation of hierarchical (tree-like) data in which a meaningful piece of data is bounded by matching starting and ending tags, such as <name> and </name>.

The idea of our project is to develop a Graphical User Interface (GUI) for the available XML (eXtensible Markup Language) querying languages (like XPath, XQuery). Our tool help the user to create his own query without any previous knowledge of XML, Its acting like a Query By Example (QBE) form that provided by some of relational database management system (RDBM) like MS-ACCESS. There are few number of research on XML query GUI , so our research is trying to cover the limitation in this area by building a stable tool with a high performance, to querying XML document like querying relational database. The information of the inquiring mode must be clear and specific and that hard because of the files complexity and the information largely.

XML document design and analysis is more complex than the relational database because it depends on text-based files to store the data and using the different syntax for XML query engines. Main SQL operations are supported in our tool like select, update, insert, delete and join queries. We developed our engine as a website, We design it by using asp.net & C# with MS-Visual Studio we used this application because it is support dealing with XML documents it allow us to add and delete record from XML document, querying from single or multiple documents using the join operator. the website is designed for two type of users; managers and end-user; with different types permission and authentication. The user can firstly register to website, then he can upload the XML documents to our engine by creating a special folder for him, then to insert XML files. When the user complete the uploading process he is allowed to perform the different functionalities provided by our engine including the download capabilities for his query results. The manger like user but he is manage the users accounts like delete user and so on .

We implement some of advanced operator like join between two XML files by using foreign key attributes. We designed four main functions which allow the user to make editing on XML file insert, delete, update and search all this functions the user can be used it with GUI without previous knowledge in XML query language.

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### ABSTRACT

The system is designed to manage different types of screens installed on -or beside- the doors of classes or instructors' offices. Some screens could be installed on the doors of the instructors on which the instructors display their classes' schedules and their office hours to the students. Other screens could be installed on the doors of the classes, including labs, where the students can see the schedules of the classes. In addition, the system gives instructors the ability to post any advertisement on their screens or any class's screen, and the system also gives the academic affairs member the ability to post any advertisement on any class's screen. The advertisements can be posted by either website or SMS.

The Screens Management System has many features that facilitate the jobs of the instructors and the academic affairs members'. For example:

Adaptability: The system can adapt different environments, such as:

- **Different Workdays:** Some colleges (faculties) have five workdays, while others have six workdays. The system redesigns the schedule's table on the screens according to the number of the workdays.
- **Different Schedule Shifts:** The system splits the time of the day to three shifts, and each shift consists of eight hours, and the starting hour for the first shift is determined automatically by looking over all the schedules. The schedule on each screen is split into a number of pages according to the number of the shifts.
- **Different Screens Types:** The installed screens on the doors could be PCs or Digital Photo Frames. The administrators of the system can select the exporting format for all the screens in each building in order to suit their types.
- If all screens in a building are PCs, it is recommended to export the data in raw format, and then a player program can be run on each PC. This system comes with a player program that is designed for the King Abdulaziz University.
- If the screens are Digital Photo Frames, it is recommended to export the data in image format.
- In addition to the previous two formats, you can export the data in Flash format, and then a Flash player needs to be installed on the screens.

Screen Saver: The system runs screen saver on selected screens according to the schedule determined by the administrators.

Expired Advertisements: The server has a tray application to monitor the expired advertisements and remove them from the screens.

More than one Instructor in the Same Office: In case of there are more than one instructor in the same office, the system will display the schedule of each instructor individually. Also, it will append the instructor's nickname to every advertisement.

Scalability: This system can connect huge number of screens without wasting the bandwidth of the network because the server communicates with the screens only when data is sent.

Advertise from anywhere: Users can post any advertisement by access the website or using SMS.

**System Testing and Implementing:**

The system has been tested on more than 50 PCs and applied in the Faculty of Computing and Information Technology in King Abdulaziz University, Jeddah.

## Design and Implementation of Network Attached Storage Systems (NAS)

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Abdulrazaq Ahmed and Al-Ghurair University  
Supervisor: Dr. Kahtan Ismail Aziz

### ABSTRACT

NAS or Network Attached Storage is file level computer data storage connected to computer network clients. A NAS unit is essentially a self contained computer connected to a computer, with the sole purpose of supplying file-based data storage services to other devices on the network.

This paper will look into the design and implantation aspects of NAS. NAS has the following features:

1. It's an open-source software and it's easy to set up.
2. Support CIFS (Samba), FTP, NFS, rsync, AFP protocols
3. Support RAID software
4. Has a web-based configuration
5. Free NAS takes less than 64MB once installed
6. Has plug-ins for various tools
7. Support most of the existing hardware components
8. Provide most of the existing hardware and SNMP (Simple Network Management) feature

Beside the above features of NAS the reasons why Free NAS has been selected:

1. Cheapest solution for a NAS storage
2. Web based management
3. Unlimited number HDD's
4. Faster than other Linux based embedded servers
5. RAID and clustering is built-in thus data availability is usually high

The paper will discuss the design and implantation issues also will carry out test of the NAS system and test results will be provided.

## HCT Charity Website

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### ABSTRACT

Inspired by the generosity that is part of our culture we decided to create a website for donations. We plan to sell the donated items to generate profit which will be used to help charity organizations in the UAE. We, as the UAE nation, have been provided with our basic needs since we were born. Our country's history shows helping our people and other countries' people. We received lots of encouragements and motivations for this endeavor. As a result we decided to create this project and name it HCT charity website. Our main goal is to provide help for the people who need it most. Also, we want to encourage the students to make good use of the things they believe is good but they don't need any more.

The overall idea is to build a website that allows HCT students to donate their used things to be sold for a minimum price to help other people. The donated materials should be useable and sellable. The students will be able to offer their own things online and the proceeds will be deposited into an account to be used directly to help needy people or be donated to the well-known charity in the UAE. The online items will be sold with a low price that anyone can afford. There will be different categories such as, shoes, clothes, bags and stationary. In particular, in the stationary section, the students will be able to donate their extra stationary such as, books, pens, notebooks in purpose of giving these materials to other schools or charity without selling them.

We will use Adobe Dreamweaver to design and create the website. In addition, the database will be created using Microsoft Access which will be linked to the website. The students who want to make donations will have to create an account in order to become a member. After the website is created, we will advertise it using brochures and college emails to promote the use of the website. In the HCT Charity website, students will be able to upload pictures of their items. The items will be shown according to different categories; for example, all the hand bags will be shown in the bags section. Once the student offers the item for sale, HCT students will be able to submit their purchase request using database form. When the order is submitted and the item is sold, the student will be asked to bring the item to the college store which will be built for this purpose. Therefore, the students who bought the items will be able to receive it from the college.

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### ABSTRACT

The living safety in our planet Earth is highly affected by air and water pollution and the heavy strain of chemical wastes on landfill sites. This produces a global warming in the atmosphere that generates dryness, flooding and coldness. Consequently the whole life cycle in the planet Earth is threatened. All living things are currently in dramatic and critical situations that necessitate a quick intervention at governments and individuals levels. The state of Qatar has launched many large-scale initiatives to protect the environment. In this work we propose a cultural and informative web portal that contains the most important information related to Environmental issues. The objective of this work is to make people aware about the importance of a clean environment in which they are living. We focus on air pollution, water quality, vehicles pollution, nitrogen dioxide emission (NO<sub>2</sub>), cigarettes and tobacco, and plastic bags break down. We group together in one structure all the environmental friendly projects being initiated in the state of Qatar. The web portal gives individuals a few tips on easy things that can be done around their houses, at work or schools, or when they are enjoying Qatar's beautiful natural environment. The benefits of this project can be summarized as follows: (1) A well developed and structured environment friendly web portal that gives details about the Qatari environmental projects. (2) A cultural and informative site that helps the Qataris citizens and residents in Qatar to better understand the environmental issues. The most important part of this work is the data gathering phase. These data are obtained from different sources: (1) The Supreme Council for Environment and Natural Reserve. (2) Ministry of Municipal Affairs and Agriculture: The Ministry has many important projects and initiatives to help the environment namely the tree's week, Agricultural Development, Plants protection, and the Qatar Green Oasis. (3) The Ministry of the Environment. The main concern in this project is how the information should be modeled, structured and retrieved? How to archive the web pages?. We have used studio.net to develop the portal and design the graphical user interface. We have developed an environmental questions/answers tool which was intended to educate people and make them aware about some important environmental issues. This tool asks the users questions related to environmental issues. It allows the users to reply to these questions and give them the correct answers. These Questions and Answers are stored into a database and retrieved when needed. The database can be expanded by adding new questions and answers related to new environmental topics. The user is assessed spontaneously after his answer selection.

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### ABSTRACT

Data streams have gained importance in recent years mainly because of the advances in hardware technology. Fast online response is a must for applications that involve multiple data streams, especially when the number of data streams is large. Finding the different clusters (groups) of data streams where the data streams of each cluster have similar values is essential for many applications, such as detection of oil spill or tracking environment contamination. Although detecting these phenomena is important, tracking the number, path, size, shape of these phenomena is equally important to confine and combat them. In addition, mining these tracked clusters to find association rules between sensors within the same cluster and different clusters is of great importance to predict cluster behavior in the future.

The goal of this paper is to efficiently mine large number of data streams to identify and track clusters of data streams with similar behavior. This usually involves processing a large number of data streams. Two readings are considered similar when the Euclidean distance between the readings is less than some threshold, which is a user defined parameter. We propose a solution for a centralized environment, where sensors send their readings to one central processing node, called a sink.

To reduce the dimensionality of data streams, we use a linear transformation, Discrete Fourier Transformation (DFT) that packs most of the stream information in a few DFT coefficients. Thus, each data stream is represented by point in a multi-dimensional space.

To detect clusters in the multi-dimensional grid, we propose a recursive grid-based clustering algorithm that is efficient, does not require prior knowledge of the number of clusters, and detect the clusters in the frequency (DFT) domain. After detecting the clusters, their spatial and temporal information are stored. By analyzing the spatial-temporal information, clusters can be tracked in terms of:

1. The number of clusters as clusters may split or merge over time,
2. The size and shape of the cluster, as it may change overtime
3. The location of the cluster, as the phenomenon may travel overtime

By being able to track such spatial-temporal information of clusters, dangerous natural phenomena, e.g., oil spills or poisonous fumes can be efficiently and effectively confined and combated. In addition, we propose to compute the association rules between the sensors with the same cluster and between different clusters. These association rules can be tracked over time and then used in the future to predict the spatial-temporal features of phenomena in the future, such as predicting the path, size and shape of an oil spill given certain environmental parameters.

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### ABSTRACT

The word “intelligence” refers to the ability to understand, and there are varied characteristics of intelligent people. A common old understanding is that students with high math grades are intelligent, while students who show other gifts do not receive the same recognition. However, this view does not contain the wide variety of abilities that humans display. Therefore, Dr. Howard Gardner came up with the theory of “multiple intelligences” which is an educational theory developed in 1983. It claims that all human have multiple intelligences which can be strengthened or weakened. Dr. Gardner appointed seven intelligences: Verbal-Linguistic, Mathematical-Logical, Musical, Visual-Spatial, Bodily-Kinesthetic, Interpersonal and Intrapersonal Intelligences.

As we esteem the highly logical people, we should also place equal attention on the others who enrich the world in which we live. Although the theory was developed several years ago, many societies do not take its benefits. The schools which implemented the theory have reported considerable improvements in various educational aspects. The issue is that the theory should have a greater popularity and acceptance among people especially the educators. Maybe some people do not value it, but if a highly bodily individual is stuck in a linguistic desk-job, sure he will feel impacts of taking appropriate decisions that facilitate life-making directions.

A thorough survey was conducted to test people’s knowledge on critical-decision-making venues. Interestingly enough, the survey’s results confirm the importance of having a tool that can advise about the different aspects of multiple intelligences and the possible improvements guidelines. Many people wonder about the right criteria to follow when taking important decisions such as choosing the track, a suitable career, the best learning style, a research area, or other matters that are related to the intelligences that each person possesses.

Thus motivated by these issues, we have designed and built the “Intelligence Explorer, IE” application. The tool allows the user to explore the seven types of intelligence by examining the user’s capabilities and accordingly provides appropriate feedbacks about the measured intellectual levels. As a result, the tool recommends and suggests possible improvements and outlines the levels that need more attention.

We believe that the tool is very beneficial in academic and professional domains in the sense that it exposes various people with different skills to realize the inherent level of intelligence and consequently can be considered as a valuable assist to:

1. Help people to know their highest intelligences, improve their weaknesses and accordingly take the appropriate decisions.
2. Inform parents about their kids’ intelligences in early ages.
3. Be used as valuable tool in academia (for example, by teachers to explore the various levels of their students).
4. Assist businesses and industrial firms to accordingly select employees with the suitable talents and capabilities that fulfill the requirements of a particular job.

In conclusion, there are many resources that provide considerable amount of information; however, these resources tend to be very sophisticated with many inherit complexity. The IE is a user-friendly, reliable and easy to use tool that can be utilized by different stakeholders.

## Students Tracking System Using Radio Frequency Identification (RFID)

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### ABSTRACT

RFID is one of the most common technology used in identification nowadays, It's an easy way to identify both human and object without any physical contact with the identification reader, basically it's consists of the following, A tag which came in wide range of shapes such as ID cards, Reader which use radio waves to retrieve data from the tag, and, Database were information are stored to process it by using any application.

The aim of this project is to develop a tracking system to automate the students' attendance taking for all lectures, labs...etc inside the university. Because, King Abdulaziz University (KAU) concern for the students attendance as a part of its regulations, Consequently, the proposed model uses Radio Frequency Identification RFID technology to identify the attendance of students by using the tag which embedded into the students university identification cards. Accordingly, the proposed model would ensure that attendance tracking for the students is more consistent, easier, and safer than current used system based on paper which is time wasting process.

The proposed prototype model uses PhidgetsRFID reader and tags which are works through passive communication. Such model is analyzed, designed and implemented using UML standards technology. In addition to Visual C#.Net in Visual Studio 2008 environment, as well as the Phidgets API in Windows XP SP3 environment. The reliability of the proposed system has been tested prior to onsite installation, to assure the functionality of the system, and to guarantee that it is operate seamlessly and efficiently, the test was done at Faculty of Computing and Information Technology in two computer labs, (LAB 001 and LAB 002).

Furthermore, a full gap analysis was done to achieve potential performance, and to identify any possible problems or particular challenges that might face us during integration of the proposed system with the On Demand University Services ODUS. Moreover, the proposed project fulfilled the university students ID issuing, as well as assigning the RFID tag ID. Beside, on-time monitoring for the readers status, plus a friendly user interface with capability for issuing detailed reports.

All project steps mentioned above were implemented to ensure the smooth shifting process to the new proposed system within minimum time. The proposed system is considered as a preliminary step in the improvement process of the electronic services at the university, which help the academic and the administrative staff. As well as providing services to address information to all of them in order to achieve the goal of being a paperless university in an era of smart technology.

Finally, we can say that the scope of this project is to automate the attendance tracking process with a prototype model reader to simulate the real use of such system at the university. Also, in the future the system can be used in other purposes like using this technology with a mobile reader, so we can use the proposed system as identification method for students in the exams, controlling the Air-conditions according to the system information, and in pilgrims tracking.



## University Video Library (UVL-Tube)

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### ABSTRACT

The proposed University Video Library (UVL-Tube) serves the students studying in the university. UVL-Tube is a unique service blending a library of video content with clever functionality that save lecturer's time and improves student learning. The main objective of the UVL-Tube is to create a media for a student to revise the topic during their study time for better understanding of the topic taught in a class. Students are bounded with the university rule for the minimum attendance requirement to appear for their end semester examinations. UVL-Tube helps the students those who missed some of the topic due to unavoidable reason.

A web based interface with an authentication provides students to access the video files based on lecturers, demonstrations, discussions etc. over the Intranet facility available in the campus. Its interactive interface and functionality allows students to browse, search and view with ease. The thumbnail/description facilitates the students to identify the right clip quickly from the search result. The lectures are filmed during the classes hours and edited using adobe premier / coral video studio for the necessary intersection of pictures, slides and titles. Finally the video is exported to .flv / .mp4 / .swf video format so that it can be viewed by any browser with a FLV/Flash player. The videos are uploaded to the server with the prior permission of the faculty who delivered lecture and students are allowed to study and use the facility till their completion of program. This web based video library developed on PHP with the SQL server. The database in the server will contain the necessary videos, lecture details, key words for searching. The WebPages are created using Dreamweaver which will list the names of the lecturer, topic details with the date, textual description of the video, related searches and recent videos viewed by the user. The webpage will be embedded with Flash player for viewing the video.

The video based education aid the students to learn on their own time, and a student can repeat the video as many time till the concept is clear. Reading books enriches knowledge but learning with a teacher/guide makes always a better learning. A teacher cannot be present physically all the time to repeat lecture but the video on a library server would a help the student to learn / revise for better understanding of the topic.

Currently, the Students Registration, Authentication, database using SQL, and search procedures are implemented. Few videos from CISCO academy have been listed and recording of some lecture classes in progress.

## Mobile Payment

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### ABSTRACT

Our project is about Mobile Payment. It is a technology that is been increasingly applied in the world. We divided it into four parts in order to do it such as, the software part, management part, implementing and the security part which itself is divided into the physical and internal security parts. This technology is working in the US, Japan and Korea [1, 2, 3]. Moreover, “touch-a-tag” is a company that has produced a device that allows this technology to work[4, 5]. Research results that has been found proves that this technology is effective and efficient than carrying a wallet with a number of credit cards and full of money. We will design a solution tailored to the UAE, but we study many other references [6, 7, 8, 9].

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## One Step Towards Green Computing in the UAE

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### ABSTRACT

Computer usage in any organization is vital to deliver services and sustain growth. However, the impact of this usage on the environment is somehow destructive and a little bit acknowledged by people. This impact should be addressed, monitored, and understood throughout the lifecycle of computer manufacturing, usage, and finally disposal. The presence of computers in the various academic settings such as laboratories, libraries, and offices consume large amount of energy, which has side-effects on people's health and the surrounded environment. The proper procedures to dispose of used computers usually don't exist in most organizations and even if such procedures exist, they are barely followed. Most of the time, organizations either divert unwanted units to landfills or store them for extended periods of time. Due to the unnecessary consumption of energy, manufacturing, and unorthodox disposal of computer systems leads to the release of toxic compounds into the environment. In this presentation we prove the need for spreading the awareness among people about this issue so they can take appropriate actions to reduce the impact of pollution on the environment. This awareness was accomplished by organizing an awareness campaign in the university under the title of "New life, Better Future". This campaign was the first to be held in Zayed University and talk about the environmental impacts of the information technology on our environment. It provided all the necessary information about the ecological footprint in the UAE, and delivered the sustainable solutions to prevent this phenomenon from impacting our environment through distributing brochures and fliers. Theses brochures and fliers contain information that help on reducing the cost and save the energy by changing computer usage habits. Besides, a page on Facebook was created that contains useful information and tips that any user can follow to become a "zero-carbon computer user" and participate in reducing the impacts of this important issue. Such campaigns are the first step toward solving this important problem and the best way to make people aware and gain their support. Additionally, the implementation of green procurement strategies with respect to computer purchase, use, and disposal would offer the necessary recommendations to improve Information Technology sustainability. For instance, building green data centers, virtualization, re-using and recycling of electronics and computers and increasing the awareness campaigns on e-waste Recycling, energy efficiency and power consume. Until now there has been no comprehensive, real-world learning environment for IT students and professionals to get green data center skills at the undergraduate level in the UAE. Therefore, in this presentation we recommend that UAE universities start offering green data center management degree as what IBM did in collaboration with Metropolitan Community College (MCC) in Omaha, Nebraska. This two-year degree includes courses to help IT students professionals gain technical and business skills in designing and managing energy efficient data centers. "Green IT Certificate" will make IT students and professionals aware of the huge impact of the Information Technology on the environment and will decrease their overall environmental impacts. The implementation of these recommendations will help UAE organizations embrace GREEN COMPUTING.

## Plagiarism Detection System for English Articles

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### ABSTRACT

Plagiarism in the sense of "theft of intellectual property" has been around for as long as humans have produced work of art and research. However, easy accesses to the Web, databases and telecommunication in general, have turned plagiarism into a serious problem for publishers, researchers and educational institutions. Search engines such as Google, Yahoo and other engines can be utilized for plagiarism detection. Googling every sentence will be a tedious effort to the detector because it requires to copy and paste each sentence to the search engine. However, a wide range of plagiarism and detection system was developed in recent years. Basically, their task is to find similarities in files, which can indicate either plagiarism (in case of students' works) or code duplication (in case of a software project analysis). The quality of the system is primarily determined by the method of similarity calculation. Typically, the faster is detection routine, the less precise result it provides. For that reason, we aim to develop a plagiarism detection system to facilitate and accelerate the plagiarism detection efficiency and to overcome the typical trade-off between speed and reliability. The system can be used for academic and researches purposes in various fields. We introduce a new approach for plagiarism detection that combines high performance and quality of pair-wise file comparison. It should be noted that we concentrate on offline (or hermetic) plagiarism detection which deals with analysis of local file collections, and then invokes k-gram Statement-Based Fingerprint Matching algorithm. The fingerprint of two documents can be compared in order to detect plagiarism. However, for handling large content articles, we integrate the fingerprint matching technique with two key features (time and speed) to overcome some weakness in Fingerprint technique that affect the efficiency of the detection process. These features are capable to choose the main point or key sentence in the articles to be compared. Those selected sentences will be tested by the fingerprint matching process in order to detect the similarity between sentences. The final product will be a summary report that shows the percentage of similarity and highlights every plagiarized sentences, phrases and pages.

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### ABSTRACT

Fingerprint image compression uses Wavelet/Scalar Quantization (WSQ) algorithm IAFIS-IC-0110(V3) described by the Federal Bureau of Investigation (FBI). Fingerprints are one of the biometric measurements most widely used in human identification and investigation areas. In the past, fingerprints were taken and stored in ink and paper. Nowadays, they are taken via sensor devices and stored electronically in computers as image formats that can be later processed and compressed to save storage space. This project implements WSQ algorithm that can be used to perform the compression.

Fingerprinting is mostly used in investigation agencies and security organizations such as the FBI, and the Central Intelligence Agency (CIA). Many countries now use the electronic fingerprint rather than ink and paper. However, the cost of the electronic fingerprint is the vast amount of space storage needed to keep the fingerprints while knowing that most of the fingerprints are only used in an occasion. For example, in 1994, the archive in the FBI was increasing at a rate of between 30,000 and 50,000 new fingerprints per day. Hence, the need for a good compression method is of a total significance.

Two classes exist in the image compression area, lossy compression and lossless compression. Lossless compression techniques are impractical since they have small compression ratios. On the other hand, numerous contributions have been made in the lossy class by many researchers. One of them is the ISO JPEG standard most widely applied in image compression. However, it performs poorly when it comes to lines drawing which is the case in fingerprints. JPEG, GIF, BMP, PNG and TIFF are all called raster image formats. They generally don't produce sufficient compression or resolution in the case of fingerprint images and hence are not suitable for fingerprint image compression. Therefore, the focus has been on finding a way to do lossy compression while maintaining the key data of a fingerprint.

This project helps reducing the size of a fingerprint image enormously. It uses WSQ algorithm to produce a fingerprint image that is small in size while keeping the key data at the same time. By reducing the size to a ratio of not less than 1:20 and maintaining the accuracy of the images, saving huge numbers of fingerprints in digital databases will be feasible. By working digitally and being able to reduce the size of a fingerprint image, investigation agencies and security organizations will become paperless agencies and organizations. This will help reduce cost, quicker access to information, more space, document security and easy information sharing, access anywhere and the ability to handle the increasing number of fingerprints daily.

Moving fingerprints from papers to computers will advance efficiency of workers in different agencies. It will be feasible for the civil affairs offices to have a database of fingerprints images of the individuals in the community. It will also be fast and easy to retrieve and share the images or to update other agencies that belong to each other. Fingerprints could replace signatures in all places where signatures are required for identity assurance.

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### ABSTRACT

The context of this project is face recognition. Face recognition is the process of identifying a person using his image as biometric data. 3D image-based face recognition is expected to overcome many problems facing the traditional 2D face recognition, such as the lack of explicit shape information, and pose and lighting variation. However as a relatively new technology, a number of challenges still exist that limit the performance of the current 3D facial image-based recognition system. Among these challenges are 1) How to automatically extract the facial region from the raw data captured by a 3D facial scanner, which may contain hair, neck and shoulder and possibly other background data. And 2) How to precisely and efficiently align two instances of 3D faces. This project addresses some aspects of these challenges. The ultimate outcome is prototype software which encompasses frontal phase extraction and facial surface alignment, as illustrated in the figure below.

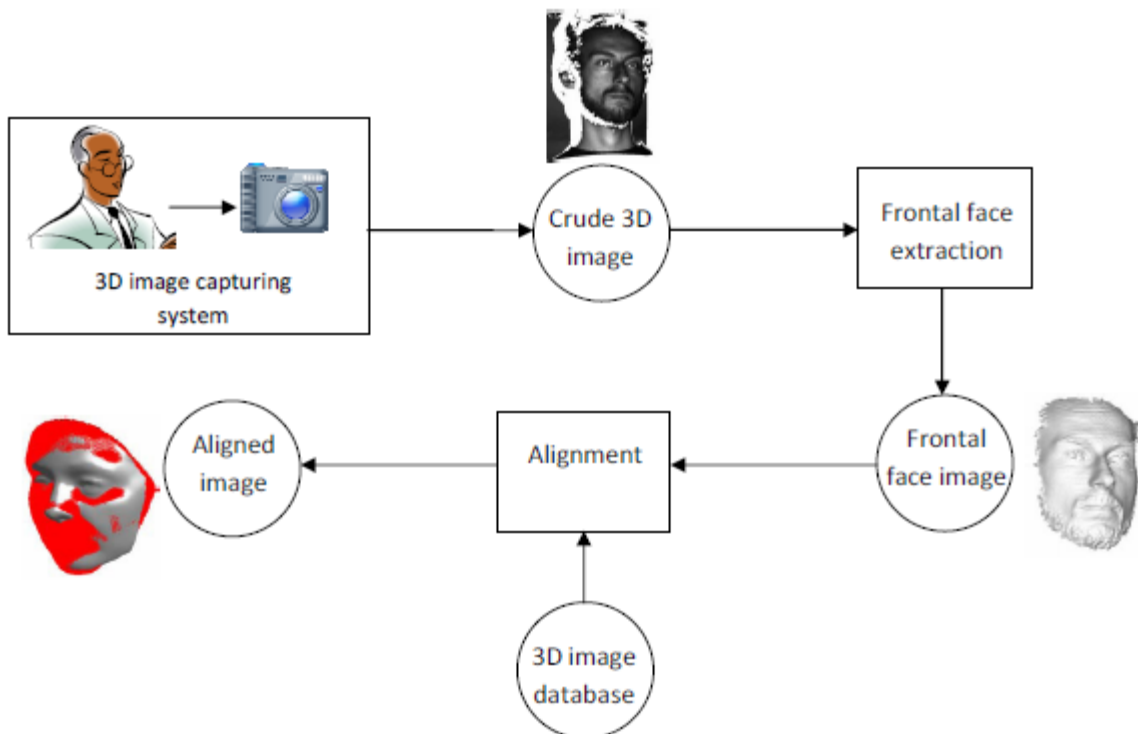


Figure 1: System Block Diagram.

For the frontal face extraction, two approaches are investigated: The first uses a point-model of the face template derived from a training set of 3D faces. This model allows to have an approximate location and of the frontal face and hence and automatic extraction. The second method is semi-automatic, yet more accurate, because it requires firstly the marking, by the user, of the nose tip. Then a ring propagation technique is applied afterwards. This technique extracts a group of concentric rings centered at the nose tip, and which span the frontal face area. For the face alignment we propose a method based on topologically ordered features. These features allow to solve the correspondence problem between the aligned facial surface. To be fully automatic, this method requires the localization of only one particular face landmark.

## “B With Me” A GPS-Based Self-Tracking System

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### ABSTRACT

High technology has touched almost every aspect of human experience all around the world. Global Positioning System (GPS) technology is no exception. In fact, it has many prospective values because it provides the coordinates of any location in its area. This is of great help especially when mobile devices are involved because the GPS makes it possible for people never to get lost.

For example, a physician faced an unusual disease in a patient or new onset of epidemic (e.g. H1N1 flu) in certain area and he was in urgent need to consult and share the patient’s symptoms, signs and the place with other people (including another physician on the internet network) for a rapid and accurate action regarding this situation. A journalist wanted to be the first in getting a scoop by swiftly informing the newspaper. An emergency event (e.g. Fire, Theft or accidents) happened and the authorities should be informed. Or simply to publicizes fabulous restaurant, a new specialty store, or a great new park for the kids to play. Therefore, communication among people should be facilitated by software that utilizes the available resources to allow people to communicate easily and immediately in another way.

We aim with our project “B with me” System to implement an exciting new dimension to social networking which is the ability to share your exact geographic location with your friends using GPS technology equipped in mobile phones. The software will improve the benefit of phone’s GPS capabilities to locate where you are, allow you to write your comment about the place and then send it to your social network space for your group to see.

By combining the technology of GPS system, web social networking and Google maps in developing this application, we will facilitate sharing special moments with friends, family or social network. “B with me” is an application that allows mobile user to post comment, picture and a link to his location on the Google map to certain social networks on the Internet by using the mobile GPS capability. The idea is to simplify the transferring of information regarding a place to the social network and to ease sharing with other users in the Internet.

The application depends mainly on the GPS and Google maps in localizing the location then the mobile user can add comment on the place, post a photo for it, then simply forward these data to a social network by a touch of a button. The application is not only helpful for the general user but it is also helpful in many professional fields e.g. in documentation of the newflashes, early effective reporting of an epidemic, keeping an eye on the outlaws and in many other field (we don’t want to give more examples to avoid mind restriction). Nowadays, GPS and Internet connection are common among regular mobile phones users. It is mandatory to have a mobile phone equipped with GPS software and hardware in addition to internet connection to be able to use this application.

## An Interactive Approach for Learning About UAE Culture

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### ABSTRACT

In this project we present an interactive approach for learning about UAE culture. The objective is to design and implement a fun and entertaining method for learning about UAE culture. Our approach features theme games focusing on people, places, food, and traditional clothes. The games are developed using Scratch, which is a visual environment for creating interactive stories, games, music, and art. Two of the games we have developed are photo puzzle and match game.

Photo Puzzle features people who have played a vital role in UAE in the terms of developing the nation. The player has to arrange the pieces of the photo to complete the puzzle as shown in Figure 1. In this game, there are nine characters that the player can learn about.



Figure 1: Photo puzzle game

The Match game focuses on Emirati traditional tools and items that were used in the past and still exist. In this game, the player clicks on a square to reveal the image and then clicks on another square to find a match as shown in Figure 2.

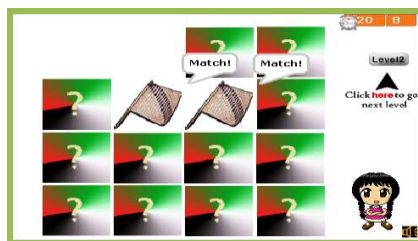


Figure 2: Match game

We have evaluated the games with faculty, staff, and students at Zayed University, South Campus. In addition, Emirati Kids from Banniyas Private School have also helped us in evaluating the games. Sample results from the survey are shown in Figure 3.

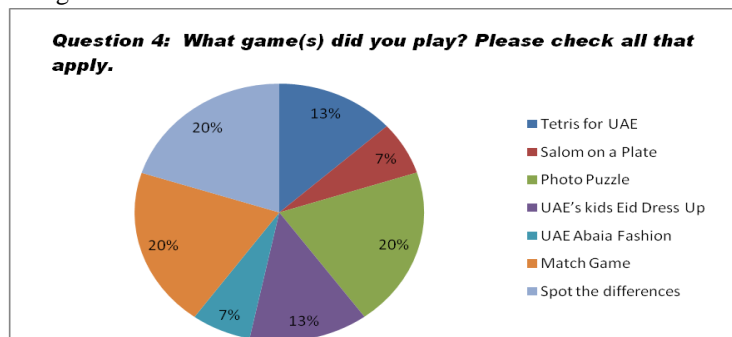


Figure 3: Sample evaluation results



## The Impact of Animation in e-Learning

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### ABSTRACT

The growth of internet, web technology and ICT has change the way we communicate, the way we learn, educate and train. E-learning is one of the tools to face challenges in the competition environment. Learning that is facilitated by electronic technology is known as e-learning. E-learning can be either fully online, hybrid or web assisted. If organizations need to adopt and take advantage of e-learning they need to develop a system which is more interactive and user friendly.

Animation is the rapid display of a sequence of images of 2-D or 3-D artwork or model positions in order to create an illusion of movement. It is an optical illusion of motion due to the phenomenon of persistence of vision, and can be created and demonstrated in a number of ways. The most common method of presenting animation is as a motion picture or video program, although several other forms of presenting animation also exist. Imagine a world without animation. There would be no Tom and Jerry, Mickey and Minnie. If animation never existed world famous cartoon characters wouldn't have been born. Would you enjoy watching movies like Avatar, Harry Potter and Jurassic park without animation in it? Fiction, Fantasy and horror wouldn't be as enhanced as they are now.

Animation has helped various sectors of the society from children to the adults. It has provided various jobs and career opportunities to the working sector. The education sector has been aided with fun and easy learning with the animated films guiding them. As far as the entertainment is concerned various cartoons, animated movies and games cater those needs. With the combination of software engineers and graphic designers the human-computer interaction while playing games has become more innovated and advanced.

This research aims to find emerging technologies and the impact of animation in the field of e-Learning and to find their needs. Surveys will be conducted to determine as to how animation industry can benefit e-Learning. Based on the findings and analysis of the data collected future solutions will be proposed.

## Bolero Company

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### ABSTRACT

We will develop a website for a company called Bolero in reference to “early season apple”, the company name signifies this type of Apple trees which fit the modern small space gardens and it symbolizes youth and health in modern and new ways. Bolero was created in 2005 by Hamad Al Zaabi. They are specialized in providing a healthy type of food for individuals and health institutes like hospitals and clinics in addition to health promoting cafés and Spas. Healthy food may not attract a lot of people and certainly is not easy to find. Bolero Company provides easy access to healthy food for all types of customers. In addition, Bolero healthy food appeals to all ages of different gender as it tastes good and is packed in well designed boxes.

Studies show dramatic increase of certain diseases such as obesity, cancer, and high blood pressure among people worldwide. This is believed to be the consequence of consuming huge amounts of fast and unhealthy food. People are concerned that their life style has changed and they have no time to get or cook healthy food. Eat unhealthy food not because it tastes good, but mostly because it is readily available and often much cheaper than healthy food.

Bolero’s goal is to help people decrease the possibility of getting harmful and dangerous ailment by providing easy access to delicious healthy food to eat healthier and live longer. Their goal is to produce food that is tasty and affordable for everyone in order to encourage people to take care of their health. Bolero’s products are created for different types of customers including those who want to stay healthy and those who have to get special type of food based on their health condition. Their special daily menu contains three healthy meals for the customers in addition to deserts and snacks.

We at Center of Excellence have been hired to create a website application for Bolero Company. We as a marketing and web development company are appointed to promote and market their business online. The web site will be called “Bolero Healthy Life Style”. The web site will be user friendly and easy to understand. We will also create web applications to computerize all information regarding customers and suppliers.

The web site will provide information regarding this company and the type of the services and products they provide. All the customers will have the ability to choose the type of food they want and order online. The customers will be able to provide suggestions and feedbacks regarding the food, which will help improve the quality of the products and services. Customers will also be able to share their favorite food recipes for healthy alternative. Finally, “Bolero Healthy Life Style” website will include links to other useful sites.

## WIPMON: Wireless Sensor System for Industrial Process Monitoring

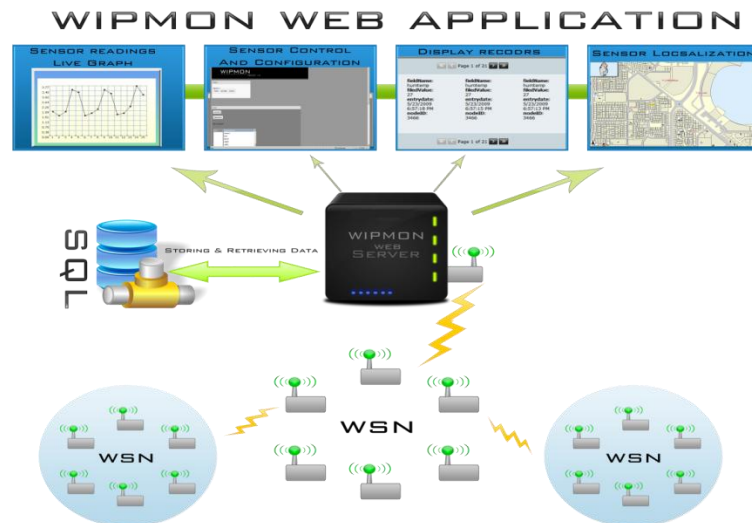
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### ABSTRACT

Technological progress of the tiny electronic circuitry together with the advancement of radio communication have led to the implementation of sophisticated (i.e. even on the microscopic scale) motes (sensors). In this paper, we design a framework for monitoring the Oil and Gas environments through a wireless sensing network. The WIPMon framework will deploy different types of CrossBow [6] sensor nodes. Nodes will be put on pipelines, barrels and other targeted areas/components to process environmental measurements such as temperature, humidity, pressure, and more. Motes will be equipped with a GPS [3] receiver to be localized for the outdoor deployment to capture measurements. It then sends data to the second board attached to it. The communication board will be responsible for routing and transporting data in the sensor network using, generally, multi-hop communication. The framework leverages ZIGBEE [1] communication standards to deliver data to the gateway node using automated network topology (e.g. star, mesh, irregular topologies). Xserve [7] will be used as an application interface running on the server to capture the readings from all motes using serial forwarder [8] technique which is responsible for parsing the data received from the motes and converting it to an XML [5] stream. The web-based application leverages the ASP.NET 3.5 [2] and the ASP AJAX [4] frameworks.

The project pursues the following objectives:

1. Monitoring industrial environment and making the gathered data available for applications in real-time.
2. Using battery operated motes which will be easily deployed.
3. Using reliable communication protocols for motes which would guarantee the reliability of data transmission.
4. Motes will be self organizing in forming redundant multi-paths amongst themselves to guarantee the delivery of monitored data.
5. Using scalable network architecture, thus allowing additional motes deployment seamlessly and effortlessly.
6. Ensuring ubiquity and allowing the access of the application from anywhere at any time through the web-based application for monitoring environmental characteristics and configuring sensors.



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### ABSTRACT

In the past few years video games have propagated intensely demonstrating an increasing influence in our societies. The use of video games has been spread among a wide range of domains with diverse purposes. One of the fields of knowledge that has been fostered by video games implementation is the educational field. Recent studies have shown that the use of games as an educational tool greatly improves learning making it interesting, challenging, contextual, and interactive. Our research focuses on the development of a game called *Marinitos*. *Marinitos* is a game-based learning software whose focus is on marine ecosystems, more specifically, marine food chains. This learning-based software is developed using Adobe Flash/Actionscript 3.0 and XML. Having a *levels-based* game we allow the player to explore the concept of food web, which is a complex representation of eating relationships between species within an ecosystem. The player follows a sequence of levels where each level is represented by a creature in the food web. In each level, depending on that specific creature, the player will explore main features of the ecological niche of that particular creature. The user advances to the next level when all the creature's life requirements are fulfilled. Each level advancement allows the user to explore a more complicated creature in the food web. This educational game has a large span of players ranging from kids up to researchers in the marine sciences field. Since in general marine sciences have been overlooked in the Middle East, this game aims at spotting the light to the significance of life in the ocean and the richness of valuable information that it holds. *Marinitos* provides a first approach towards gaining interest in marine science field and a possibility of use as a pedagogical tool to be used by education professionals. As for marine scientists, it gives a new way of visualizing and summarizing the concepts behind food webs.

## On the Performance of MIMO Technology for Wireless Networks

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### ABSTRACT

In the domain of wireless networks, IEEE 802.11 was the first wireless networking standard. This legacy standard has many amendments to overcome its limitations such as the low data rate and frequency. The 802.11a, 802.11b, and 802.11g amendments have a maximum data rate of 54Mbps, 11Mbps, and 54Mbps respectively. The latest amendment is 802.11n which incorporates several significant enhancements and gives higher data rate, at least 100Mbps, longer range and more reliable coverage than the previous amendments.

The 802.11n standard based devices can deliver five times or more throughput and more robust connections at up to twice the range of the legacy 802.11 standard. Therefore, this standard is best suited for our homes and business, because it doesn't limit our daily activities when used with several devices and in large areas. This standard (802.11n) can be achieved through adding a technology known as multiple input, multiple output (MIMO), that refers to a link for which the transmitting end as well as the receiving end is equipped with multiple antenna elements which causes an improvement in the data rate of the communication. Our project will implement this technology through simulation.

Many MAC protocols for implementing directional antennas have been studied. We have searched for existing protocols and understood how they are implemented. One of the protocols doesn't know the position of other nodes during the communication. The other protocol depends on the Global Positioning System (GPS) to know the position of other nodes. In our project, we chose to implement the first one using NS2. This protocol should improve the average throughput in the network up to 2 to 3 times by using four directional antennas for each node over that obtained by using the 802.11 standard.

In our project we'll use the network simulation tool (NS2) to support us in the 802.11n standard implementation. NS2 simulator is equipped with the legacy system, 802.11, which lacks a lot of features needed by researchers to support their research.

Therefore, MIMO project will modify the physical to network layers implementation of the NS2 simulation tool according to 802.11n. MIMO technology will be implemented as a module using C++ language to add new network elements and protocols, and utilizing TCL language as an interface to use existing network elements. After implementation of 802.11n, researchers can easily create different network scenarios based on the 802.11n protocol, and the result of those scenarios will be visualized by a network animator called "NAM". Also, a trace files will be produced and analyzed using AWK language to extract results and determine the value of a specific feature, such as throughput, packet loss, and some other measurements.

Making a comparison between the 802.11 and 802.11n standards will facilitate the testing phase and exploring the improvement found in the 802.11n standard. After finishing the implementation, the code will be posted on the simulator development site under KSU name which will be helpful to many other researchers in their MIMO based research.

## Public Awareness Campaign “Be Stupid”

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### ABSTRACT

"Be Stupid" campaign is the idea for our graduation project, and public awareness campaign with an unusual name however a powerful one. The campaign is aiming to make people stop, and rethink their lifestyle and the decisions they make on daily basis. Our message will touch the contemporary issues that affect people's relationships and lifestyle, for example the extensive use of new technological gadgets keeps younger generations from maintaining a meaningful connection with the older generations. Another example is the thoughtless actions in different situations which can harm their health and people around them. Such carelessness can be seen in all sorts of areas: from destroying the environment to smoking or passing a red traffic light.

When people make wrong decisions or act unwisely, the reaction from everyone will be: "come on, don't be stupid" or "that was a stupid thing to do". We decided to start a campaign to encourage and inspire people to think before taking actions and predict what the alternative wise options in each situation may be. Nowadays many people think that they know everything and they will not accept a direct advice on any decision they make. We came up with an unusual slogan to attract their attention and make them rethink before deciding what they should do. The slogan is "Be Stupid".

The project is going to be executed and promoted using a planned and studied marketing strategy. "Be Stupid" is going to be promoted through the web, posters, marketing materials, multimedia messages, desktop backgrounds, and other communication channels to reach as many people as possible.

We are proposing to complete the first phase of this project during the period between February and May 2010. Our plan is to promote the campaign starting in the UAE and to expand our campaign to other Gulf countries in the next phases. We anticipate great response and acceptance, especially with the communications tools that we are planning to use. We should be able to reach a big audience. The outcome of the project is to deliver our message to as many people as possible. We are not expecting any financial revenue from this campaign as it considered social service.

The website will be developed using ASP.NET (VB) connected to Access database. The applications which we will use include: Visual Studio, Microsoft Access, and Dreamweaver.

The Multimedia materials used for the project will be created using the following applications: Adobe Photoshop, Adobe Illustrator, Adobe Flash, Swish Max, Windows Movie Maker, and Video Converter.







# Open Source Awareness: Measuring and Analyzing the Use of Open Source Software in the UAE

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## ABSTRACT

Open-source software is programs and source code that is available for free. This permits users to use, change, and improve the software, and to redistribute it in modified or unmodified forms. It is very often developed in a public, collaborative manner. Open-source software is one of the most prominent types of software paradigms. Unlike proprietary off-the-shelf software, which comes with restrictive copyright licenses, open-source software can be given away for no charge. In this research we present an overview of open source software use in the UAE.

Since the UAE is always coping with the rapid growth in technology, and it has a lack of publication on the OSS, it is worthy to address the usage of OSS in this region. For example, “The construction company, whose current projects include the Burj Khalifa (the tallest tower in the world), The Dubai International Finance center and the Conference Palace in Abu Dhabi, has seen reduced costs, recognized at least 5 times performance gain and already experienced approximately 35% TCO improvement since the deployment of Red Hat Enterprise Linux.”. In this research, we have discovered how many establishments are using OSS. The survey study has been conducted on almost 70 organizations. 54% of the organizations are public, 30% of them are private and the rest are hybrid. As it is shown in the following table, the closed source software (76%) is used more than the open source software (59%) in the UAE.

Public		54%
Private		30%
Hybrid		16%
Open source software		24%
Closed source software		41%
Both of them		35%

From the survey, we have also compared between the organizations that use, exclusively, either of software. For organizations that deploy open source software, are they open source developers or users? Overall, are they comfortable and productive using the open source software and how much they save in cutting IT expenses by using this type of software? We also asked the organizations that use closed source software about the adoption rate of closed source software per year, the cost of software and support, and if they are comfortable using this type of software. We explored the problems while using either categories of software in these organizations.

After doing this survey and in order to develop the UAE economy, we came up with a simple catalog which provides the suitable solution for the companies to help them in replacing the commercial source software with open source software. We developed the catalog that contains different types of open source software and it is classified by platforms. In each platform, we have sub-classified each category by different functions such as web servers and accounting suits. To improve the quality of our catalog, we have interviewed expert professors in Zayed University and in Al Hosen University and tried to gather their knowledge to put it all in our outcome. To test our survey results and our catalog, we shared them with the Ministry of Youth and Culture and Community Development, spoke about our project and introduced the use of our catalog and what the benefits will be added to them by using it. We have also distributed these outcomes to some research participants and the capstone project presentations' audience.



## Human Resources Management System: Online Performance Appraisals

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### ABSTRACT

The Human Resources (HR) Department is one of the most sensitive departments in any organization because it manages employee data of the whole organization. A Human Resources Management Systems (HRMS) to store employee data can make work safer and more efficient. HRMS generates Management Information system reports (MIS) for management decisions and future planning. The Human Resources department consists of five sections: Recruitment, Operations, Compensation & Benefit, Employee Relations, and Training Center. In this project we focus on developing an HRMS for the compensation and benefits section which is still paper driven to record employee data and generate reports required from the top management. We relied on an existing system (Dubai Islamic Bank HRMS) to understand the system. In this research we focus on the performance appraisals process within the HRMS and related details and how we can improve the process.

We conducted our search process and used two case studies to show the importance of automated systems and how they are effective for an organization. The first case study is about Patni computer systems; which is one of the leading companies in Computer Systems, and it has a worldwide approach to technology services. This company offers services of application development and maintenance, business process outsourcing, enterprise system management, quality assurance, and software implementation. This company faced some problems in its HR management and upgraded the system, which is explained in the research conducted. The second company is Capgemini that has out a series of Oracle initiatives to satisfy its customers with a unique business value. Capgemini sees a competitive advantage through adopting Oracle HRMS. Their major driver for implementing Oracle HRMS was reducing HR costs and improving the efficiency of data delivery for present and future strategic planning.

We will be discussing system specifications such as benefits, limitations, constraints, system functionality with the focus on Performance Appraisals Process. In addition to focusing on the strategic planning of the organization starting from organization's vision, mission, goals, and objectives. We conducted an interview with Senior payroll officer, and another interview with supervisor of HR planning and Compensation of the Human Resources Department at Dubai Islamic Bank to rely on their implemented system of HRMS. We found some errors of the data cleaning which impacts payments and MIS reports.

Based on our analysis, research on other companies, and conducted interviews we designed a new system. We adopted the same process of performance appraisals. However, it's now e-performance appraisals. We used UML diagrams such as Use Case, Class, Sequence, and state-transition. Furthermore, we clarified the types of risks to establish this system to this organization, and the ways to control the risk if occurred and discussed system implementation stage. We contributed in the improvement of the operations, cutting cost, generating efficient and effective MIS reports for decision making.



## Cinema Guiding System

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### ABSTRACT

As we know there are many people like to spend their free time at cinemas. They go to the cinema alone or with their families and friends which make the cinema one of the most crowd places. Moreover, all cinemas around the world use posters to explain any movie which did not present the movie clearly and increase the customer complains about different movies. Many people attend movies and the movie don't look like its poster which give us an idea to implement a system that present the movies better by showing movies trailer.

We will design a system that gives the visitor more idea about the movie story, general information about the movies in each cinema around the UAE and the cinema itself, and the movie poster. Moreover, by using our system the visitor will have a chance to see the trailer of each movie before s/he enters the movie. This will give the customer more chance to get a better idea of what the movie about, and let them feel more exciting to see the movie to know what will happen next and what is the end of the story. The system will save customers and ticket windows employees' time. Customers spend a lot of their time asking ticket windows employees about the movie and try to collect more information than what they got from the poster.

Cinema Guiding System is the first system around UAE, and gulf that let customers know all information about the movies and see the trailer in the same time before entering the cinema. UAE will be the first country has this system. This system will decrease the customer complains about movies that present perfectly in their posters but actually the movie is not interested. It is creative, helpful, and useful system to many people such as who don't know how to read, and even don't know the name of the actors.

Cinema Guiding System is different than cinema websites. People will find our system all around malls and they will have the opportunity to pay their tickets and get it from the cinema vending machine using their credit card or cash. Moreover, the Cinema Guiding System will let people pay ticket to any cinema around UAE. For example, if the customer in Abu Dhabi in the morning and he plans to go to the cinema at night in Dubai he will have chance to book his ticket and pay for it which make his life easier and let him make sure that he will get his seat in the cinema. This category will save the customer time, decrease the crowded and make short line in front of any cinema.

The technique that we will use to finish up this system is defied to two parts, software and hardware. The software that we will use are MS Access to create a database, Visual Basics and Multimedia Flash. The Tablet PC will be our hardware to use it as a touch screen. The system will be available in different places around the mall, and to all people in different ages.

## Employee Relation System for Urban Planning Council

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### ABSTRACT

Our group is going to create an information system to serve the specific departments such as Human Resources, Finance, Procurement, and all other General Services in Abu Dhabi Urban Planning Council (UPC). UPC was established in 2007, as a small organization under the Executive Affairs Council. The council's main job is to ensure all the projects and developments in the Abu Dhabi follow the Vision 2030 created by the UAE government.

The Council's mission is to ensure that all the projects and developments located in the Abu Dhabi Island, Mainland Al Ain, and Western Region go through the UPC for approval. Different departments will review the projects in various aspects such as, infrastructure, environment, building heights, suitable sizes, and all other design and build related issues. We are targeting the small organizations that will need small systems which will fulfill the need of the organization without waste of their budget. In this project we are having our first customer which is Abu Dhabi Urban Planning Council (UPC). We have surveyed our customer in order to reach our objectives and to apply the requirements in a satisfactory system for the client.

As mentioned above, UPC is a new organization and there are many important systems that need to be added for the working processes. We are going to create an information system which will be used in HR, Finance, and other General Service departments.

To create the system, we will use Visual Basic and Microsoft Office Access database management system. We will create forms in Visual Basics for each requirement and will link them to the database. In addition, we will use designing software to create an attractive and user friendly interface for the system which is one of the most important features from the customer's view point. We are planning to use Adobe Photoshop and Adobe illustrator for design.

We are going to use different learning methods in order to help the users operate the system easily. We are planning to produce a tutorial video showing them how they can use the system; we will use Camtasia Studio to produce the video. Furthermore, we will prepare handouts for the employees to explain the steps. We will use Snagit for editing the print screens that we will put in the handout. We anticipate training requests from the users and are ready to provide training as requested.

## Mobile Phone Based Educational Games to Improve English Literacy Skills of Limited English Proficient Adults

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### ABSTRACT

English is one of the most commonly used languages in international business, and therefore, some level of fluency in English becomes a pre-requisite for many lucrative employment opportunities. Many immigrant workers in the fields of construction, menial labor, household help, and service sectors in countries like Qatar and the United States of America (USA) have limited English proficiency (LEP), which is often a barrier to advancement in their careers and creates problems in communication with their supervisors. These problems also expand to refugee populations in similar countries who find it hard to get jobs with limited English skills, thereby making their adjustment process in their host country harder. English proficiency is also a challenge for the deaf population. Only 10% of deaf 18-year olds read at or above an 8th grade level in the USA, and the average deaf adult reaches only a 4th grade reading level. Our work aims to address the problems of limited English proficiency among adults by providing these groups with a low-cost, easily accessible, and fun tool for enhancing their English skills.

Mobile phones are the most prevalent and accessible computing technology for people of all ages and incomes. A majority of the related research efforts, such as MILLEE (Mobile Immersive Learning for Literacy in Emerging Economies)[1] and TechBridgeWorld's iSTEP 2009 Literacy Tools [2, 3], have determined the success of mobile phone educational games in improving the English Literacy skills of primary school students in India and Tanzania, respectively. The goal of our work is to build on this work and understand the effectiveness of mobile phone based educational games on adult English literacy. Our technology tool consists of two parts: a single player game on the mobile phone, and an online content authoring system which will allow teachers and/or administrators to add the content to the games. The separation of the game and content ensures that the same game can be used to teach various exercises and can be easily customized for other user groups. This project also involves significant work to effectively incorporate proven techniques from English as Foreign Language (EFL) teachers into educational games with graphics that are exciting to play, effective in teaching, and accessible via mobile phones. Our proposal is to disseminate the background, related literature, implementation, and field testing results from this work through an oral presentation as well as give a demo of the online content authoring system and the mobile phone game at the Second Annual Conference on Undergraduate Research in Computing Science at Zayed University, Dubai Campus.

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## Proposing a Cost Effective Implementation of Thin Client Technology in School Learning Environment

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### ABSTRACT

A thin client can either be a software program or an actual computer which relies heavily on a high end computer or a server. The thin clients are also known as dumb terminals because little or no processing is done on client. These occur as components of a broader computer infrastructure, where many clients share their computations with the same server. Thin Client has no hard disk and no processor. The focus of this research is to encourage an implementation of hardware thin client in educational institutions. The hardware components that make up thin client are just a monitor, keyboard, mouse, graphic card and an integrated smart card reader.

The advantages of thin client are numerous. Its usage results in lower administrative cost and greater security. Since all the processing is done on the server and the network is centrally managed, the local environment is stateless. The hardware has fewer points of contact with processing activity resulting in a lower probability of error. Thin clients have a low initial purchase price. They have no moving parts so are less likely to fail. Even old PC's could be modified to work as dumb terminals with simple modification for a better speed operation. The information is secure as there are no applications or data held locally so they are immune to threats and viruses. Security has always been a major issue when setting up a network. Thin client has centralized, session-based computing that uses character terminals which are somewhat dated, and it remains stubbornly reliable, particularly when security is a more important factor than usability. The improvement in overall security comes from not having to constantly maintain a network of hundreds of thick clients. Instead, the security focus is now on the main servers that provide the sessions. Unlike PCs and traditional laptops, thin clients are locked down and offer greater security against theft, damage, malware, spyware, and viruses because all data is on the network – not the computer. One of the major disadvantages of thin client is the single point failure, i.e., the processing load of the server clients is performed by the high end server. Thin Client is currently been used in various sectors such as healthcare, call centers etc. in various countries all over the world.

Finally we conclude our research with a case study. The study will include cost analysis of the thin client and fat client already implemented in the educational institutions within the UAE. The data will be collected by carrying out interviews with the respective authorized heads of the institutions and IT administration. The limitation of this research is that there are not many institutions within the U.A.E that have implemented the thin client architecture.

## Avatar-Based Approach for Teaching Arabic Sign-Language

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### ABSTRACT

Sign language is the natural mean of communication between deaf, almost as talking is for healthy persons. To communicate with the community around them deaf need a translator in order to translate signs to equivalent words and vice versa. To facilitate this task, computer programs have been developed to assist deaf persons acquiring their independency.

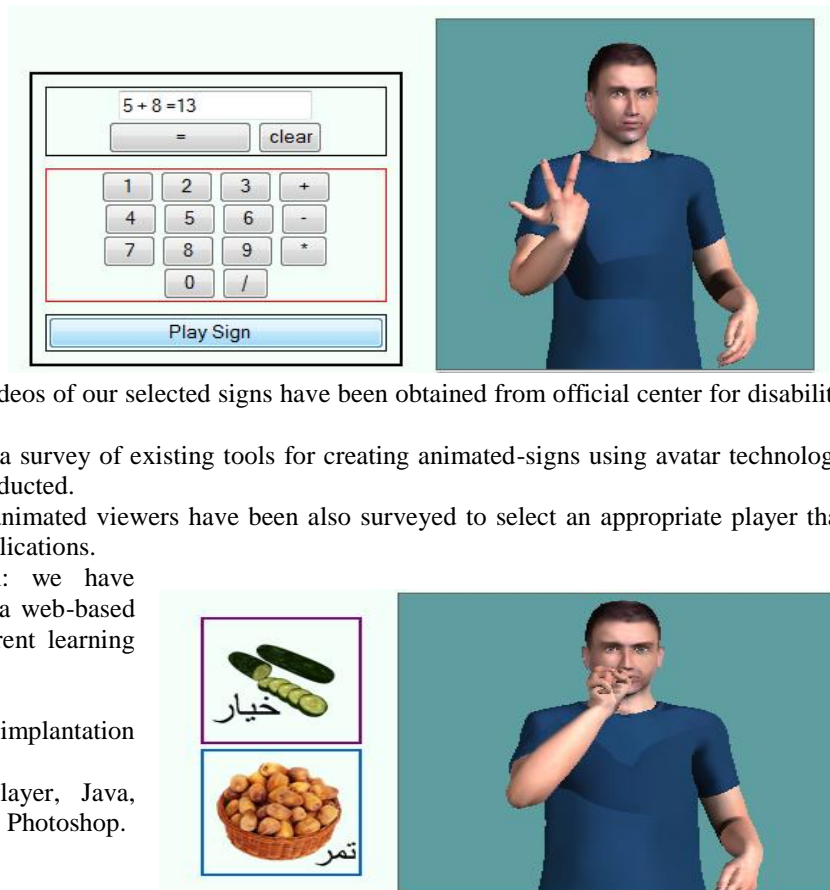
Methods for visualization of signs by using computers have been evolved from images to video-clips and finally to 3D technology called Avatar. Virtual Human Signing as 3D format is designed to display the signs through the internet or other applications. Sign-dictionary has firstly to be transformed to animated forms and stored in appropriate file-formats, using special editors allowing the manipulation of avatars. These animated-signs can then be visualized by an application that can read the corresponding files (The avatar software). These files are very much smaller than videos and images, thus the amount of storage space required is minimal, and the download time (or visualization time) is very fast.

Our objective in this project was to build a web-based learning system that can be used to teach sign language in easy and fast way. This has been done throughout the following phases:

1. Collection of signs: signs related to different aspects in the life of impaired persons have been firstly collected.
2. Accusation of sign-videos: videos of our selected signs have been obtained from official center for disability affairs.
3. Creation of sign-animations: a survey of existing tools for creating animated-signs using avatar technology (sign-builders) has been conducted.
4. Visualization of signs: sign-animated viewers have been also surveyed to select an appropriate player that can be plugged-on other applications.
5. Build the learning system: we have designed and implemented a web-based teaching system with different learning levels

The main tools used in the implantation include:

eSign editor, SigmlSigning player, Java, JavaScript, Internet Explorer and Photoshop.



## P300 Speller Brain Computer Interface

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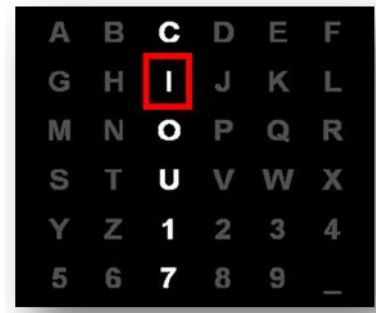
### ABSTRACT

Our project focuses on the development of a Word Speller application on P300 which can be used easily by merely looking on the letter the user wants to type on screen. This work concentrates on using many algorithms for implementing the Word Speller application on P300 and comparing them for future implementations.

Brain Computer Interfaces (BCI) represents a new communication option for those suffering from neuromuscular impairment that prevents them from using conventional augmented communication methods. It is a communication and control mechanism that does not rely on any kind of muscular response to send a message to the external world. The majority of BCI research is rooted in the electrical activity generated by the neurons firing in the brain because this activity has been studied in cognitive psychology since its discovery by Hans Berger in 1929. In addition, EEG is fast and cost effective compared to other brain imaging methods.

P300 evoked potential was used which is a positive deflection in the EEG, appearing approximately 300 ms after the presentation of rare or surprising, task-relevant stimuli. To evoke the P300, subjects are asked to observe a random sequence of two types of stimuli. One stimulus type (the oddball or target stimulus) appears only rarely in the sequence, while the other stimulus type (the normal or non-target stimulus) appears more often. Whenever the target stimulus appears, a P300 can be observed in the EEG. The EEG dataset is used from the BCI Competition III Challenge 2004. Peak Picking, Correlation and Principle Component Analysis (PCA) are used in classification.

The way the experiment was done to obtain the EEG we analyzed was by presenting a 6 by 6 matrix of characters to the user (see figure.1). The user's task prescribed by the investigator. All rows and columns of this matrix were successively and randomly intensified at a rate of 5.7Hz. Two out of 12 intensifications of rows or columns contained the desired character. The responses evoked by these infrequent stimuli (i.e., the 2 out of 12 stimuli that did contain the desired character) are different from those evoked by the stimuli that did not contain the desired character and they are similar to the P300 responses previously reported.



Figure(1): 6 by 6 Matrix

Classifiers used are Peak Picking which is an algorithm to classify a P300 component using the difference between the minimum and maximum amplitude in an epoch. An epoch with a prototypical P300 signal contains a large peak around 300msec, peak picking recognizes a P300 when the amplitude difference is greater than or equal to a specified voltage points within a specified time window. And Correlation which is a slightly more complex algorithm. It may be looked at as template matching when the correlation is performed between single trials and a template of what each kind of trial should look like. Other methods used to classify are Adaptive Neuro Fuzzy and Power Spectral Density. Working to use Fisher Linear Discriminate is in progress to get much better accuracy.

The following are the results of each classifier in the term of accuracy:

Adaptive Neuro Fuzzy: 26.6667%  
Peak Picking: 38.82%  
Power Spectral Density: 36.47%  
Correlation: 49.42%

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### ABSTRACT

Targeted Learning is a concept which aims at providing personalized learning to students so as to help them overcome their weak areas in any course. It is important to first identify the weak areas of the student and a common technique for this can be by evaluating the student course knowledge through a computer based assessment test. Based on the result of this test the software is expected to create the required learning material for the student. As such learning material targets to overcome weakness of students, it is known as targeted learning material. The “Pegasus” project has been motivated by this idea and the main aim of this project is to create software that implements the concepts of targeted learning. “Pegasus” has a dictionary meaning of a “winged horse”. This term has been used as the title to philosophically give “wings” to the students so that they overcome their weaknesses and “fly” effortlessly in this academic world. There have been numerous researches conducted in this discipline. An innovative feature proposed in the Pegasus would be to overcome the fairly predictable nature of online tests by providing a means for random selection of questions to be included in the online assessments test. The software would enable students to set targets for themselves with a realistic outcome. The System would then provide a feedback to the students whether they were successful in achieving their targets and in case they were unsuccessful, what were the problem areas or topics. The system would be designed to automate the assessment of students and once this assessment is completed, the system would generate a report to describe the results.

The most distinguishing and innovative feature of this system would be to create highly customized study resources for the student. The objective of these resources is to help them prepare better and thus overcome their subject weaknesses. This would be implemented by compiling topics from a subject knowledge base to address weak areas of the student. As self preparation is the ideology behind Pegasus, there would be no provision made for gathering inputs from the student’s tutor. The research team would initially study existing literature in this field to gain a better understanding of the concept of targeted learning. After the preliminary study, a model of the system would be created and validated. The Pegasus system would then be implemented from the model by using tools such as MySQL and PHP. Targeted Learning is a topic that is being researched and there are not many commercial systems existing which completely address these concepts. This project is an earnest attempt by this research and project team to fulfill most requirements of targeted learning.



## Customer Perception Towards E-commerce Technology Special Case: UAE Market

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### ABSTRACT

E-commerce it's not only to sell products and services for customers through technological methods , it's also a kind of showing creativity in communication and the acquirement in conducting commerce. Technological innovation and revolutionary change in information systems are playing major role in the development of commerce industries, especially e-commerce, companied with Internet channels through which e-commerce services are provided this is a major step in the development process. E-commerce has become mainstream for many customers because it has many benefits such as finding phenomenal items, doing a direct comparison between products and services, and the most special thing is making purchases and ordering from home without moving. On the other hand, many other customers are way of it and have a negative idea about the way it works, also many of them think that it's risky and not secure enough to use it and to submit personal and confidential data. This research paper has several objectives such as highlighting the real meaning of e-commerce and examining customer perception toward e-commerce technology. The study identifies customer considerations regarding e-commerce and thus the barriers that hinder the diffusion of this technology in the market. Finally, this study explores the adoption process of e-commerce and the main issues related to it. To reach these objectives, a combination of methods were used which include literature review and empirical study based on feedback provided by a random sample of participants using a questionnaire instrument. The data analysis and results from the empirical study reveals a strong indication of how people perceive e-commerce in the UAE market. The findings from the study have shown that the current e-commerce situation has the potential and ability to grow for many years ahead without any problems as people will continue to shift toward Internet for their shopping needs. There are many significant areas were these e-commerce providers need to make improvements for their quality of services. Security has shown one major issue where there is room for ample improvements, especially with the increase number of online shoppers. So to limit these frauds more innovative solutions and measurement should be taken and people should be trained to protect themselves from these kinds of frauds.



## Password Security of Key Exchange Protocol Using Elliptic Curve Cryptosystem

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### ABSTRACT

In this paper we have proposed an efficient password security of Key Exchange Protocol based on Elliptic Curve Discrete Logarithm Problem. In key exchange protocols allow a group of clients or parties with a trusted server where they registered their password and communicate over a public network to establish a common secret key called session key. A number of key exchange protocols have been suggested. Here we have taken two one-way hash functions to built the level of security high and resist Off-line dictionary attack. The protocol also does not leak any information that allow the adversary to verify the correctness of password guesses. The proposed protocol is also easy to implement for low processor mobile device such as Smart Card, PDA etc. The security of our system is based on Elliptic Curve Discrete Logarithm Problem (ECDLP).

Key exchange protocols allow two parties to agree on a secret shared secret key that they can use to do further encryption for a long message. One of these protocols is the Diffie-Hellman, which is the most used one. The Elliptic curve Diffie- Helman is considered as an extension to the standard Diffie- Hellman.

Password-based key exchange protocols assume a more realistic scenario. They also seem more convenient since human-memorable passwords are simpler to use than, for example, having additional cryptographic devices capable of storing high-entropy secret keys. The vast majority of protocols found in practice does not account, however, for such scenario and are often subject to so-called dictionary attacks. Dictionary attacks are attacks in which an adversary tries to break the security of a scheme by a brute-force method, in which it tries all possible combinations of secret keys in a given small set of values (i.e., the dictionary). Even though these attacks are not very effective in the case of high-entropy keys, they can be very damaging when the secret key is a password since the attacker has a non-negligible chance of winning. To address this problem, several protocols have been designed to be secure even when the secret key is a password. The goal is to restrict the adversary's success to on-line guessing attacks only. In these attacks, the adversary must be present and interact with the system to be able to verify whether its guess is correct. The security in these systems usually relies on a policy of invalidating or blocking the use of a password if a certain number of failed attempts has occurred.

In this research a new protocol for exchanging key between a numbers of parties with a trusted Server has been defined. This new protocol has two major advantages over all previous key exchange protocol, first this protocol does not leak any information that allow the adversary to verify the correctness of password guesses. The second one is that this protocol does not leak any information that allows verifying the correctness of password guesses. The security of our system is based on Elliptic Curve Discrete Logarithm Problem (ECDLP). The primary reason for the attractiveness of ECC over systems such as RSA and DSA is that the best algorithm known for solving the underlying mathematical problem (namely, the ECDLP) takes fully exponential time. In contrast, sub-exponential time algorithms are known for underlying mathematical problems on which RSA and DSA are based, namely the integer factorization (IFP) and the discrete logarithm (DLP) problems. This means that the algorithms for solving the ECDLP become infeasible much more rapidly as the problem size increases than those for the IFP and DLP. For this reason, ECC offers security equivalent to RSA and DSA while using far smaller key sizes. The attractiveness of ECC will increase relative to other public-key cryptosystems as computing power improvements force a general increase in the key size. The benefits include higher speeds, lower power consumption, bandwidth savings, storage efficiencies, and smaller certificates.

## Car Safety System to Prevent Accidents due to Health Conditions that Affect the Heart Rate of the Driver

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### ABSTRACT

The objective of this paper is to design a new car safety system that detects drivers under stress or under the influence of alcohol and prevent accidents that results in serious casualties and even death. This project uses LabVIEW 2009® – primarily to show the power of applied computing in designing a real-time vehicle-tracking and control device that would benefit society.

The car safety system has two parts – the In-Vehicle unit (IVU), and a ‘communication link’ between a driver and an Operator (an employee in the same company as the driver - who tracks the driver’s automobile activity). The IVU consists of the Vernier® Heart Rate Monitor which would be embedded within the steering wheel and would record the Heart beat rate per minute (HBM) of the driver. When the driver starts the car and his/her palms grip the steering, signals from the sensor would be acquired by the Vernier® DAQ which would send out a digitized signal to the mobile through the USB. Once the mobile phone receives the data, the NI® mobile module activates and the VI starts running. The VI is programmed to start an alarm, give a warning message and send an SMS to the Operator when the HBM of the driver exceeds a  $\pm 10$  HBM range from the driver’s NRHR (i.e. the abnormal condition). The operator on receiving the SMS calls the driver and would start monitoring the vehicle’s motion through GPS.

The primary program (a.k.a VI); created in LabVIEW® will be downloaded into the driver’s mobile phone through the NI® Mobile Module. It would display the driver’s normal resting heart rate (NRHR), the current heart rate and when it detects an abnormal heart rate would activate an alarm and send an SMS to the Operator. The normal resting heart rate (NRHR) would serve as the value with which the heart rate of the driver would be compared with. The software is also programmed to store more NRHR values if the car is used by multiple drivers.

Research on heart rate shows that heart rate varies by more than  $\pm 10$  HBM range from the NRHR for every person due to several factors some of which are hypertension, stress, tiredness and alcohol or drug consumption. This necessitates the presence of an Operator for the safety system who would call and analyze the speech of the driver. All the above mentioned causes for heart rate variation have a considerable effect on consciousness and hence the speech of a person. The operator on analyzing the speech can decide to switch off the alarm if the driver’s condition does not seriously affect driving (such as tiredness) or would switch off the engine of the car if the driver is in a condition that considerably affects the driver’s driving capacity (such as drowsiness, stress, excessive alcohol or drug consumption).

This safety system is independent of the legal limit of alcohol consumption and solely based on the heart rate, which is an easier and a safer input for the safety system.

## Open Education Project

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### ABSTRACT

In today's rapidly changes, information technology (IT) has become a vital and essential part of each successful organization. IT is used to improve higher education (HE). Millions of dollars are invested to set up an IT department in universities around the world. The cost and the performance of the commercial software increased the concern of the higher education community toward open source software (OSS). Understanding the OSS roles, effects and benefits will reflect distinctly in its implementation in the HE universities.

There are two main types of software which are open source software (OSS) and closed or proprietary software. Open source software is free software which allows anyone to see the program code and make any changes on it. By contrast, proprietary software is software developed by a company or business enterprise to generate profits and the source code kept secret to have the full control over the product. There are some differences between the open source software and proprietary software. In proprietary software, the purpose of copyright product is to protect the software from outside interference. As the source code is closed, the modification of the source code is not possible for experts and they could not review the source code or find strategies to breach the security restrictions. On the other hand, open source software is different because it is free and everyone could access it, fix it or upgrade it. Also, the transparency of open-source means the software can be made secure because security flaws could be detected. Furthermore, open source software is less expensive than proprietary software. To illustrate, Linux could be downloaded freely but Microsoft Windows are expensive when buying it from the vendor. Also, on the open source software, users can be flexible in their choice of vendors.

Our main goal was raising the awareness about open source software and enhancing its use in the Middle East especially the UAE context, an Open Education package (OEP) that contains many systems which vary from operating system to email system was proposed as a complete open source solution for the Education sector. The project is focusing on installing and administrating open source educational management tools that facilitates communication and enhances learning experience. In our Open Education Package (OEP), we provided 2 DVDs for installing the OS package and one CD for the user manual and your guide to moodle. The manual is structured to guide IT people in installing the package step by step. It can be considered as a reference whenever you need a help. It is divided into six major sections starting from installing the operating system which is OpenSUSE and ending with installing Focus/SIS which is a software that enables the students' families to keep in touch with the students' learning process. Through using the OEP, schools can reduce the cost of IT department as well as enjoying the same features of the commercial software. Both the students and instructors can communicate well, upload/download materials, view grades, share ideas, use forum, wiki and do quizzes online. Many government and private academic institutions were involved in our pilot project. A survey was conducted to estimate the knowledge about open source software in our institutions and their willing to use it in their IT infrastructures in the future. According to the survey's results, 94% of the students were interested to use free educational management tool to ease their interaction.



The objective of this paper is to provide clear guidelines for configuring and installing open source products which will serve the university's requirements and develop an open source platform for the Higher Education.

## Impact of the Internet on Reading Habits

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### ABSTRACT

Reading is a vital communication activity and proficiency in the reading and comprehension over the Internet will become essential to our literacy future. Internet has revolutionized the concept of reading and the way people read. It could be the major media to encourage the reading level in the world. The Internet changed the way people read and the concept of reading. The research paper discusses the impact of Internet on our reading habits that are clear by observing the variety of information available that motives adolescent to search read and enhances their minds with availability of unlimited choices of reading materials. Latest news became easily accessible on the Internet consuming energies and cost to get it. The Internet provides a variety of material in many languages along with the translation tools that help overcoming the language barriers. Nevertheless, on the other hand, the internet has also caused the lack of deliberate reading. Searching online may puts researchers in consent with established opinions, but this may speeds up agreement and satisfaction. When reading about a previously unread subject moves the reader from some topic to another which loses the train of thoughts. Multimedia features decreased the level of imagination, limiting the ability to form reader's own mental pictures. Internet reading of newspapers is fast and many people skim headlines. This leads to predicting and misinterpreting the news.

The study shows how the Internet and the Web made it possible to present the information in variety of interfaces using information visualization techniques that affects the comprehensibility of the reader. For example, in the linear interface, the document is shown as a linear sequence of text and pictures. Electronic documents such as research papers, articles and reports follow this interface. Linear interface is simple and readability is high but it does not provide navigation help to jump to other pages quickly. Other example is the overview + detail interface that has two panes, a detail pane and an overview pane. The document is shown as a linear sequence of text and pictures in the detail pane. The overview pane shows the overview of the document. This type of interface solves the navigation problem. We concluded the paper by highlighting some interesting, effective and helpful reading strategies that help readers develop their reading skills such as: Activate prior knowledge about what is known and asking questions, determine the important information while reading, Synthesize, use fix-up strategies such as re-reading, skipping ahead, underlining words, and using dictionary, and visualize.

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### ABSTRACT

Open Source Software(OSS) is defined as computer software freely provided that permits users to use, change, and improve the software, and to redistribute it in a modified or unmodified forms. Academic Institutes, worldwide have different opinions for the use of OSS in academic disciplines. Open source Software (OSS) is developed in a highly social online environment where developers are frequently dispersed in space and time, but rarely interact face-to-face. Literature in this field specifies many successful OSS implementations in Academic Institutions globally. Many studies have been conducted to find the acceptance of Open Source Software (OSS) in Academic Institutions. After reviewing some studies conducted in various countries like Switzerland, USA, Australia and UK etc, it has been found that there are two distinct views of the academic acceptance of Open Source Software - one which is totally in favor of the use of OSS, while the other one is apprehensive about the same as it could suppress the creativity of individuals.

The purpose of this research is to see the overall acceptance of open source software in Academic Institutions in the UAE. The Open Source Software phenomenon is still in its infancy in the UAE and very few studies have been conducted on this topic in the UAE. This fact will provide a unique flavor and opportunity to this proposed research work. Most Educational Institutions are operated on a non-profit basis and many of them are government funded. Open Source Software's are freely available on well known OSS Project community providers such as [www.SourceForge.net](http://www.SourceForge.net) and hence can be implemented in Educational Institutions at no procurement costs. This fact can prove to be very beneficial for the non-profit nature of business conducted by Educational Institutions. Semi – structured interview instruments would be constructed after extensive literature review. Data would be collected from a segment of Academic Institutions in the UAE. Statistical analysis will be performed to see the behavior of the data and significant differences in the data sets. Findings of this study could facilitate Universities, Academic Institutions to evaluate the options of using OSS (Open Source Software). Further research could also be carried out on these findings to create a maturity levels framework of Open Source Software implementations in educational institutions. The main limitation of this undergraduate research is the regional boundaries and authors unable to expand in this work. The scope of this research is limited to the UAE.

## Textbook Tracking Application

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### ABSTRACT

At Zayed University students are required to borrow textbooks for most of the courses they take. In order to manage the process of borrowing these textbooks, the university uses manual system. The system consists of a paper that the students should sign whenever they want to check-in or check-out a textbook. This manual system is unreliable and causes many problems. First, the system resulted in losing many textbooks. This is because some students do not return the textbooks on time either because they forget or because they do not feel obliged to do so. Second, the current system does not provide accurate information on who borrowed which textbooks. Therefore, it will be hard for the instructors to rely on them in collecting the textbooks at the end of the semester.

The objective of this project is to build a web-based tracking application that provides access to centralized database via any computer. Textbook Tracking Application (TBT) is web-based application that can be accessed by any computer anytime anywhere. It manages the process of borrowing textbooks and solves all of the above mentioned problems. First, it provides an interface for the instructors to check-in and check-out textbooks for specific students. Second, it is totally computerized which means that there are minimum errors and inaccurate data. Instructors can rely on TBT to generate reliable information on who borrowed which textbook and when. Third, the application stores all borrowing processes in the database. Thus, the instructor can retrieve and see the student borrowing history. Forth, TBT saves textbooks because the instructors can check who did not return the textbook on time and send an email reminder to the students. This can help to reduce the number of the lost textbooks. Also, the application serves as a portal where the instructors can search for textbooks' information from the centralized database.

TBT is developed using Visual Studio 2008 and Microsoft SQL Server 2008. Developing this application was challenging because it was developed using technologies that are new and do not have enough resources to learn from. TBT was developed in a very short time. In ten weeks, the whole application was developed from collecting the textbooks' data, to designing the interface, and fixing the errors. TBT can be used in universities, schools or institutions that wish to manage and keep track of their borrowed textbooks. TBT is similar to a standard library management system in terms of tracking borrowed books. However, it does not require adding barcode to the books or any other identification method. Also, it shows the borrowing history of the student, and it is web-based. Thus, it can be accessed through any browser anytime anywhere. TBT is easy to use and learn since it does not require lot of input from the user.

## The Impact of Computer Technology on National Families

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### ABSTRACT

In this research paper we present results from a research study that looked at how information technology is changing national families. Families produce the generations who will help to improve the country future. If those generations grow up in an unhealthy environment it will affect their way of thinking. As UAE citizens we are concerned about our country, we want to see the UAE as a developed country and this will not happen unless we as citizens in this country work hard towards it. Therefore, we are interested in whether or not information technology has impacted National families. We surveyed 35 Zayed University College of Business students because they regularly use computers in their courses.

Five key themes emerged. First, 97% of the Business students strongly agreed or agreed that information technology was rapidly increasing in UAE society and 84% strongly agreed or agreed that it helped Nationals to keep connected with important people in their lives. 87% strongly agreed or agreed that information technology made their lives easier. Second, text messages were the most popular method to stay connected: 62% of the Business students sent 20 or more SMS messages per week compared to 82% sending less than 10 email messages per week. Third, the impact of technology on National Families was varied: 12% of business students thought information technology brought families closer together or very close together. However, 47% thought that information technology either divided or was very divisive on National families. 41% of Business students thought that information technology had no effect on national families.

Business students also thought internet technologies brought them closer to their friends. 82% of Business students felt that internet technologies improved or very much improved their connections with their friends. Finally, 81 % of Business students thought internet technologies improved or very much improved their ability to meet new friends.

Information technology is greatly affecting National families in many ways: some positive, others not so positive. Information technology has the ability to bring people together as seen in the large number of SMS messages. It is not always easy in our culture for women to meet others face to face. Therefore, using information technology helps friends stay connected. Since families see each other face to face, information technology is not an important tool to keep families connected. However, information can be a negative thing if the person uses information technology too much rather than interacting with their families. According to the Business students, information technology is more important for friends to stay connected but less so for families; but it could be harmful if used too much.



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### ABSTRACT

Implementing a reliable financial system in any institution is a crucial task. Furthermore, in private universities where students are the main 'customers' of the institution, recording and tracking students' financial transactions should be carefully handled. ALHOSN University is a young institution which started with a humble number of students and in which some tasks related to students' finance operations were either manually performed or needed improvement. As the university is growing up, such methods of handling finances present problem and the improvement of students' financial system module becomes urgent and mandatory.

Therefore, the goal of our project is to handle such issue putting into practice all the concepts and software packages learnt during our study in ALHOSN University. These concepts are more related to the creation and management of databases, human-computer interaction, and Web developing applications fields. Assuming that the admission and registration modules are already developed and working efficiently, our main concern is to provide user-friendly interfaces to enable managing students' accounts and financial related information by students, admission and accounting department (each per their privileges). The proposed module will also provide a support to students for online application for any service and the possibility to pay online as well, and on the other hand, supports the admission department to process the applications and control the fees whether related to services or enrollment. Concerning the accounting department, the proposed module provides a support in collecting financial information related to all students, generating statistics on total profit, or profit per faculty or department.

As software engineering students, our first step was an investigation study, collecting the necessary requirements for our application. For that, we have conducted interviews in ALHOSN University, approaching students, admission and registration staff, and finance department staff. We have also extended our investigation outside our university, visiting some universities in Abu Dhabi such as MASDAR Institute of Science and Technology and Paris-Sorbonne University. Afterwards, comes the designing phase. Different user interfaces are to be designed targeting the intended users with the needed functions and information, in addition to designing a database that holds and manages all the needed data to enhance transactions of the system.

Implementation phase will take its place after the completion of the previous phase. Tools and packages will be used to develop a web application that matches the specified functional and non-functional requirements. Furthermore, there will be time for testing the application to insure that desirable results have been achieved taking into account that some modifications and changes may be performed.

In conclusion, the enhanced financial system will facilitate many actions for students and accountants. Students will be able to access all their financial records and apply student-forms online. Accountants will be able to carry out computational tasks regarding the students' fees with ease in addition to the calculation of the profits coming from all the academic departments. Also, the system provides deadline options for the accountants that derive the payment procedures of the university. Therefore, through these actions the system will achieve its objectives of saving time and effort.



## Design and Development of a Talking Calculator (TC)

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### ABSTRACT

Calculator is an electronic device, which is used by most of us. However, visually impaired people may not able to enjoy the benefit out of it and also small kids who wanted to learn math through fun. The proposed design will drive their motivation towards learning. The existing talking calculator has few limitations such as English language operation, need of PC with talking calculator software and unclear voice results. In our project, we have planned to study different types of microcomputers, non-volatile memories, digital voice coding, decoding, power amplifiers and communication standards.

The ATMEL AVR microcontroller is used for project design, as RISC architectural advantage of AVR will be more effective than HCS12 which we have learnt during our course of study. The most popular open source software WinAVR C compiler used for build process of the source code and AVR studio is used for debugging. The entire system embedded in single ATmega 16 controller, with expandable voice memory up to 1Mb.

The complete set of voices is recorded using Speech recorder in Windows XP, saved as separate .wav files for coding purpose. RC speech coder software is used to convert the voice data into PCM data output format. The TC with external EEPROM is used to store the coded voice data, ie the English and Arabic voices are coded with voice encoder software. The two wire interface (TWI, in some cases it is referred as IIC) of mega controllers used for communication between EEPROM. We are also in the process of collecting literature about allophonic in speech decoding. This could be adopted instead of stored voices in EEPROM, if we are successful, this leads to first talking calculator using allophonic codes.

The calculator may be operated with/without voice, when voice activated, there is an option to switch over between English and Arabic. Upon every key stroke, the appropriate digital voice signal will be retrieved from EEPROM, decoded using appropriate decoding method. The reconstructed voice is very weak, so the audio amplifier is used to amplify the signal. The matrix keypad interfaced through timer interrupt to avoid key debouncing. All the entries are made through the keypad. The input and computed results are also displayed in 16X2 LCD.

The challenges in this work are learning of AVR architecture, tool chain, voice coding, TWI interface and integration of the system. Our work will facilitate special Arab speaking nationals to facilitate and enjoy the outcome of science and technology. We are in the process of getting permission from our College Executives, and we will be pleased to develop a prototype model of the same and give it to Al Noor Association for the Blind, Muscat, Sultanate of Oman.

## Mobile Learning and Communication Using Arabic Sign Language

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### ABSTRACT

Sign language is a language that uses hand and body gestures and movements, lip movements and facial expressions to express words and meanings. It was developed in deaf communities to help deaf and hard of hearing people to communicate with each other and with ordinary people. There are many sign languages that were developed in many countries and some of them have a legal recognition like the American sign language and the British sign language. However, each sign language is different from the other ones. For example, the American sign language and the British sign language are different from each other, although the USA and UK both share the same spoken language (English).

Arabic sign language suffered from the same problem. Each Arabic country has its own sign language. Nevertheless, there have been efforts to standardize the Arabic sign language to be used in all Arabic countries. One standardization effort is the “standard sign language dictionary” which contains over two thousand Arabic sign language words.

One issue that most Arabic people suffer from is the ignorance of Arabic sign language. This project presents M-Learning as a solution to this problem. M-learning which is “Mobile learning” can be defined as the ability to learn new information using mobile technologies regardless of the learner location. This means that the Arabic user of the sign language application can learn the Arabic standard sign language more conveniently and at any time.

The mobile application developed here has several features that can be used not only to teach Arabic sign language but also to communicate using Arabic sign language. The first feature is translating from Arabic sign language to Arabic text and audio. This feature can be used by the deaf people to communicate with ordinary people. The second feature is the translation from Arabic text to Arabic sign language and audio. The user can use this feature either to learn the sign language or to communicate with deaf people. The third feature is chatting where two users can use the application to chat in Arabic sign language. The fourth feature is translating from vocal Arabic to Arabic sign language. The application also takes vocal Arabic words as an input and tries to translate them into Arabic sign language.

The application was developed using Java Micro Edition (JME) as a programming language and using NetBeans as an IDE. In addition, MySQL was used to set up the database of the application. There are also other tools used in this project such as XAMPP, which was used to set up the webserver of the application.

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### ABSTRACT

Decorative art and graphic design have been an important part of every culture in every period of history, and continued to be important to our present day. This paper discusses, study, and analyzes the evolution of the ornamental computer-generated patterns by exploring different mathematical ways in which these patterns can be generated. The mathematical tools used are based mainly on the mathematical theory of tiling, symmetry, symmetry group and folding concept. The objective of this paper is divided into two parts. First, illustrates, describes, and traces the ornamental geometric patterns and show how such decorative patterns start from very basic and simple geometric shapes evolving into sophisticated captivating ornamental styles. Second, offering insight on how simple mathematical tools can be utilized with computer graphics for generating unlimited class of simple and complex ornamental patterns based on a certain simple defined motif and the kinds of the fold-types symmetry chosen.

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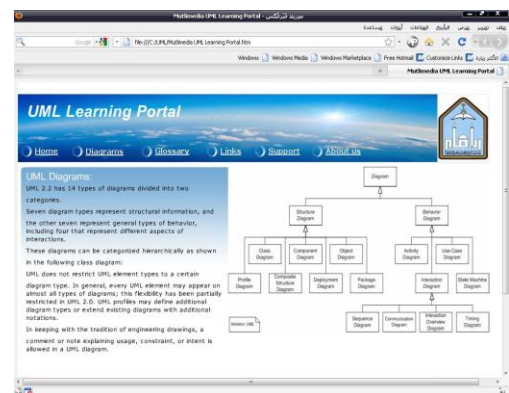
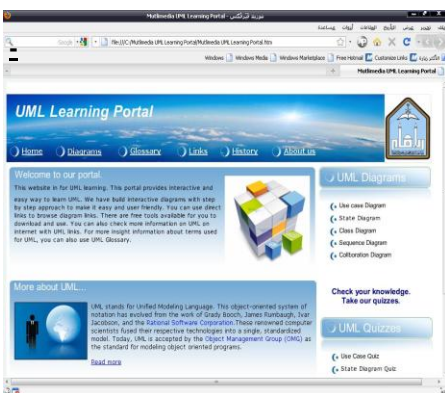
### ABSTRACT

The Unified Modeling Language (UML) is a standard graphical language for specifying, visualizing, constructing and documenting the artifacts of software systems, as well as for business modeling and other non-software systems. The UML represents a collection of best engineering practices that has been proven successful. It uses mostly graphical notations to express the design of software projects. Using the UML helps the project's teams communicate, explore potential designs, and validate the architectural design of the software. Its flexibility lets you model distributed applications that use just about any middleware or hardware. [1]

Information technology has a great importance in the education field. By using information technology, the process of learning becomes rich with information and be more active because students can access the information and learn it in many different ways (graphic, video, audio, text) in any time any place. Also, Information technology can be used to reduce the reliance on paper-based books. Based on experiments, technology can help students in their achievements, skills and knowledge. Technology can also improve the administration and management of educational institutions. In this project the goal is to develop a system of improving learning or education that can make students learn and understand UML (unified modeling language) in an easy and fast way.

This project focuses on the utilization of information systems for students pursuing higher education. All Information Systems students learn the UML by reading books or PowerPoint slides but this way of learning takes more time and work. The Faculty of computer and information sciences is trying to use high technologies to make learning more easier but it still suffers from several problems such as: Does not make sure that the student has gained the subject perfectly, still learning with PowerPoint slides and text books, does not use different method or ways to teach students, the time and effort it takes to teach students with the PowerPoint slides and text books. The problem with PowerPoint slides is that they don't cover the subject very well because the contents of the slides are just points without any explanation unlike the text books they are filled with basic and detailed information but it takes more time and effort to learn from books. So, our system will cover this missing alternative of giving the detailed information and taking less time and effort to learn from books.

In this project we will develop a system with an interactive environment to help Information System students or any specialist to learn the UML by using multimedia (video, audio and graphics). So the final result is a system with an interactive environment that uses multimedia to learn and provide the user with the tools on how to design and draw an UML diagram.



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## GetSeen Web Project

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### ABSTRACT

The following is the description of an IT project to create a web site and web applications for GetSeen. GetSeen is a company with the mission of providing free promotional opportunities for talented UAE Nationals who seek exposure and recognition. We are focusing on encouraging those who have skills in IT, media, art, and other fields. Moreover, the company will give these nationals a chance to be connected to UAE work place.

To accomplish our goal, our plan is to develop a website where the talented UAE nationals' work can be published online as an advertisement of their efforts. The site will provide the detailed personal and professional profile of the talented nationals to be saved in the database applications and accessible through the website. This information include name, location, date of birth, contact number, address, e-mail, and photograph as well as professional information such as qualifications and certifications related to their work. To create a profile the user should create an account with a username and a password. Once their account is created then they will be able to upload samples of their work or links to their online projects for all viewers to visit. GetSeen is the owner of this local talent advertising web application. The clients or the people who will be using the site include any web surfer where he or she can register with their information and upload their work for the public to see. These users should enter their passport number or their national ID, so we know that they are locals of UAE.

The site will be connected to a database where all data will be stored. The data will be collected from the information entered and updated by the users. Our company will not claim any rights over the published art or technical material. The companies who are interested to hire or contact the talented individuals will have to create accounts to enter the site and to establish direct contact with the individuals. Without the account they can't access and email the talents.

We will be using Dreamweaver for the design and development of the site and the active components. We will also create a database to store the individual profile information and to allow upload of the art work or IT applications. The website will be published to the public and any person can enter the site for viewing. The companies who are interested to hire or contact the talented individuals will have to create accounts to establish direct contact with the individuals.

## Finding a Practical IT Solution- An Open Source Accounting Software

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### ABSTRACT

Companies in the UAE are emerging from small to large; and then it requires a good decision in choosing the right accounting software that considers a challenge for these companies. A better understanding of the role that an open source accounting software plays as a good tool in enhancing high performance in the accounting or finance departments. This research project proposes to study the state of art of accounting software used in the UAE and then demonstrate how an open source accounting software could be a valuable solution for companies. In particular an analysis of having an accounting software is supported by Zayed University and this research will expand to discuss specific areas in terms of exploring more for the reasons of the needs of an accounting software to run a specific business. A survey is conducted for the UAE companies, showing that most of the companies are using the commercial accounting software and they face problems with them where the minority are using the open source accounting software.

While commercial accounting software can be a time saver and help to preserve data, there are some disadvantages of using commercial accounting software. There are two reasons made the previous solution insufficient. Firstly, the system configuration. Every business has unique aspects that may cause difficulties when it tries to tailor a generic accounting software package to its needs. While customization is available for many programs, it may cause downtime and potential inaccuracies if not done correctly. Also, as a business grows, there may be a need to change accounting software packages; this could cause a large disruption, as information must be migrated and new training is needed for personnel. The second one is the cost. Beyond the initial outlay to purchase the software there is the cost of maintenance, customization, training and computer hardware. While time savings may justify the cost, for some businesses it may take years before an accounting software investment pays for itself.

The problem is relevant to the open source accounting software, as a solution for the companies, because it offers several advantages such as reliability, auditability, cost, flexibility and freedom, and support and accountability. Our work will fill this gap by providing two user manuals in a CD for the companies. They have to follow the steps in the first user manual in order to install the WebERP, the chosen open source accounting software, in their systems. It also has a user manual of using the software itself. The same steps can be used for any open source accounting software in case the company wants to change the software without costing them a single dirham.

## Content Management and E-learning an Empirical Study

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### ABSTRACT

Today more and more countries are moving towards information-based societies. The terms ‘globalization’, ‘information and communication technology’ are no longer buzzwords, but are in fact the daily realities changing the way people live, work, and learn. A lot of attention has been devoted to educational systems and electronic learning (“e-learning”) in recent years. This is due to the fact that content and tool support can now be offered at a widely affordable level, both with respect to technical prerequisites and pricing. Currently, these systems are mainly based on client-server or peer-to-peer architectures. However, these architectures suffer from technical drawbacks and the interchange of educational content between servers or peers is still a problem which has not been solved satisfactorily. Content Management is the set of processes and technologies that support the collection, managing, and publishing of information in any form or medium. In recent times this information is typically referred to as content or, to be precise, digital content. Digital content may take the form of text, such as documents, multimedia files, such as audio or video files, or any other file type that follows a content lifecycle which requires management. Gaps appear when executives are asked where they are today and where they hope to be in building their portals and content management capabilities. The objective of our research is to understand and study the concept of content management in e-learning which is referred to as learning content management. We intend identify and understand the advantages of this system through a literature survey. Based on the findings we would highlight and discuss the key issues of the system and propose a better enhanced system.

## A Mobile Shopping Application for Consumer Electronics

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### ABSTRACT

Mobile devices such as the BlackBerry Smartphone are widely used in UAE but mainly for voice and text messaging. Very few applications are available that are customized to the UAE market, such as an application that allows users to use their mobile devices to search for deals on consumer electronic products for example that are available at local hypermarkets. Such an application would save customers time and money as they don't have to drive on congested streets for comparison shopping; they could shop from their homes.

To address this issue, we present the design and development of an end-to-end mobile application that enables customers to use their mobile devices to browse for such products and available offers from several local hypermarkets. The application communicates with a database-driven website that allows companies to register, create accounts and upload their offers. We'll also present a business model for making this idea commercially viable. Figure1 depicts a high level architectural diagram of the proposed solution.



Figure 1: Architectural diagram of the proposed solution

The software technologies used to implement the proposed solution include Apache Web Server, MySQL, and PHP. The mobile application is developed to run on the BlackBerry smartphone, but we plan to make the application available for other mobile devices.

In order to make an application such as the one we have presented here commercially viable, we need to design a business model. Our business model is simple: vendors must pay a fee in order to advertise their offers, and users will be able to browse and search for such offers free of charge. Another source of revenue includes advertising on the website responsible for maintaining the offers database. We also plan to allow customers to advertise second-hands products for sale in which they will be able to do that for free unless they want their products to show on the first page.



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### ABSTRACT

Learning to program is a challenging task that requires hard work and dedication. Learning programming needs many skills like solving problem and some idea of the mathematics. Little computing education beyond how to use Microsoft Office is provided in school and little computer programming is offered in high schools. Some high schools in Abu Dhabi offered Visual Basic as a tool of teaching programming which is the wrong tool for them. Students at the university still struggling with learning how to program especially with Visual Basic so how about the high school student who never program before.

Over the past few years several interactive tools, such as Alice and Scratch, have been developed to ease the learning curve and make it fun and exciting experience. Alice is a 3D programming environment that makes it easy to create an animation to tell a story, play an interactive game, or create a video to share on the web. Scratch is another interactive tool developed at MIT for teaching computer programming concepts to students from K-12 all the way through college. It has a simple drag-and-drop programming interface.

The objective of this project was to investigate how effective these tools are in teaching computer programming concepts and problem solving skills for high school students (Grade 10 and 11) in Abu Dhabi. We have developed hands-on programming scenarios in Scratch and Alice that will be used to test students understanding of programming concepts. Students will be asked to fill-out a survey before and after doing the scenarios in order for us to evaluate the effectiveness of these interactive tools. To this end, we present our study findings from visiting several high schools (public and private) in Abu Dhabi and discuss the computer experiments we have conducted with students from Grade 10 and the same from Grade 11. We discuss the results and present the recommendations for schools in Abu Dhabi and the UAE.

## Robotic Upper Limb Prosthesis – Phase 1

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### ABSTRACT

We are designing and developing a mechatronic prosthetic hand with multiple Degrees Of Freedom (DOF). In collaboration with Hamad Medical Corporation (HMC), the team will carry out a comprehensive analysis of currently available technologies. The team's target is to develop a hand that is: beautiful, easy to wear, and easy to operate. Our hands help us carry out a variety of tasks ranging from the delicate and complex to the strong and forceful. In phase I, the team will be introduced to product development process and consists of foundation work based mainly on hardware design and control systems programming. The ultimate goal of the project would be the development of a functional concept system that would be clinically tested in collaboration with the HMC.

The project is challenging because of its multidisciplinary nature, which necessitates building knowledge and hands on experience in addition to what is generally taught in Mechanical & Electrical Engineering at the undergraduate level. Moreover, it requires the electrical engineering team to understand the biology of the hand in order to advance past phase I

In this project, we are using Simulink to develop the control system of the hand. In addition, SolidWorks is being used to design the mechanical structure of the hand to be manufactured.

Advances in upper limb prosthetics have typically lagged behind their lower limb counterparts. Its easy to identify two main reasons behind this bias: 1) the lower number of upper limb amputations implies a lower market demand for the prostheses, making research and development of next generation prostheses harder to justify; 2) the significantly larger number of actuated degrees of freedom (DOFs) involved in controlling upper extremities requires many more biosignals and advanced control techniques for a biometric control of the prostheses.

In Qatar, most people in need of prosthetic limbs prefer to travel abroad in spite of having a Prosthetic and Orthotic department as part of the government medical facilities. The hospital has difficulty convincing the patients to use their services, which in turn increases treatment costs. There is a lack of awareness and doubt about the services offered; although they are skilled and have specialized apparatus. Additionally, the department specializes in lower limb prosthetics, leaving the field open for the development of sophisticated upper limb prosthetics.

We believe that our project helps in advancing the available technology in Qatar. Two institutions that would probably benefit from this project are the following:

- Qatar Robotic Surgery Center
- Sidra Medical and Research Center

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### ABSTRACT

Our project is about a smart door camera “Smart Gate Cam” .It is a technology related to biometrics specifically face recognition . This technology is basically an intelligent camera attached to an automated door or gate. Face recognition cameras are being widely used around the world but our idea has some level of uniqueness. It will have several functions such as improved face recognition software that will have the ability to scan faces and store them in a database list especially customized by the owners, they will be able to add /delete certain people to allow them access to the house with a record of the time. Another function would be remote lock/unlock feature via PC. Our project will be divided into three parts; technical, database, and network. We are currently researching existing biometric device systems [1-6] in order to design the solution best fit for our needs.

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- [5] Smart Homes, <http://www.smarthome.com>
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## e-Village: Transformation of Virtual Living

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### ABSTRACT

People of different nationalities and ages have been using technologies such as computers and cell phones for the past twenty years. These devices help people to communicate with others in their countries and internationally within seconds. New technologies such as cell phones, smart phones, and GPS now enable humans to manage their lives better.

This poster will examine the use of smart technologies in a village of 50 homes with three bedrooms, two baths and two -car garages on approximately 150 sq. miles to 200 sq. miles. The main reason for choosing a village as such is because it will not cost the government a lot of money to develop the homes and village for the residents to use smart devices. Moreover, the new life style in the UAE needs changes that will help to make life easier. As a girl that work or study this village will help my life in different senses.

With smart technology, this Project will provide a network for the citizens to access the Internet. Village areas and buildings will be connected to the Internet with special software applications. The residents will be able to use this technology with Wi-Fi on their laptops, smart phones and PDAs, or remote control. Residents will be able to control their appliances such as Fire Smart Smoke & Fire Alarm, Video Door Intercom, System Line Multi Room Entertainment, and TV Companion Touch screen, kitchens of the future, refrigerators, microwave, oven, and microwave, as well as the lighting, and the fire and smoke alarms. Outside their homes, residents will be able to check the traffic conditions and the timing of the watering systems for lawns, as well as connect to fire stations and hospitals in case of a fire or an emergency. Moreover, they will also be able to find the locations of specific places such as restaurants, hospitals and schools by using GPS maps. These maps will be provided on their PDAs, and these will be updated as needed. Each owners of these services have to pay certain fees for using e-services.

We will use OPUS, a software that can be easily implemented in any smart devices and any regular laptop.. The protocol we will used is TCP/IT , and the wire we will be used in the village is CAT 6. Finally, we need to consider the elderly residents of the village. They can get ill easily, and therefore some smart facilities will enable them to communicate immediately with hospitals for emergencies by turning on a switch in their homes. In addition, in the case of a robbery, they will be able to inform the police using the same switch. Each house will have a unique number which will inform the police about the location of the house. In the case of fire, the residents will not need to use this switch, as the fire alarm will already be connected to the fire station. The next phase of this project is to implement in the near future this concept in the U.A.E.

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### ABSTRACT

The presented project is (Campus Souq 2010) which is planned to be placed in Abu Dhabi Women's College (ADWC) website. The system will be developed by team of two students as a gradation project. This name was chose because campus refers to the college and souq means market where products are placed.

Nowadays more people become comfortable with using internet instead of using usual advertising resources like ads and posters so having a web presence will make better trade sense. This may also encourage other students to have their own online businesses. This website will help cut advertising and marketing costs and it's more efficient and less expensive than traditional advertising. By applying an online ordering system we will get rid of manual paper work and telephone order taking.

This free online market place will have a verity of features. Students will be able to buy offered items as well as submitting items for sale. The system will have many item categories. These categories include Games and Toys, Health and Beauty, Rides, Books, Computer and Software, Electronics, Jewelry, Fashion and others. Based on our initial market analysis we anticipate many items under each category, and we will be open to add other categories as the need arises.

The purpose of conducting this project is to have a vital web presence in "e-business environment" and encourage entrepreneurial activities among ADWC students. The implementation of this project will have positive outcomes such as: improve communications between students and help in sharing information and knowledge. Furthermore it will assist in the reductions of inventory, improve customer service, motivate students to get involved with online trade environments, increase their communication and business skills, and help them learn more about online activities.

Students will be able to access the system with the same ID number and password that they have for the college. Each student will be able to submit an item to be sold under available categories. The website will allow students to create an account, provide information about the items including images and videos, price, and their contact information. ADWC students will be able to buy and sell items. They will also be able to evaluate transaction from a buyer or seller view point. The system is designed for students only at this time. However, we may expand it after months of a positive experience. Students will be able to submit comments about their e-shopping experience. We are planning to use these comments for promoting the website and make changes.

The project is online based and will be designed using HTML and Plug-ins. They are chosen to develop the system interfaces (web pages) that use web services, controls and data. It's critical to have a good database to store all the needed information.

## FYONKATINO GIFT SHOP

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### ABSTRACT

Fyonkatino is an online gift shop which provides services and cretin types of products such as, boxes, albums, cards, etc. The shop is an Emirati ladies business which depends on special creativity. The business started in November 2009 and the creation of this shop was inspired by ideas we encountered throughout our previous education in HCT. The shop is currently online where the customers can see the products and submit orders. We can also schedule our representatives to present samples of items at the customer's choice of location within Abu Dhabi. We market our business by sending messages (SMS & Emails) to friends and family, BBMBC (Blackberry Messenger Broad Cast), advertising through other websites such as UAEWOMEN.NET, Facebook.com, Twitter.com and through other magazines. Even though our target group is Emirati ladies, we've had male customers as well. For a new business the growth is acceptable, and with the proposed improvement of the internet use for the business, we are looking forward to a more rapid increase in the order numbers.

Fyonkatino already has a website that contains our products and services along with price details. This project's goal is to update the web pages design, add language choice and create an online ordering system to make purchasing easier for the customers. Also, we will create a database which will be connected to the website to store all the data and customers information. In addition, we will provide the price tags and the product's information along with the sample picture in the web page instead of downloading the PDF catalogue price list of each category. Indeed, we've got an email address for the website which is configured in our blackberries so that we can response immediately to the customer's emails and/or receive any suggestions or opinion regards the products and services. The three business owners will have the authorization of using the whole system and will have unlimited access to it.

Our future plans is to open a shop for our business but for now we want to join exhibition in different places in the UAE to let people know about our business and also to be able to give out our business cards, flyers and free samples to ladies who can't access the internet. Also so they can see our products and its quality. In addition to these activities, we look for a public and well known websites to advertise our business and promote our new products and services.

## Visualization of Pore Network in Reservoir Rocks Using 3D Modeling of Computed Tomography Scans

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### ABSTRACT

This presentation aims to show the capabilities of 3D visualization in helping students understand the structure of pore networks in rocks. In the Middle East, the most common reservoir systems are carbonates-limestone and dolomites. Carbonate systems have very complex pore systems that change during drilling, completion, stimulation and production. A lot of imagination goes into visualizing these pore networks and what effects stimulation (for example acidizing) can have on the structure of the networks.

Computed Tomography (CT) scanners are used in this project to scan the inside of the rocks and create images of the pore spaces within a rock or core sample. The 3D visualization of the CT scans provides valuable insight into the complex pore networks. Available computer software provides the capabilities of converting the raw CT scan data into an interactive 3D image of the rock that can be manipulated to give the desired images. These images can include certain slices of the rock from a certain plane, an image of the rock that can be rotated, highlight the pore spaces in each slice or even throughout the sample and most importantly it can show the pore system of the rock sample and can visualize the thickness of each pore.

This project is ongoing in parallel with other research projects and the results obtained from this result will help facilitate the success of the other projects. One of these projects is a CO<sub>2</sub> sequestration project in which CO<sub>2</sub> interacts heavily with the carbonate rocks and visualizing the effects of this interaction will facilitate better solutions to any problems that arise. Another project is the effect of acid jetting on the pore network in the rocks where CT scans will be taken before and after the interaction of the rock with acid and the change in pore network structure can be visualized to enhance the understanding of how acid jetting affects rocks.

## 3D Visualization and Animation of Computer Simulation Results for Water-Oil Displacements in Sub-Surface Reservoirs

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### ABSTRACT

3D immersive visualization can be a very powerful tool in improving the understanding of fluid displacement in complex reservoir systems. This project stems from a capstone design project completed by the senior students of Texas A&M University at Qatar (TAMUQ). Students were given data for an oilfield and asked to develop a computer based geological model and a simulation model that is representative of the reservoir. This simulation model was then calibrated to match the historical production data of the field for last forty years and the model was optimized to improve production.

The final calibrated simulation model was displayed in the immersive visualization facility (CAVE) that was recently installed in TAMUQ in an interactive 3D image. Fluid displacement was visualized and its time dependent behavior was animated as a video clip using the 3D results function in the simulation software. The 3D visualization helps students and professionals get an insight and understanding of in fluid displacement processes in a reservoir which one can never visit since it is thousands of meters underground. After optimizing, one would expect the fluid displacement of the reservoir to change. This theory can be verified visually using the CAVE.

The 3D visualization capabilities allow Engineers to rely less on intuitive decisions and rely more on actually visualizing results and in this case fluid displacement for better decisions.



## Shopper's Avenue: Revolutionizing eCommerce

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### ABSTRACT

eCommerce systems are defined as commercially purposive systems or processes in which search, assessment and transactions and post- transaction interactions are enabled and supported by information and communications technologies. In the past decade, E-Commerce concept and technology has evolved a commercial revolution and has witnessed numerous successful cases such as Amazon.com, eBay.com, Yahoo.com and many others. eCommerce has also been one of the hot research topic among academicians and researchers worldwide. Newer eCommerce business models such as eGovernment, eLearning, eCommunity and eMarketplace have arised in recent times.

This project has been inspired by the eCommerce business model – eMarketplace. Marketplaces allow suppliers and buyers to meet at a certain place in order to communicate and transact. However, owing to the evolution of telecommunication networks and the Internet, this traditional meeting point has now morphed into a virtual meeting point called as eMarketplace. Shoppers Avenue is a project which aims to create a digital ecosystem. A digital ecosystem is a distributed adaptive open socio-technological system, enabling social interaction with an intuitive design and interface, promoting trade in an all-in-one commercial hub. This means that apart from the traditional eCommerce medium of transactions and product delivery, this system encourages customer-to-customer instant interaction and product discussions.

There are three main factors which provide the inspiration for this proposed project work. Firstly, not many existing eCommerce websites provide a medium for enabling discussions between their consumers. Encouraging discussions amongst consumers will elevate the levels of customer satisfaction and also boost awareness among the consumers. Secondly, eCommerce is considered as convenience shopping and is usually an option chosen by those who do not have much time for traditional commerce. Thus, it is important to streamline the time-consuming website navigation and purchase process which is almost typical to any e commerce environment. Thirdly, an intuitive design and interface that is user friendly is a must for creating an all-new experience to shopping. The result of combining the three factors (namely social interaction, streamlining processes and intuitive approach to design and interface) is what outlines the purpose of the Shoppers Avenue. Shoppers Avenue is a proposed collective hub for various brands that club their catalogues into the system. This way, shoppers can find the answers to all their product requirements under a common eMarketplace. The Digital ecosystem to be created by Shoppers Avenue using tools such as Adobe Integrated Run Time 2.0 SDK, Adobe Flash Builder, PhP and MySQL and would aim to perform various functions such as commercial transactions and social interaction with a simple yet intuitive interface and design. Privacy is an important aspect of eCommerce, thus Shopper's Avenue would enable the shoppers to appear "invisible" or "offline" to other shoppers. The system could possibly be implemented in various platforms like conventional desktop, multi-touch enabled environment, advertisement kiosks etc.

## iMarket: An Intelligent Shopping Assistant

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### ABSTRACT

iMarket is a mobile-based intelligent shopping assistant, that improves customers shopping experience in supermarkets through the use of their mobile phones. iMarket is a website that provides customers with many services from creating and managing multiple shopping lists, managing and sharing product recipes, retrieving up-to-date product's information, finding products in a supermarket, personalize recommendations on products and promotions, use adapted Shopping list for saving money, perform automatic checkout and payment. It can be accessed from any web-enabled mobile phone or PC.

iMarket's goal is to grasp the opportunity of utilizing modern technologies such as RFID (Radio frequency identification) embedded in the next generation of mobile phones, along with Business Intelligence (BI) techniques to help improve the shopping experience as well as marketing. RFID is a technology similar in theory to bar code identification. It transmits the product's identity, in the form of a unique serial number, wirelessly using radio waves.

The recommendation system in iMarket, provides predictions of customers shopping behavior by performing analysis on their demographic features and purchase history. Recommendation is achieved by using K-Means Clustering algorithm, K-Nearest Neighbor Classification algorithm, and Market Basket Analysis algorithm. The adaption method, implemented using Constraint Satisfaction Problem intelligent algorithm, helps customers save money. This is done by replacing the products in their grocery lists with other products from different manufacturers with lower prices. Recommendation, adaption and optimization are what make iMarket "intelligent".

As a result, customers, supermarkets, and the environment all benefit from using the iMarket system. For supermarkets, the system helps to understand customers' needs which will attract more customers. It also increases products' sales using targeted recommendations and promotions. It can reduce supermarket's expenses by limiting the number of cashiers (human resources), build long term relationship with customers and provide a fast checkout process to retain current customers. As for customers, iMarket reduces the transaction cost, search cost and cognitive energy, provides customers with customized promotions, suggest personalized recommendations on products according to their demographic features and purchasing behavior and help customers save money by monitoring and controlling their budget and alerting them when exceeding their threshold. It also provides customers with an alternative grocery list which contains their needs but with a lower price. In addition, iMarket helps reducing time wasted in long queues, by implementing auto-checkout feature and prepayment system. iMarket is a "green" device, since it is environment-friendly and creates a paperless environment eliminating the use of flayers and receipts.

While preserving the tradition of shopping, adding the flavor of technology would create the best convenient shopping experience. iMarket was developed with this concept in mind. Overall, the results indicate that a connection of BI and RFID has powerful business potential that goes well beyond operational improvements. The benefits and of course costs of a BI Infrastructure for data integration, refinement, and analysis should therefore not be neglected in a cost-benefit evaluation for RFID.

## Simulation of Speed Control System

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### ABSTRACT

This paper deals with the simulation of Speed Control System. The System been used is a DC servomotor that been simulated using MATLAB with Simulink tool box. The paper is first deal with the servomotor in an open loop (Figure 1) environment so that its speed response will used to measure the improvement of the controllers that will provide.

The paper will then consider different type of control systems, will start with normal Proportional plus Integral plus Derivative controller (PID) as shown in figure 2. This type of controller considers to be the simplest type of controller but it will need careful selection of its parameters (Proportional gain, Integral gain, and Derivative gain). The paper will consider two more type of controllers, Model Reference Adaptive Controller (MRAC) and PID with approximate derivative.

The paper will look into each of the controller that been used to make a comparison study of these type of controllers. The study will include the measurements of rise time, peak overshoot, settling time and steady state error. From the open loop response of the servomotor, it's been found that the rise time of the speed is slow also the steady state error is big. From this analysis of the open loop response, the paper will look at the type controller that will provide faster rise time with minimum overshoot also that will give near zero steady state error.

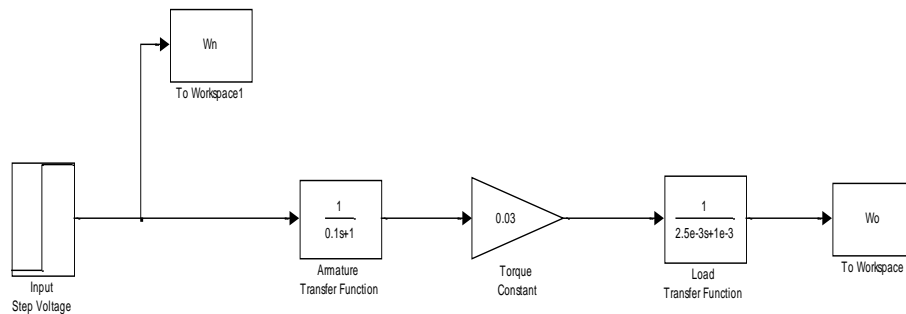


Figure (1)

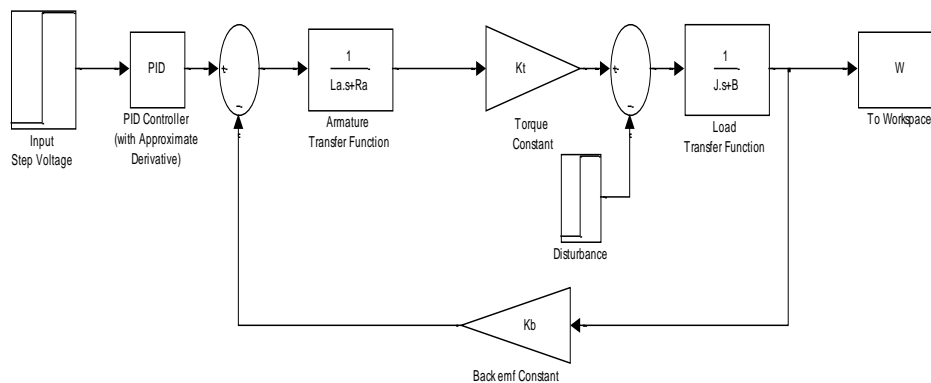


Figure (2)

## Drive Safe: Car Driver Safety System

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### ABSTRACT

Yearly, over 1 million people die on the world's roads and between 20 and 50 million suffer non-fatal injuries. Road traffic accidents (RTA) are the leading cause of death among young people. In the UAE and despite the huge government investments in building world class networks of roads and the enforcement of the new traffic law, during the last few years in the UAE the rate of RTA has increased to an alarming level. The world statistics shows that one of the main reasons for car accidents is drink and drives and sleeps deprivation resulting in serious car accidents.

This project introduces a car safety system to help reduce the number of car accidents due to drink and drive or sleep deprivation. In the case of drink and drive, the system is equipped with and sensitive alcohol sensor with a fast response time. The sensor provides an analog signal relevant to the amount of alcohol in the proximity. The analog signal is amplified and digitized using an 8 bit A/D converter with 100 $\mu$ s response time. The digitized signal provides an accurate level of the amount of alcohol in the air. If the car is in standstill and the level of alcohol exceeds the predefined threshold, the car ignition is disabled. However, if the detection occurs while the driver is already in motion, the engine is gradually slowed down until it stops and at the same time the car horn and the light will flash to alarm neighboring cars. The other part of the project is focused on sleep deprivation. To detect sleepy drivers the system incorporates a camera and a face recognition system. The face recognition focuses on the eye movement and detects if a person has fell asleep for short period of time. The eye detection system is image based detection technique.

The software relies on face and eye detection followed by eye feature detection. The software used in this project is based on Track eye and has been modified for this application. In this project, when the driver eyes are closed for a short period of time, typically 5 seconds. The car is gradually slowed down until complete stop while sounding the car horn and flashing lights for passing cars to stay vigilant of the slowing car. To slow the car, a pulse width modulation (PWM) scheme is used to control the speed of a DC motor which controls the speed of the accelerator. The PWM is selected to provide accurate and fine control over the car speed.

## Security Video Game for Children

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### ABSTRACT

This project consists of the design and implementation of a videogame software that teaches security concepts for children. As children are very interested in playing video games online, in this project we are designing a security video game to educate and aware the children about different IT security issues such as firewall, viruses, hacking, and encryption. Before starting designing the game, we did a search to find the existed video games with a similar idea. We found some games [1, 2, 3], but they are complicated and not suitable for children. These games are only suitable for professionals who are experienced in security. It only serves as reinforcement.

We are focusing on Flash software to design the game and reviewing flash tutorials [4, 5, 6]. It will include sounds and short clips that will get children's attention. We found flash to be the most suitable environment due to the environment for producing high quality graphics and the suitability for deployment on the web as well as mobile devices.

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## Application and Importance of Free Open Source Software in the Current Environment of UAE Corporate Sector: An Empirical Investigation

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### ABSTRACT

Free Open Source Software (F/OSS) products have rapidly acquired a notable importance in the last few years among professionals and business institutions all over the world. F/OSS projects are hosted for free of charge on virtual platforms (also called as Online Project Communities) such as [www.SourceForge.net](http://www.SourceForge.net), [www.FreshMeat.net](http://www.FreshMeat.net) and [www.savannah.gnu.org](http://www.savannah.gnu.org). Open Source developers and debuggers join these Online Project Communities and contribute their unique ideas, software codes and provide creative solutions to software bugs in online projects. The rights of such collaboratively developed software are normally reserved for copyright holders and source are provided under a license that meets specific standard definition of Open Source. This allows the user to use, modify, improve and redistribute the software. Some well known examples of open source products are the Apache HTTP Server, Mozilla Firefox and GNU/Linux. Research on open source software has been conducted in many fields to analyze the use of the software in various firms; to scrutinize the reasons for its popularity among the masses; to find what motivates the developers to contribute to open source freely. Many research studies have found that these software are reliable, cost effective, free, easily available and extremely flexible to use. Some researchers have tried to determine the acceptance of open source software as a replacement of commercial software.

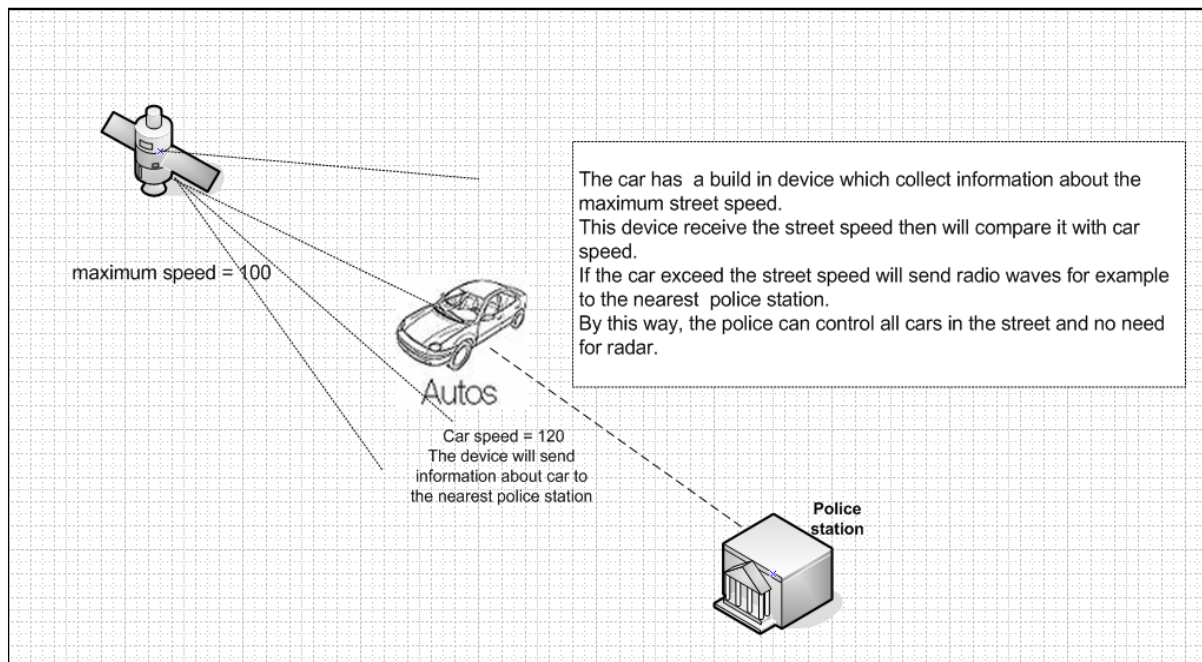
This research aims to analyze the acceptance of Free Open Source Software (F/OSS) used by leading firms in the United Arab Emirates (UAE). Data will be collected from UAE based organizations to identify the factors that promote the use of such software as well as those factors that inhibit their use in these organizations. Similar kind of studies would be considered as a secondary data source in order to design the data collection instrument. This instrument will be tested prior to the final survey. Validated instrument will be used to collect information from organizations who are currently involved in using F/OSS Software. This data would be analyzed statistically and would be compared to existing literature. The research findings could provide valuable information for Information Systems managers to evaluate their organizational Information Systems Strategy with respect to Open Source implementation. This research would be conducted in UAE and could be expanded in other regions of the world at a later stage.

## Car Radar

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### ABSTRACT

This project is about a Car Radar System. The idea of Car Radar is new and have many advantages which will serve drivers and the police field. The most important goal for this device is to ensure safety in the street. The idea is that the car has a build in device with a screen. The function of this device is to collect information about the maximum street speed from a satellite. When the car enters the street, the implemented device will receive the street speed that will appear on the device screen, and the device will compare it with the speed of the car. If the car speed exceeds the maximum speed allowed, the device alarm will ring, informing the driver to reduce the car speed. If after 5 minutes the driver continues over the speed limit, the device will send radio waves to the nearest police station. With this way, the police can control all cars in the street and no need for radars in the street. The proposal is to study existing Car radar system and implement a prototype that will perform the monitoring.



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### ABSTRACT

Software-as-a-Service (SaaS) is a new model for distributing applications online instead of buying software as a product on a CD. The software may be hosted in a server where users can access business services through a regular browser or a mobile device. Users pay subscription fees or usage fees (pay per use) instead of buying the whole thing and this is especially attractive for software that is seldom used by users. On the other hand, using such a software model raises questions about the security and privacy of users' information which may be hosted on a remote server as well.

The objective of this project is to investigate the use of SaaS in the UAE and provide answers to the following questions: how popular is SaaS in the UAE? What are the users' perceptions of SaaS? What are the security implications of SaaS? What types of applications are suitable for SaaS?

In addition, the project aims to investigate how SaaS can be used as a software distribution model for dealing with software piracy which is the illegal installation of copyrighted software on more computers than authorized under the terms of the software license agreement. To understand how SaaS can be used to deal with software piracy, consider the following: when a user subscribes to a SaaS service, the subscription is valid for a certain period of time and it is possible that only one user at a time can use that service from a specific machine. When the subscription expires, the service will no longer be available for that user, and if a user provides their account information to another user then they risk not being able to use the service at the same time and more importantly they'd be allowing other users to see some confidential information. In this part of the project we will present a SaaS-based solution for dealing with software piracy.

SaaS, however, is not suitable for all types of applications. For example, it may not be suitable for highly interactive desktop games or any other applications or the network may have a performance implication on the running of the application. We plan to categorize the domains of applications where the SaaS model can be effective.



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### ABSTRACT

To the best of our knowledge, there is almost no complete study on using IT standards in the UAE. The project focuses more specifically on the IT Security techniques. Emirates Authority for Standardization and Metrology (ESMA) seeks to focus its resources on IT field. IT Security techniques are one of them. In addition, Zayed University doesn't have information about using IT standards in its document "Standardisation & Classification in the UAE." This proposal is a unique project among other IT standards used in the UAE since it discusses the standards from the IT perspective in the context of UAE.

To obtain any information about standards in the UAE, organizations should reach out to ESMA offices in Abu Dhabi and Dubai (<http://www.esma.ae/lang-en>). Therefore, we have contacted and visited ESMA in Abu Dhabi. Eng. Muhsin Al-Asim, who is from the Information Center in ESMA, has told us that they don't have ISO standards in the IT field and he shows a great interest in order to help them. Although, ISO standards in IT field could be already implemented by many organizations and taught by many universities in the UAE, this kind of data must be collected and given to ESMA so that they officially adapt these standards in the UAE. For example, we have visited many organizations' websites and one of them is Abu Dhabi Systems & Information Centre (ADSIC): <http://adsic.abudhabi.ae/Sites/ADSIC/Navigation/EN/root.html>. ADSIC's Information Security Program did put together policies, procedures and security standards. However, there is a gap between ESMA and the companies as well as there is another gap between the academia and the industry.

Standards play an important role in our lives as they ensure a high level of quality, safety, reliability, and efficiency to the products and the services provided by the organizations in the UAE. With the high percentage of failure of any IT project, implementing IT standards is the best way to reduce failure possibility and raise the level of quality. Our project's objectives can be summarized as following:

1. Increase freedom of choice of IT Security techniques
2. Increase growth of using ISO standards in IT field
3. Reduce the gap between ESMA and the companies (the industry sector)
4. Reduce the gap between ESMA and the universities (the academic sector)
5. Update the document "Standardisation & Classification in the UAE" that Zayed University had and published in its website (<http://www.zu.ac.ae/library/html/UAEInfo/documents/UAEStandards.pdf>)

In order to achieve the above objectives, we may contact at least 70 organizations and investigate if they are using standards in their IT departments for securing the existing data, the advantages and disadvantages, how long it takes them to be certified, if they are not using any standards then what are the policies and procedures that they follow to assure the security in their organizations. We will also develop a website to publish the research results and it is to be added to ESMA website since they seek this type of information. This web application will have an access to a backend database to categorize the results and organize the findings. In future, any organization in the UAE can have an access to it. It will serve as a central service and it will be a growing database that keeps track of using the standards in the UAE. The expected outcomes are as following:

1. Updated version for "Standardisation & Classification in the UAE" documentation at ZU.
2. Full solution documentation and a web application to be given to ESMA.
3. At least one workshop and one booth will be conducted to promote the ISO standards for IT Security techniques. The workshop is to be held in Zayed University and the booth is in European, Mediterranean & Middle Eastern Conference on Information Systems (EMCIS2010). The website is: <http://www.iseing.org/emcis/>

## Smart Home Automation

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### ABSTRACT

Information communication technology (ICT) has experienced exceptional growth over the past decade and now touches nearly every aspect of humans' daily lives. This growth has permitted the abundance of such technology at affordable and reasonable costs, allowing it to be integrated in the consumer industry products and services. The ability to integrate various components of ICT is enabling many services and applications. An area that started to benefit from ICT sophisticated products is smart homes. Systems that support the realization of the smart home concept enable automation of various home applications.

This paper presents the design and implementation of a smart home. The smart home system integrates ZigBee wireless communication technology, various sensors, and an intelligent application program. ZigBee technology was selected due to its many desirable characteristics which include low power operational requirements, support for large networks, simple association process, and reasonable data rates.

The smart home system allows the household to intelligently interact with the surrounding environment including monitoring and control of various functionalities. Among the wide range of functionalities supported by the system are ambient control, such as temperature and humidity, and security. Temperatures settings, for example, in various quarters of the home adapt to the profile of an individual and hence heating or air conditioning parameters get adjusted autonomously. The security system detects intruders and automatically alerts the household as well as police. The overall smart home system has a well structured modular design. It enables the addition of any device that requires monitoring/control provided that it has an intelligent interface. The interaction with the home environment can be done while inside the home or from a remote location anywhere around the world provided that internet or GSM mobile communication connectivity is available. Remote access may be acquired via the internet using a computer interface that would allow the user to monitor the status and control the behavior of the smart home system. Otherwise remote access may be acquired via GSM mobile by sending an SMS to a certain device at home to enquire about its status or to initiate a certain control action.

In addition to the above, the smart home system supports some aspects of independent living. This part of the system is targeted at elderly persons who would like to live in their own homes but have medical conditions that require monitoring. The prototype system will have some sensors that monitor certain health parameters. The data acquired by the sensors gets sent to a computer server through the ZigBee network. The program on the server performs the required analysis on the data and generates alerts should the sensors' readings indicate abnormal medical condition/s. The alerts get sent as SMS (short message service) through the GSM mobile communication network to the medical health professional looking after the elderly personal as well as any other designated persons. The monitoring program also has the ability to build a pattern of the daily living of the elderly person. This will also be used to take a decision on the well being of that elderly person.

## Blind Assistant Navigation System

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### ABSTRACT

Blindness or visual impairment is a condition that affects many persons around the world. This condition leads to the loss of the precious sense of vision to such a degree that makes the concerned person handicapped due to the need for guidance or assistance and in some cases special treatment. Guidance by other humans, with good vision, or specially trained dogs is obvious solutions to help blind persons find their way around both the house as well as outside. However, dependence on other humans is highly demanding and constraining in many ways. Trained dogs are very helpful however they have limitations that include inability to interpret what the blind persons really wants and identifying objects.

Some technological solutions have been introduced fairly recently. Many of those solutions rely on GPS (global positioning system) to identify the position and orientation of the blind person. While such systems are suitable for outdoor navigation, due to the need for line of sight access to satellites, they still need additional components to improve on the resolution and proximity detection to prevent collision. The use of robot-dog is another technological solution proposed by a number of researchers. The robot-dog is an attempt to replace the real dog. It also depends on GPS and object avoidance technology. These solutions are useful, however they can only be used outdoor and miss interpretation of requests as well as accuracy issues may have serious consequences on the well being of the user.

This paper describes the integration of wireless communication technologies, ubiquitous computing, robotic path planning, and some conventional computer programming techniques to build a compact portable system that will enable a blind or visually impaired person to navigate independently inside the home. The system will be able to precisely guide the blind person to the desired location while avoiding any obstacle along the way. It is envisaged that the prototype system will have a portable device that the blind person will wear and all interaction with the system will be through audio commands and responses.

An optimal path finding technique will be developed to help the user reach a particular target within the home (e.g. kitchen) given the present location. The adaptive system presented in the paper will continuously monitor the location of the user, even as that user is on the move, and update the path to the target in order to take into account wrong moves by the user. The interface between the user and the system will be through voice synthesis. The user will literally says the name of desired item or zone in the house. Then the system will conduct the guidance process. The resultant output will be a set of speech commands to direct the user until the desired location is reached.

## A Mobile Application for Car Shoppers

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### ABSTRACT

Mobile devices are widely used in the UAE and in fact the penetration rate (around 200%) of such devices is among the highest in the world. However, few mobile applications exist that have been specifically developed for the local market. In this project, we present our experience in designing and developing a mobile business application created for the local market. To understand the benefit of using our application, consider the task of shopping for a new car in Abu Dhabi. The streets are congested with cars and it is very time consuming to visit showrooms to find out about offers. With our application, customers will be able to search for offers from the comforts of their homes.

We have designed and implemented an end-to-end mobile application that enables customers to search for offers on cars at various local showrooms. The application consists of a database-driven website that allows vendors to register, create account, login, and upload their offers. Users of mobile devices would then be able to search for offers at anytime and anywhere. Figure 1 depicts an architectural diagram of the proposed solution.

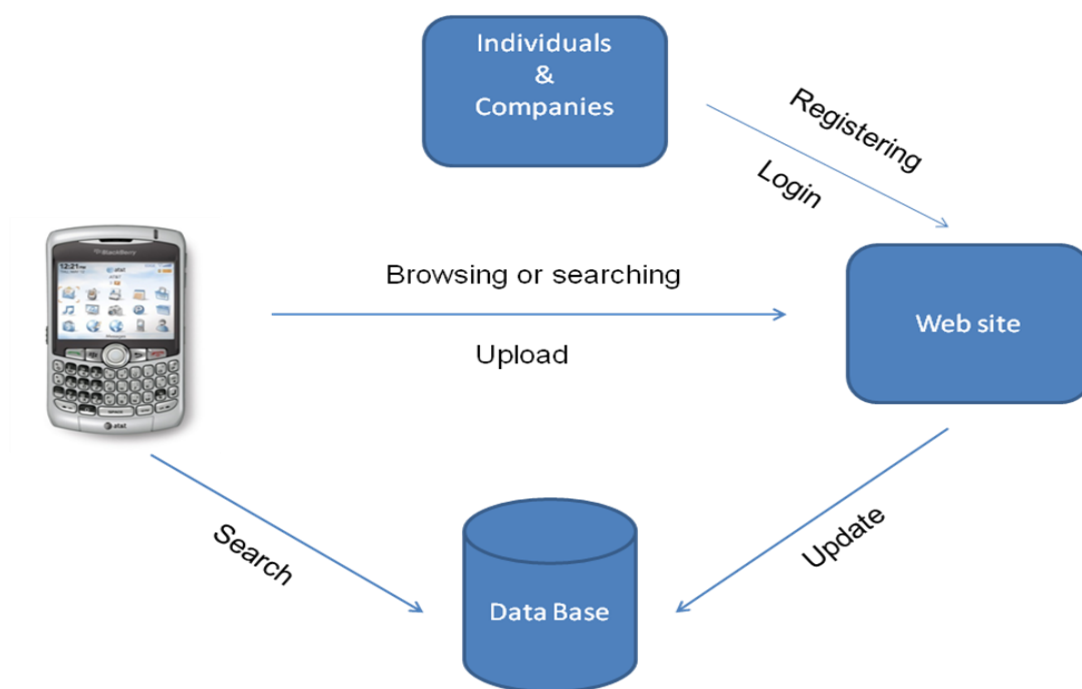


Figure 1: Architectural diagram

The technologies used to realize this architecture include the Apache Web Server, MySQL, and PHP on the server-side. The mobile application has been developed to run on the BlackBerry smartphone but we hope to be able to have it available on any mobile devices with a browser.

To make this project a commercially viable solution, we have proposed a business model whereby vendors need to pay a fee to advertise their offers, but customers will be able to search for offers free of charge.

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### ABSTRACT

Visualization is the transformation of data into pictures. Today's computers and scientific instruments produce a deluge of data. Without visualization this data would sit unseen on various storage media. Scientific 3D Visualization offers the ability to extract important information hidden within the data by taking advantage of the natural ability of the human visual system and the brain to aid our understanding.

One of the recent applications of scientific visualization is the Virtual Prototyping (VP). Virtual Prototyping consists of building a digital model that looks and behaves similar to the real product. In Mechanical Engineering, it is an invaluable aspect of information technology that permits analyst to examine, manipulate, and test the machine and motion designs without the need to build the expensive physical mock-ups.

In this work, we are devolving a 3D Stereoscopic computer model to visualize and evaluate prototypes of a sorting machine with a six degree-of-freedom robot arm. The 3D visualization part is performed on the high performance 3d Immersive Visualization facility installed at Texas A&M University at Qatar.

Several aspects are emphasized in this work, among them are:

1. Data visualization: such as strain and temperature in different machine components.
2. Motion profile validation and optimization using 3D CAD models. This will also allow checking the trajectory of selected points as the assembly moves on.
3. Assessment of the control system logic without the risk of damaging the physical machine.
4. Evaluation of security interlocks for the overall machine operation.

## Solar Powered Autonomous Explorer

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### ABSTRACT

The demand for wireless portable devices such as mobile phones and laptop computers keeps ever increasing. An important aspect of the portability is the availability of a power source. At present the power source is normally the battery, which supplies the device with the necessary energy. A huge research and development effort continues to be invested in developing efficient batteries that can be used in portable consumer electronic devices as well as other applications such electric cars and robots. In virtually all these applications the source of energy required to charge the batteries is basically the main electrical power in the home or special industrial charging station. This process has a guaranteed steady source of power and hence the design of the embedded system that monitors the charging task can be simplified with this regard.

This paper presents the design and implementation of a complete solar powered autonomous explorer. The robotic system is expected to monitor various parameters of interest in a remote location using its onboard set of sensors and communicate using appropriate wireless technology with the monitoring and control base station. The autonomous machine has an intelligent embedded computing system that enables it to function autonomously. The robotic explorer system uses only solar energy collected through a number of panels to charge its onboard batteries.

Realization of the system has a number of challenges that include intelligent charging of the batteries, optimal management of the available power, and integration of the sensors as well as the wireless communication system. This is in addition to the design issues at the base station which include a data logging system, a user interface, and a communication module to send command and control signals to the remote explorer.

The embedded computing system onboard the solar powered explorer has a sophisticated algorithm for intelligent power management control which can handle both charging and consumption. The charging part uses maximum point power tracking (MPPT) as the basis to connect the solar array to the batteries. This approach is vital as the power extracted from the solar panels does not solely depend on the rays of light that hit the panels. While the other part uses a control power consumption algorithm to manage the power utilization of the system in order to prolong the battery life and the system operational period. This necessitates switching on and off various functions depending on their priority and the amount of available power. The design of the autonomous explorer is highly modular. This enables the addition of various sensors and functionality depending on the intended application. The robotic explorer is also capable of communication with the base station through a variety of technologies depending on the distance from the base, availability of coverage, and power.

## Web-Based System for Academic Program Assessment

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### ABSTRACT

In the context of higher education, it is becoming increasingly important – both on a national and international level – for tertiary institutions to implement and maintain formal, transparent and credible systems of quality assurance. Evaluation forms an integral part of the quality assurance processes, particularly in relation to academic program effectiveness.

In attempting to improve their academic programs, a major consideration for universities is the formulation and adoption of best-practice policies for the efficient execution of internal evaluation processes. Program assessment includes both direct and indirect measurements: Direct measures assesses student behavior and/or educational products in terms of learning outcomes; the evaluation of student essays, presentations, projects, course grades and tests are all examples of direct measures. Indirect measures evaluate phenomena which imply how well learning outcomes have been achieved, examples of such are surveys soliciting student feedback concerning academic program quality and performance appraisals of graduates by their employers. Surveys, exit interviews and focus groups that focus on opinion are examples of indirect measures.

This project reports on the prototypical implementation of an online system to support data collection and analysis of direct and indirect measures for academic programs with a view to improving the decision-making processes of in relation to academic programs. The online system's purpose is, essentially, a strategic management tool, allowing the user to specify and evaluate certain program objectives; for example, the program is designed to accept data (such as course-level grades) to verify if a particular academic module has satisfied the following program-level outcome: "60 % of students will meet 70 % of course learning outcomes (CLOs) for all courses offered Semester 1". In this particular scenario, the online system would measure the extent to which the program-level outcome has been achieved by processing input representing (i) student for every individual assignment for a particular course (ii) the overall allocation/weighting of course-work and exam marks for a given CLO. When provided with the aforementioned data, the system will calculate the performance, CLO-wise, for all students taking the specified course. Moreover, the system will produce a program effectiveness report – based on the direct and indirect measurements – by comparing the stated program-level objective with actual student performance.

In terms of system implementation, the online system was developed using the following third-party software: MS SQL server as database and ASP.net. In order to ensure system reliability, the following quality control procedures were used: unit testing, system testing, and acceptance testing. The initial feedback from academic and administrative staff is promising; the next stage of testing will include other categories of user. It is also envisaged that this online program assessment system will be integrated with other systems, such as the registration/admissions system, which contain valuable data for the evaluation of program effectiveness.

## Cloud Computing Security

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### ABSTRACT

Cloud Computing is a Service Oriented Architecture (SOA), It is designed on the concept of sharing computer resources. By providing these resources on the internet, allowing the users to utilize a lot of services without the need to install them on his servers, or without the need to possess a server in the first place. This allows the users to use of these services with standard work stations, even if the service that he is acquiring requires much stronger and advanced hardware.

Cloud Computing can provide many service applications, such as peer-to-peer, web applications, security as a service, software as a service and storage. Also Cloud Computing can provide hardware as a service, Infrastructure as a service, and platform as a service.

This project focuses on securing this architecture as it is a new trend and there is not sufficient research works that has been done in this area. Cloud Computing is a very large concept and could not be covered in cloud computing security research. Thus, this project is based on securing web mail security in the Cloud Computing environment that ensures Confidentiality, Integrity, and Availability (CIA) of this architecture. Moreover, end users' data stored in the service provider's data centers rather than storing it on user computer. This will make users concerned about their security and privacy.

There are two main adversaries who are interested in attacking the web mail cloud and they are: Economically Motivated Adversary by this I mean any other party who is interested in the information stored in the Cloud, either interested in getting them, or modifying them, or denying the owner to access them. Securing the information from this adversary lies mainly on the cloud provider.

Cloud Service Provider (CSP) where the provider can be self-interested, so as a provider he can access the customer's confidential information, for his own profit. And in my project I will try to find a solution for this problem and try to protect the information in the cloud from this particular adversary.

The aim of this project is to develop a novel and practical solution for the security and privacy issues of the cloud computing via studying and investigating existing methods with the symmetric and asymmetric key algorithms and we would like to propose a hybrid system that uses both of these algorithms.

The project designed to encrypt the data stored in the email sever. For example, the emails are saved on the cloud provider's server. In this case the CSP will not be able to access the data even though it's on his server, even if he tried all what he will see is an encrypted message. As I chose to work on Linux environment, the project will be limited by that environment, and use only the tools that are supported by it.

This project is also unique in its field where the cloud computing is an emerging technology and there exists only few researches related to the exact topic. Thus, I would like to demonstrate and implement a novel email security system that could protect the data from the cloud service provider.



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### ABSTRACT

Information Technology (IT) plays a significant role in today's Higher Education System, with the emergence of new technologies; every education system is implementing IT as a tool to improve services they offer. IT is amazing which is dramatically affecting virtually every department in the education system and in one form or another, has had a profound effect on how Education Services are designed and delivered. Manipal University (MU), Dubai is one among the universities in U.A.E offering varied IT services like Internet, email, eLearning, library, online examination, HR Management, Asset Management, Department automation system and other ERP applications for students and staff. These services are implemented on ad hoc physical and logical servers with different data centers using traditional architecture of disk arrays that are inflexible and difficult to manage, at the same time provides data protection through remote replication which is inefficient and complex. Every department in MU demands new and better applications as they strive to deliver higher levels of customer service, this study found that the fast growing technology changes, customer demands and growth opportunities forces IT services in MU to stabilize and improve the availability of information for staff and students effectively with better quality and tightly controlled distribution of the information.

The purpose of this research project is to thoroughly study existing IT infrastructure in MU and propose an adaptive agile IT infrastructure that is build to deliver better outcomes. One way to achieve this goal is "Virtualization", moving applications from a static deployment to an on-demand delivery model that bridges the gap between users and applications and to increase the utilization of information technology (IT) assets, including servers and storage devices that can help cut IT cost, increase IT agility, and improve business outcomes.

Virtualization is an important enabling technology that increase manageability, security, and flexibility in IT environments, virtualization technology solutions both hardware and software based provide maximum system utilization by consolidating multiple environments into a single server or PC by abstracting the software away from the underlying hardware that reduce costs, increase management efficiency, strengthen security, while making your computing infrastructure more flexible. It is also found that in many IT organizations, the rapid adoption of server virtualization has had a fundamental impact on the way that server and storage resources are managed that is significantly more dynamic and responsive to business needs. To help take advantage of virtualization we recommend a complete, integrated virtualization solution model spanning the desktop to the data center that makes MU for an Adaptive Infrastructure reducing the number of physical servers necessary to support infrastructure that can reduce capital expenditures for storage devices by consolidating data storage, to protect corporate data and meet security obstacles while delivering desktops, applications, training, support and online collaboration tools to end users who often have high technology expectations. At the same time provide the same or better service levels and ease of use to users with high performance expectations to ensure high productivity while not adding complexity or cost.

## Environment Sound Recognition Using Zero Crossing Features

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### ABSTRACT

Digital audio forensic is to provide evidence from left over audio files contained in audio / video media in the crime spot. This type of forensic can be categorized into four different classes according to its nature: (a) speaker identification / verification / recognition, to find the answer of 'who', (b) speech recognition / enhancement, to find the answer of 'what', (c) environment detection, to find the answer of 'where' or 'situation' and (d) source authentication, to find the answer of 'how'. In this work, we try to recognize environment sound for digital forensics application. We have recorded seven different scenarios: restaurant, office room, fountain cafeteria, mall, meeting room and corridor. Each environment has 30 minutes of data and sampling rate is set to 22.05 kHz. Zero crossing features and k-NN (k-nearest neighborhood) based classification are used. Frame length is 512 samples with overlapping 256 samples. Two types of experiments, one with decreasing number of samples per file and the other one with increasing number of file in training, are conducted. First, the experiments with different number of samples 1000000, 500000 and 100000 for each file are performed. The reason is to see the affect of decreasing the number of samples. Six file for training and five file for testing are used. The average accuracies are 20%, 40% and 46% when the number of samples is 1000000, 500000 and 100000, respectively. When we decrease number of sample from 1000000 to 500000, the accuracy is enhanced for restaurant, office room, fountain cafeteria, and mall. Meeting room and corridor are still in the same accuracy. When we decrease number of sample from 500000 to 100000, the accuracy is enhanced for office room, meeting room and corridor. Mall is still in the same accuracy. For restaurant, fountain and cafeteria cases, the accuracy is decreased. The total average of accuracy is increased when the size is decreased. In the second type of experiments, the number of file in training is increase from six to fifteen files while using the same number of samples as in the former experiments. The accuracies are 37%, 43% and 57% when the number of samples is 1000000, 500000 and 100000, respectively. When we decrease number of samples from 1000000 to 500000, the accuracy is enhanced for cafeteria, meeting room and corridor. Office room, fountain and mall have no change in accuracy. For restaurant the accuracy is decreased. When we decrease number of samples from 500000 to 100000, the accuracy is enhanced for restaurant, office room, mall and corridor. Meeting room is still in the same accuracy. For fountain and cafeteria the accuracy is decreased. The total average of accuracy is enhanced when the size is decreased. The following table shows average recognition accuracy (%) of different environments using zero crossing features with varied number of samples and training files. The experimental results showed significant improvement in accuracy using zero crossing when we decrease number of samples and increase number of file training.

file #	6- file	15 file
ZC- (1000000)	20	37
ZC- (500000)	40	43
ZC- (100000)	46	57

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### ABSTRACT

“WikiWikiWeb” is the name given by Ward Cunningham. The name “wiki” was chosen by Ward, because of its meaning in Hawaiian i.e. “quick”. Wiki technology follows the concept of ‘open-editing’. Wiki is a website designed to allow individuals to collaborate electronically in an easy way for authoring. Specifically it enables users to add, link, edit and remove other pages or resources and change content without registration. Wiki Technology is web-based collaborative software that allows a group of people to create, store and edit shared web documents called wiki pages. The wiki pages can be linked together and this collection of hypertext document is called a wiki. The content on a wiki is maintained in a completely open manner. We can change the contents of a wiki page and add a link to a new wiki page by using a simple markup language and a standard web browser. Authors should concentrate more on the content which they want to add or remove from the wiki, without the need to worry about the knowledge of the underlying technology. Many researchers have explored the concept of Wiki in various aspects e.g. – to identify the technological requirements of Wiki, to determine the motivational factors for Wiki contributors, to assess the quality and authenticity of information contributed in Wikis. Some researchers have the opinion that Information systems educators could be benefitted from an alternative infrastructure for learning in the near future. These researchers presented the concept of an “Open Classroom” model for modern education. This innovative and revolutionary concept expands education by integrating “open” technologies such as Wiki to create enduring “knowledge products” that completely engage students and provide value to society.

This proposed research work aims to explore the “Open Classroom” idea to find how collaborative knowledge generated over a period of time and how can this benefit to students and faculty as well. A survey will be conducted among university faculties and students to determine how a university wiki will help them. Based on the research findings and the synthesis of existing literature in this field, the researchers aim to propose a conceptual model of “Manipal Wiki”. This model would be further investigated and refined in the coming years to build a working Wiki system for the academic community.

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### ABSTRACT

Online helpdesk system for University's students' computers is an interesting topic that may solve the maintenance issues that take place as part of daily routine activities in Zayed University. Therefore, our project will provide a report and steps of the troubleshooting to solve users' problems. We will design a website that will help users not only in Zayed University, but also will help users in different universities and organizations that don't have a help desk or a service desk to help them in finding solutions for their problems and solving them. The system represents a media between technicians and computers users. Online help desks system will highly support computers users for many reasons. It will save money and effort, in which they will be able to find the possible solution online without the needs to go to technicians and ask for help. Also, they will save time by determining the problem as quick as possible. We will research multiple on-line help desk systems designed at other institutions [1, 2, 3, 4, 5, 6]. However, our system will be unique for Zayed University's needs .

### References

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- [4] <http://www.24x7helpdesk.com/>
- [5] <http://www.eastwright.com/internet/hdol/>
- [6] <http://www.helpdesk.com/>

## Lexeme: A Semantic Advertising Network

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### ABSTRACT

*Lexeme: A Semantic Advertising Network* understands that advertising networks can only be successful when they are able to bring services, resources, and products that are of interest to the web user. However, the structure of the Web is inadequate for the world of advertising because current advertising networks are incapable of accurately understanding the content of a web page or a search query. When advertising networks scan for keywords, they fail to understand how those keywords are used in the context of the page. Therefore, advertising networks' dependence on only the keywords in the content without a precise interpretation of the context of the page, results in showing irrelevant and unappealing ads which in turn results in poor sales and loss of profits. With this decrease in potential revenues, it is vital for businesses, organizations, and associations to enhance and improve advertising methods by implementing better approaches for reaching and attracting people. By seizing the opportunities of the Semantic Web, the corporate community stands to benefit by spending less energy, time, and money pursuing the wrong prospects and marketing to the wrong channels. Hence, developing a context-based ad network that incorporates the Semantic Web technology will enable computers to know what particular ads mean, to know what particular documents and data are about, and to understand relationships between them all. Therefore, the innovative technology behind Semantics moves beyond simple keywords by understanding all the words on a page, and how they relate to one another. Such structured information that can be read and understood by computers is the key that enables machine-to-machine exchange and automated processing in a way that computers can understand.

We, therefore, envision an algorithm that contains not only information to instruct machines about what ads to display, but also structured data to help machines to understand what ads have been displayed. *Lexeme's* Semantic technology will be utilized by advertisers to analyze the meanings behind the word or words in order to place ads in prime web-locations for the sole purpose of reaching their targeted consumers. The goal of this project, therefore, is to develop a context-based ad network that incorporates the Semantic Web technology for the purpose of increasing the effectiveness of online advertising which will result in financial benefit for merchants and advertisers. In a time of mass content creation, improving ad placement through more optimized, findable content ushers in a new era of Semantic technology that delivers the right message to the right user. Our objectives are to utilize the concepts and tools behind Semantic technology in order to revolutionize the advertising arena and take online advertising to a whole new level of relevance.

## RAINBOW: Home Recycling Device

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### ABSTRACT

Recycling has existed for a long time but was almost unheard of until the earth climate was declared at risk. To help undo this damage, people around the world have become aware of the benefits of recycling to our climate. Today, and in the 21st century recycling has become a global issue and a worldwide responsibility. Recycling helps reduce carbon footprints and global warming. In the UAE and according to the Emirates Environmental Group (EEG), recycling is still in its infancy; however there is a positive change across the UAE. The UAE government and people are already participating in recycling efforts and initiative. This project introduces “Rainbow” an innovative device that introduces recycling to households in the UAE and help save our environment. The RAINBOW device recycles our own unwanted materials at home, rather than just throw them out. Ultimately, the device will be one of our household appliances. The Rainbow device includes bacteria treatment and heating element in addition to the compaction process. These two new features differentiate Rainbow from existing trash compactors.

The device operates and recycles unwanted material in three main stages, chemical treatment, heating and finally compression. In the first stage, unwanted material is treated using environmentally friendly chemicals. The chemical material is a bacteria disinfectant and odor treatment process used for treating the trash. This process can also be operated in a self cleaning process of the machine. To release this substance, a solenoid relay is used to release the liquid from a high pressure nozzle. The second process heats the waste material using a heating element. The heating element is necessary to remove the moisture and helps in the compaction stage. Finally, the heated and treated material is compressed to a small size. For the futuristic home, the device is operated using a touch screen or Human Machine Interface (HMI) panel to provide a user friendly interface. The HMI interface provides a visual image of the three stages of the recycling process. Rainbow is also equipped with GSM modem just to let you know that your recycling process is completed. The heart of the system is controlled using a Programmable Logic Controller (PLC). PLC has been selected to provide robust operation of the recycling process. The PLC controls a conveyor belt where the waste material is placed. The conveyor belt moves the material through the three recycling stages. At each stage a sensor is used to detect the flow of material and that the process is completed. The PLC detects this and advances the conveyor belt along with the recycling material to the next stage.

## Augmented Reality in the Future of Video Games

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### ABSTRACT

Over the years, game designers have endeavored to bring gaming experience closer to reality. Advent of various gaming accessories like wireless controllers, motion sensing etc provide the gamer with a sense of realism in the game such as never before. A latest addition to gaming is the use of an upcoming concept “Augmented reality” (AR). AR is a term used to describe the viewing of an actual environment in real time with some virtual elements added on to enhance the viewing experience in various ways. After Sony’s Six-Axis, Nintendo Wii’s motion capture and Microsoft’s Project Natal for Xbox 360, augmented reality seems to be the future of gaming.

AR works by aligning input devices like cameras etc with preprogrammed markers in real time to create virtual objects in order to enhance the viewing experience. These markers can vary from printed 2-Dimensional barcodes to real world objects including shapes, outlines and even GPS coordinates. More recent versions of AR are even programmed to accept readings from digital compasses and accelerometers to provide additional markers. The main components required for the use of AR is normally a combination of a camera and the above mentioned markers. The difference between augmented and virtual reality is that in the former most of the environment is actual with some details such as opponents/characters and the weapons etc being virtual objects, whereas in virtual reality everything is pre-rendered.

Nowadays most consoles have more than enough processing power to handle the resource intensive games being released. This has resulted in a lot of power being wasted hence making it easier to introduce add-ons without the worry of it becoming obsolete. At the moment there are very few games that support AR such as: ARQuake, The Invisible Train. Microsoft’s Project Natal provides a combination of AR as well as motion capture to provide a complete controller free environment.

Our study focuses on the use of Augmented Reality in gaming for all kinds of gamers and on different genres of games. The study will also try to evaluate the advantages and disadvantages of including AR into gaming. We intend to analyze this through the use of a case study that will be conducted with the help of questionnaires. Included in the research will be various details about the implementation of augmented reality on a few different genres of games, as well as a sample questionnaire, details and dimensions of the system used to play the games and some details of the games as well. The goal of our research is to help us identify how augmented reality can be better implemented in different genres of gaming.

## UML Checker Using XML-Based Parser

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### ABSTRACT

UML is the standardized modeling language concerning the software engineering domain. UML is widely used for creating models to visualize a system. Each of these models contains a set of graphical notations to be used in the UML diagrams. An important feature of UML models is their portability. Many UML tools can exchange their models with another modeling tool by storing the UML model description in an XML format.

The main goal of our project is to build a tool that can detect errors in the UML model, which may lead to diagram inconsistencies. Not forgetting that early error detection can save plenty of time for the developers. It also will help them achieve a well-constructed design for the system.

We build our UML model using a UML modeling tool. Then, we use the modeling tool to export the UML model in an XML format. Our UML checker tool deals with an XML format of the UML models. The generated XML file is the input for the checker tool. Next, the checker tool will handle the provided input and process it. The three phases of the project is shown in Figure 1.

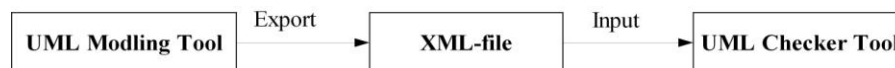


Figure 1: Phases of the Project

The checker tool is going to analyze the XML file. The checker performs this analysis in three steps. First, it parses the file using SAX parser to read it properly. Then, it identifies the important data to be extracted, which we need later on. After that, it uses DOM parser to store the extracted data in DOM trees. In this tree, each diagram of the UML model will be stored individually.

The second part of the checking process is to check the data provided by the user for any possible errors in the provided diagrams. Rules are required in order to be able to check a UML model. We ought to come up with our own UML rules to check the UML model. These rules are the base for the checking process since they define what considered an error in the provided diagrams. In this project, we have defined some rules for class, use-case, state, and sequence diagrams.

Figure 2 shows the necessary steps that we have used in our project to detect any possible errors in the diagrams.

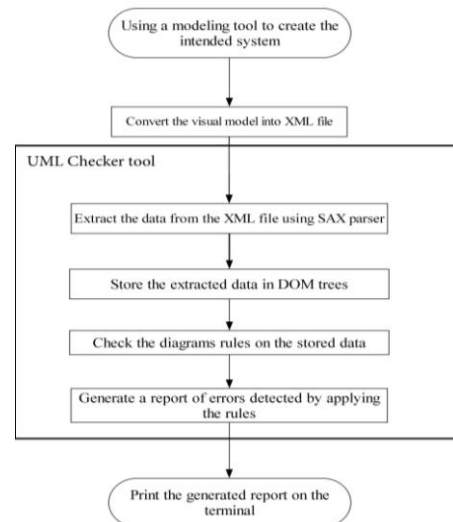


Figure 2: The steps of the project



## Medical Check-Up Using LabVIEW Programming Language

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### ABSTRACT

Most doctors do not keep medical records in any digital form and this could potentially cause problems while diagnosing a patient. Only in the best of cases, records are transferred manually from medical instruments to digital storage systems (like computers). This could be a very tedious task for the doctor or nurse. Currently, there could be many improvements made to the way that medical records are kept.

The objective of this project is to develop a program that could be used for a medical check-up. Data on blood pressure, heart rate, and muscle fatigue can be collected through Vernier sensors to a Vernier sensor DAQ board to the computer USB port. Using the programming power of LabVIEW, the proposed system would compare the information collected from the Vernier sensors to a database that has been built through taking a vast number of measurements with the intention to validate this database with international health standards. A person's measurements would then be compared to the database in order to determine how healthy the person is. The program is so simple that it does not need to be used by a medical professional.

Although current solutions seem to be sufficient enough, the proposed program is much better in many ways. For the proposed program, blood pressure, heart rate and muscle fatigue can be measured, and the system can be changed to include any additional sensors. The system can graph and make calculations automatically that could be useful for a doctor. One feature of the proposed program is its ability to upload a patients' information instantly into their own personal file on a database. This would make it easier for the doctor to find a patient's records and get full information on the patient. These benefits are a great advantage to the current method of keeping medical information.

## Charity Association Information Portal System

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### ABSTRACT

The Information Technology Revolution has been used in many business sectors. Every organization use IT in their administrative work and commercial trading. Many of Charity Associations used Information technology (IT) to facilitate their processes, to minimize their time, and to provide interactive services. On the other hand, the Charity Associations who aren't used Information technology like the one in Orija, which is provide free services but without using the Information technology in efficient way. Based on this misusing, new problems were appear like registration delay, and missing interactive services and enough information about donation ways which decreases number of donations.

The Charity Association needs to publish their information on the internet and allow large number of visitors to access to their information that are seeking for. We decided to establish a web Information Portal System that serves the Charity Association and represent it to all the users who are searching for related information. Orija Charity Association faces insufficient ways of providing information to the people who interests in such information. The need of publishing information and services is increasing more and more. The portal system will provide rich information about the Association and interactive services that increase their profits. The interactive services provides registration in the portal, donating through the portal, employing beneficiaries, contacting the Association wherever and whenever, calculating Al-Zakat, search engine, and more. The proposed system will make the processes faster and easier. Contacting the Association in specific time will not be a problem as long as the visitors on the portal can contact the Association whenever and wherever they want.

## An Official Orphanage Website in the Sultanate of Oman

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### ABSTRACT

The new literacy for the 21st century is to use appropriate technological tools in an information society. The computer and its associated innovations, - the World Wide Web – e-mail, have become commonplace. Serving a wide selection of user needs, web applications are ever more important in society. In other part, “Children are the future of our world ...” is the simple, yet profound adage that resonated in our minds. Although web applications for this category are numerous, very few are concerned with the needed ones: Orphans.

The orphanage in our society is one such entity that has not been given the necessary prominence and priority over the years. Due to the lack of media coverage and attention many people in Oman were not even aware of the existence of the orphanage thus hindering the chances of the orphans receiving any donations, support, contributions, sympathy or love from the community. Interested parties would have to search far and wide for any relevant information which generally is not from legitimate sources, only to be left dubious and frustrated by the waste of efforts in the end.

Considering all these factors, a practical and an innovative approach was taken that will change the children’s lives for the greater good; that is to implement a database – driven web application for the Muscat orphanage. The application is the means through which new doors are opened for the orphanage and give them an opportunity to fulfill their needs and requirements to the maximum. The application is also built to effectively serve the society and strives to ensure that the orphans get the best childhood experience and aims to produce a generation of independent youth that have been well nurtured and loved for.

On the long term the website will focus on facilitating a better future for the innocent and neglected orphans providing the means for the public to get closer and interact with them on a whole new level. It will be the means to integrate the orphans as an essential part of the society. An additional feature is the “foster care” service which provides temporary care with foster parents for abused, neglected and dependent children who need a safe place to live. The website can later on be broadened to accommodate all the other orphanages in the Sultanate, which will serve as an effective means of communication among one another. As a result, the website can help reach out to people outside the borders of Oman to the Gulf region and beyond.

# Arabic Sign Language Recognition System: Glove-Based Approach

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## ABSTRACT

Sign languages are the mean by which deaf people communicate. Nowadays the world is paying more attention to help disabled communities using the increasing advances in computer technology. In addition, most recent researches are about natural interfaces with computers.

We developed an Arabic Sign Language recognition system using DG5 VHand DataGlove as an input device. The glove comes with five embedded bend sensors measuring fingers' flexion on a scale from 0% (total extension of finger) to 100% (total flexion) and three embedded axes accelerometer allow to sense hand orientation (roll and pitch) as illustrated in figure 2.

Gesture recognition can be viewed as pattern recognition and classification problem. Many different techniques are used to solve the problem such as statistical template matching and neural networks. Neural networks have shown excellent results in pattern recognition and sign patterns are no exception.

We built three 2-layer feed-forward, back propagation neural networks using MATLAB neural network toolbox. The output layer is composed of 43 neurons in all three networks. Each output corresponds to a sign implemented in the system. The hidden layer is composed of 50, 80 and 100 neurons respectively.

We collected 50 samples for each sign (50 samples \* 43 sign = 2150 samples) from different subjects to train the neural networks. Collecting data from different subjects is so important to accommodate variations between different people. The batch training style is used where data presented to neural networks at once.

The process of recognizing sign patterns consists of two parts: verification and the recognition engine: After the three neural networks return their outputs, a voting algorithm is applied to decide the most valid return value. The test took place while the subject is standing. For every sign, five tries took place. The Overall accuracy is 85.11%.

The overall performance of the system is satisfactory and we achieved an overall accuracy up to 85%. We concluded that the specifications of the DG5 VHand DataGlove are not sufficient to provide high accurate and differentiable readings. For that, some signs are ambiguous and the approach used in the system could not differentiate between them.



FIGURE (2): STATIC FINGER SPELLING

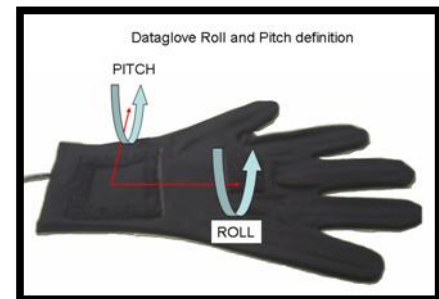


Figure (2): Roll and Pitch Angles

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### ABSTRACT

The development of e-learning systems has increased exponentially in recent years. In the last few years, researchers have begun to investigate various data mining methods to help teachers improve e-learning systems. These methods allow them to discover new knowledge based on students' usage data. Following this line, one of the most promising areas for e-learning systems to integrate is the application of knowledge extraction. This project aims at developing data mining and knowledge discovery (DMKD) system that applies data mining techniques in Learning Management Systems (LMS or eLearning systems). These systems accumulate a vast amount of information which is very valuable for analysis and could create a gold mine of educational data. They normally provide a database that stores all the system's information, personal data about the users, and records of activities within the system. For instance, they can save any student activities such as reading, writing, taking tests, performing various tasks, and even communicating with peers. It is important that educators understand how these systems are used by their students and how the students behaviors affect their performance. An effective way of discovering new knowledge from large and complex data sets is through data mining. Its techniques enable the discovery of the hidden patterns and the relationships among such large amounts of data. In this project we will embed an e-learning system with the ability to mine the students' usage data present in the system database.

Here we are interested in mining the data of Moodle; a popular open source Course Management System (CMS). We are interested in applying, and embedding different data mining techniques, such as Clustering, Classification, Regression, Rule Association, along with Visualization. These techniques can be applied on different application levels including mining data of students in a course, students in a department or an educational institution wide. For each DM technique there are many algorithms available, and it will be our role to determine the most appropriate ones in terms of accuracy and efficiency. Furthermore, we will customize and work on improving the selected algorithms to work best with our data. The initial implementation of such algorithms will be adapted from an open source data mining and machine learning tool (Weka) from University of Waikato. Weka is a widely used tool written in Java. Thus, the algorithms will be rewritten in PHP (the language Moodle is written in). This e-learning system with well integrated DM applications will be designed in such a way that instructors, decision makers in the educational institute should not necessarily have background in understanding data mining techniques. The applications will not need any special training or tutorials to gain the great benefits of it.

## Twitter User Habits in ZU

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### ABSTRACT

More and more people are using social networking sites like Facebook, Twitter and flickr. Social networking technologies have changed how we interact with people. Twitter, the world's fastest-growing social networking and micro-blogging website, is quickly evolving into an important tool for social networking. The growth of Twitter has reached 1,382% each month of new users. This growth exceeded Facebook which was 228% growth per month. This research project is an investigation of twitter habits of ZU students. Specifically, our research question is: What is the experience of ZU communication students with Twitter? We used the survey method of multiple choice questions and collected data using the software tool called SelectSurvey. 35 communication students answered 13 Likert type questions about how they used Twitter. We collected the results and compared them to a similar global study of Twitter users.

We have arranged the results into three main themes: i) growth of Twitter; ii) the role of culture; and iii) Twitter content. The results indicate the similarities and differences between ZU and global Twitter users regarding their preferences for Twitter over emails and SMS messages to stay connected with others. We will present how they use Twitter and their frequency of use. We will present the research participants' thought about being anonymous on Twitter and their opinions about how Twitter safety. The results reveal differences in who the two different samples follow in Twitter as well as the different reasons for using Twitter. We will also show that more ZU communications students are interested in using Twitter in the near future. Finally, we will present our analysis for the similarities and differences between the global group of Twitter users and ZU communication students.

## Detecting Empty Car Parking Spaces and Parking Allocation Using Surveillance Images

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### ABSTRACT

With increasing number of vehicles over years, parking has become an important issue particularly in commercial environments such as shopping malls and airports. It is important to utilize information about the status of parking areas to quickly guide their customers to the nearest empty parking space. Empty parking space detection system that can automatically identify empty parking spaces and guide users to them. Recently, a number of different solutions which employ sensors for this purpose have been suggested, but they are either too expensive to implement or have failed to be effective due to high sensitivity to noise and other external conditions. A majority of these systems use mechanical devices such as electronic/magnetic sensors for managing parking allocations and these can particularly be found in some shopping malls in the UAE.

This project investigates innovative intelligent empty parking space detection and allocation system based on visual input (videos/images) captured from surveillance cameras. The proposed model makes two important assumptions: a) that the images of the parking lot are captured from an altitude and b) that the parking spaces are separated from one another using a clear block lines. We hypothesize that this model is accurate and more robust to noise, small changes in illumination conditions compared to the existing techniques.

The proposed system works in two distinct phases. In the first phase, we perform accurate rectangle detection and its variations to cluster lines, groups of lines that are parallel and orthogonal to each other that make-up potential parking areas. The rectangle detection framework iterates between three steps of 1) preprocessing - including edge detection and enhancement (based on edge linking), 2) peak detection using Hough/Radon transform and 3) filtering of peaks that satisfy geometrical conditions in both the transform and spatial domains. In the second stage, we analyze the parking area using Scale Invariant Feature Transform (SIFT).

The outcome of this project will be a prototype system with appropriate graphical user interface that demonstrates the accuracy and robustness of the proposed system on several synthetic and real data. Our results also analyze the sensitivity of the proposed model with reference to its system parameters. We also critically evaluate the potential failure modes of our strategy and aim to target them as future work.

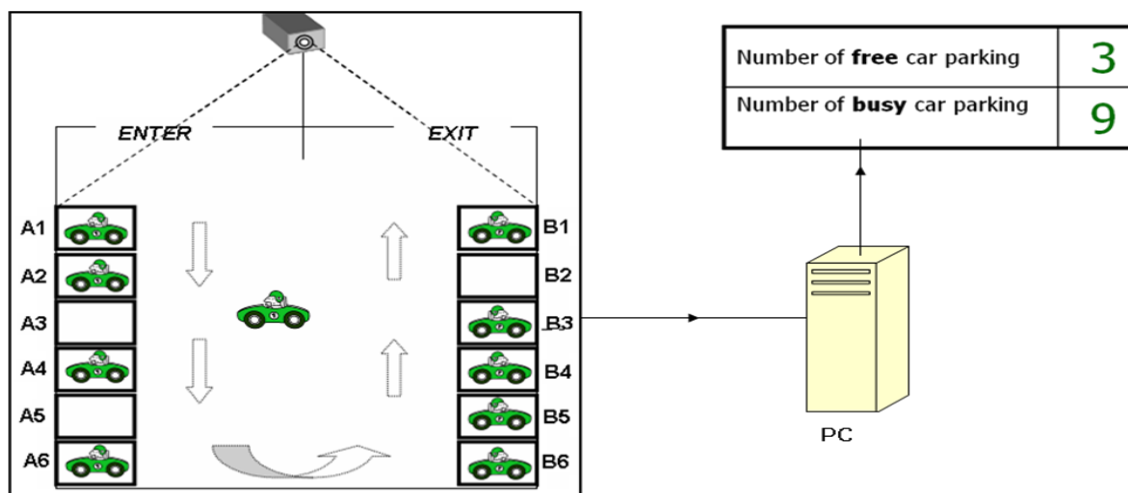


Figure 1: Layout of the project.

## On Quality of Pseudo Random Numbers for Monte Carlo Simulations

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### ABSTRACT

Monte Carlo methods are computational techniques employed where analytical solutions are not possible. Results are obtained by carrying out repeated random sampling and determining what fraction obeys a certain rule. Since computational algorithms can only generate pseudo random numbers, and not true random numbers, the accuracy of final result depends upon the quality of the numbers used. The quality can be judged by analyzing various properties of the numbers. This can be quite complex and time consuming. An indirect approach is to simulate something whose result is accurately known. The departure of the computed result from the actual result then provides an indication of the quality of random numbers that were used.

We chose to use the Monte Carlo method to estimate the value of PI as the yard stick. The results of our measurements are summarized in the table below. The simulation programs generated 20 billion points for each pseudo random generation method tested. Averaged results were output after each billion points simulated. The table shows the magnitude of error in the value of PI after 1 billion and 20 billion samples; as well as the total time taken for the simulation of 20 billion points. It can be seen that the default 'C' random number generation function, rand(), provides no hope for further convergence. Although the same compiler (gcc) is used under Centos Linux and Windows 7, the poorer performance under Windows is due to lower value of RAND\_MAX. Lehmer method (based on code available at <http://www.cs.wm.edu/~va/software/park/park.html>) does not provide much improvement but it settles quickly which means that seed selection will not have much impact on the end result. All the remaining measurements are based upon a library of routines provided by Agner Fox ([www.agner.org/random/](http://www.agner.org/random/)). The Mersenne Twister method converges slower but has lesser error than the Lehmer method. The Mother-Of-All (MOA) generator gives better results, overall. The SIMD oriented Fast Mersenne Twister (SFMT) gives best result for any single generator. The SFMT requires the SSE2 instruction set which is available in most of the current processors. In the end, we have two measurements with compounded generators. Mersenne and MOA combination takes the longest to run and does not provide any improvement over the SFMT. The SFMT and MOA combination, however, provides some improvement over the single SFMT but consumes 70% more time. The SFMT, standalone, is the best choice where execution time is more important.

Methods	Time (secs)	Error (1B points)	Error (20B points)
Rand (Centos Linux)	1171	8x10 <sup>-5</sup>	2x10 <sup>-5</sup>
Rand (Windows 7)	1310*	6x10 <sup>-5</sup>	7x10 <sup>-5</sup>
Lehmer	1305	3x10 <sup>-5</sup>	2x10 <sup>-5</sup>
Mersenne Twister	1240	6x10 <sup>-5</sup>	1x10 <sup>-5</sup>
Mother-Of-All	1318	2x10 <sup>-5</sup>	1x10 <sup>-5</sup>
SFMT	1303	3x10 <sup>-5</sup>	5x10 <sup>-6</sup>
SFMT + MOA	2217	2x10 <sup>-5</sup>	4x10 <sup>-6</sup>
Mersenne + MOA	2791	1x10 <sup>-4</sup>	9x10 <sup>-6</sup>

\* This time value is for another computer.



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### ABSTRACT

Several years ago, King Fahd University of Petroleum and Minerals (KFUPM) have introduced an initiative to assist the students in getting the International Computing Driving License (ICDL®) certification. Free access to an interactive e-learning system for the ICDL modules was provided to the students. This system is a commercial system that was not designed to meet the needs of the university. It has an expensive annual fee. Hence, the idea of developing an in-house e-learning system that is specifically tailored to KFUPM students' level meeting the university requirements has come to light.

As a result, KFUPM started the development of a full e-learning web-based system for teaching the modules of the ICDL. In our senior project, we developed and implemented the fourth module of ICDL regarding spreadsheets. It is meant to cover all the knowledge points set and specified by the ICDL syllabus v5.0 proposed by The European Computer Driving License Foundation (ECDL®). Working on this project involves two tracks: The educational track, whereby we design and prepare readable, easy-to-follow content that will be used in presenting the modules in an interactive way, covering all the skills specified in the syllabus; and the technical track which involves translating the developed content into rich multimedia lessons and building the web application that hosts them.

As a result, a fully functional prototype was implemented. The interactive lessons were developed using Adobe® e-learning technology. This provides a simulated environment of Microsoft® Excel that is assisted with sound narration. The sound narration was developed using the text-to-speech component of Adobe Captivate® with Neo® sounds database. It also includes small quizzes in the middle of the lessons and summaries at the end of the lessons. The developed lessons are: "Using the Application", "Cells", "Worksheets", "Formulas and Functions", "Formatting", "Charts", and "Preparing Outputs". These lessons were packaged as a web application developed using ASP.NET MVC® to host these interactive lessons. The design of the system was made such that it can be easily and modularly extensible to host other ICDL modules that will be developed in the future.

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### ABSTRACT

The capstone project is a cornerstone in students' academic learning, as well as, their professional future career. Investing a lot of time in such a project is truly worth it. Furthermore, going beyond their limitations during this duty is essential for students to enhance the concepts taken in previous courses. However, its management is a real dilemma for them, their supervisors, as well as, the capstone project committee members. This predicament arises due the fact that capstone projects are managed manually which generally implies inefficiency and a decline in productivity. To the best of our knowledge, there is no software that manages capstone projects. Thus, the purpose of this project is to improve the organization of capstone project tasks, for all those parties, through a software that will allow students to manage their tasks and deadline with minimum effort, supervisors to easily keep track of students' work and their progress, and ultimately capstone project committee members to monitor all transactions taking place to ensure that all is well.

In order to analyze the project requirements, a combination of case study and personal interviews is deemed as an appropriate approach to follow in this project. The case study is a thorough study of a behavior, concept or phenomenon done through experiments and surveys. Case studies can be helpful in making perception of a real situation. The capstone projects at the faculty of engineering of ALHOSN University and the College of Information Technology of Zayed University present the case study of this project. They are examined to draw an understanding of the processes included in the capstone project.

In addition, a series of formal and informal interviews are conducted over a two-month period with students and supervisors from ALHOSN and Zayed Universities. Interviews are generally of one hour duration. Informal interviews are used to clarify and refine issues as they emerged. All of these procedures contribute towards defining significant functions of the capstone project manager software for students, supervisors, capstone project committee members and software administrator. For instance, students can select topics, get resources from supervisor, upload deliverables for their supervisor, fill out a calendar with a to-do list, view their project plan and view percentage of work completed. Moreover, supervisors can post resources for their students, create a list of tasks and their deadlines, get deliverables, provide feedback by posting remarks or uploading updated documents and view percentage of work completed.

Following the analysis phase, the gathered requirements are filtered, refined and then modeled using UML diagrams. These diagrams capture the system with all of its components, and illustrate the way these components interact with one another. This process is carried on in order to provide a clear understanding of the system's functionality and ease the transition to the implementation phase.

The Capstone Project Manager, an online application, is implemented using JSP and Java Servlets as part of J2EE platform to dynamically generate web pages. JSP and Java Servlets are run on Apache Tomcat server. The system utilizes a relational database known as Oracle Database.

In conclusion, this capstone project aims at tackling capstone project management issues and is believed to hold promising results that shall significantly enhance capstone project management for all of the concerned parties.

## Electrical Power Network Design for an Urban City in Oman

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### ABSTRACT

In recent years Oman has implemented new planning strategies of power distribution systems in urban cities. Planning goals are to provide services at lower cost and higher reliability. Since planning requires a mix of geographic, engineering and economic analysis skills, new circuits should be integrated into the existing distribution systems within a variety of economic, political, environmental, electrical and geographical constraints. As the peak demand is rapidly increasing in the Sultanate of Oman, the planner should need an accurate estimation of loads, knowledge of when and where development is occurring, as well as full awareness of local development, regulations and procedures.

Cables, connectors, and installation equipment advanced considerably in the last quarter of the twentieth century, making underground distribution installations faster and less expensive. Currently, distribution planning is directed towards the use of underground cables which is much hidden from view than overhead lines and more reliable. A reliable distribution system must be designed to meet the future power requirements. It should also provide an adequate protection against various types of faults that might occur. This could be achieved through circuit breakers, fuses and other protective devices which have the ability to interrupt the very high short-circuit currents that can occur at the time of faults.

Transmission and distribution systems must satisfy some basic requirements such as providing power all the time to consumers while maintaining a stable nominal voltage that does not vary by more than  $\pm 10\%$ . On distribution circuits, voltage drops happen due to current flowing through the line impedances. Voltage regulators in the substation or on feeders can adjust primary voltage. The design should also maintain a stable frequency that does not vary by more than  $\pm 0.1\%$ , supply energy at an acceptable price and meet the international standards of safety, policies and regulations related to environmental issues.

The main objective of this research work is to design an underground electrical power network for Al Saadah town, Salalah city in Dhofar region, Sultanate of Oman. The proposed design will replace the currently existing power network in Al Saadah that is based on overhead transmission lines. Basically, the design should meet the international standards and satisfy various technical, economical and environmental factors. This will include load estimation, calculation of transformer ratings and locations in addition to the selection of the proper conductor size and route. The methodology of design is based on a number of technical constraints such as the thermal limit, voltage drop and short-circuit limit. Programs implemented using MATLAB software package will perform the design calculations and verify the validity of the proposed design. The aim of this proposed design is to provide a more stable operation; hence increasing the efficiency of the electrical energy and providing a better uninterrupted power supply to consumers.

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### ABSTRACT

Research in structural dynamics focuses on the study of structures (concrete, mechanical, and so on) and their response under static and dynamic loading. This process typically involves:

- Developing mathematical models that describe a physical system
- Analyzing the models to learn about their dynamic characteristics

The objective of the experiment presented in this paper is to perform static and dynamic analysis on a truss bridge model using computer aided software with an aim to obtain a design which has a better stress distribution. The process of analyzing and reconstruction of the bridge using SolidWorks software is a cost and time effective way to determine the best possible structure in the design phase.

A physical mock-up of an initial bridge design was built using plastic beams and connectors from PASCO Structures System. A 3D digital model of the bridge was then developed using SolidWorks, which is a powerful 3D mechanical engineering design software that allows static and dynamic analysis. The physical mock-up was analyzed using empirical data obtained through load sensors that were connected at different points of the structure. Multiple weights were used to stimulate forces on the bridge at different locations for the static analysis. The weights were placed on a cart that was pulled along the bridge at a constant speed for the dynamic analysis. Using an appropriate data acquisition system, the data from the load sensors were recorded and the stresses were calculated. The 3D model created on SolidWorks along with the measured data were imported into LabVIEW, data was categorized according to the sensor location on the structure. The processed data was then mapped to their specific locations on the imported 3D model using sensor mapping VI. As a result, a 3D stress diagram of the model was obtained.

The model in Solidworks was defined as an ABS plastic material. Using SolidWorks simulation, the same setup was simulated for the static analysis and a 3D stress diagram was rendered. This diagram was compared with its empirical counterpart and was found to have a percentage difference of 5.4%. This percentage difference is negligible considering the scope of our project and was expected since we made few assumptions.

The data acquired from the experimental and simulated systems will be used as a guideline in modifying the structure. Additional support will be placed, where necessary, in order to distribute the stresses evenly. Members which provided negligible support to the structure will be removed. Different truss configurations such as Kingpost, Queenpost, Fink and Howe truss systems will be compared. After each redesigning process, the model is analyzed in SolidWorks simulation for flaws.

This project helps people understand how software packages like SolidWorks and LabVIEW exploit the computing power of normal desktop computers to carry out complex analysis tasks. The method of analysis in this project is applicable to any structure, ranging from small scale structures like parts in an automobile to large scale structures such as bridges and flyovers. Flaws in the structure can be determined efficiently thus saving time and money.

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### ABSTRACT

This abstract describes the idea of the IT project for Tawseel Company that will be implemented and submitted by June. Tawseel is a delivery company which provides premium and fast services across the UAE. It was established in 2007 by two emirates ladies. In 2009, the company expanded their business and penetrated the Gulf region. The mission statement of Tawseel is to be a leader in the business market by providing guaranteed on time delivery services. Tawseel employees focus in serving customers and exceed their expectations all the time.

The company's website offers the best delivery services and makes the shipment and pickup process easy for their customers. Through the website, customers can request for package shipment or schedule for a pickup. The customers must register in the website and have a user name and a password (user account). They can choose the kind of the service they want. The customers have to provide the pickup and destinations address and then they will receive a tracking number upon pickup. The customer will be able to track their shipment online. The shipment carrier sends a message by the Blackberry to the database to update the shipment's location which can be displayed in the website. Customers will experience a new way of delivery services through the use of the website.

The website for this shipping company is our graduating project. We will use Visual Basic program to create our website and Oracle for creating the database which will be linked to the server that will send the information directly to the website. The database will be also linked to the carrier employees' Blackberry devices to receive updated location of the shipment. The website will consist of informative web pages about the company as well. It will also contain forms to enable the customers to add their information which will be placed in the database. The frequent users of service can create accounts to save their information for future ease of use. These forms are very important to start any process in the Tawseel website and will be a major part of our web project.

## Social Networking Services and Academics an Empirical Study

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### ABSTRACT

In the present century people connect from one end of the global to the other at the click of a mouse. In this scenario social networking plays a remarkable role, as the most popular and convenient way of socializing by facilitating new and diverse ways to communicate via the Internet. Particularly, the young have adopted themselves to this new technology blurring the scope of offline activities. On another perspective, the scenario of Education has migrated from the course of traditional classrooms to the contemporary age of Internet void which the students would be left handicapped for their educational research. The pedagogical field when integrated with the Social Networking sector, has given rise to Educational Networking. Educational Networking is emerging as a convenient tool focused on raising the key competencies such as collaboration, negotiation, reflection, constructive criticism, selection and information analysis to name a few, among the students. It helps learners' gain knowledge and constructs their skills and sharing experiences with other learners. A person who learns in an online environment, publishes their own thoughts or professional advice in blogs, collaborates to create online dictionaries, encyclopedias or wikis, shares photos, or exchanges files in peer-to-peer networks. Educational Networking contributes in extending the boundaries of classrooms, and aims at assisting the students to gain knowledge and learn in an online social environment using innovative technologies. The main participants to the platform of Educational networking no doubt are students, Educators and could possibly be parents who would want to be informed of the happening in their wards life.

In our research we plan to conduct a survey to analyze the significance of Social Networking platform, how it benefits the participants in terms of Education and what kinds of problems or barriers they encounter. On the analysis draw with these aspects in view, we plan to propose amicable policies that would aid in accomplishing a safe and encouraging learning environment beneficial to the students, educators and the institution.

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### ABSTRACT

Electronic Bus Ticketing Machine (EBTM) design is an in-house ticketing machine for our country. Basically, this project idea has taken up from Oman National Transport Corporation (ONTC). The existing EBTM has many bottlenecks such as non Arabic language operation, short duration battery backup and expensive printing material/mechanism results poor utilization of the same. In our project, we have planned to design EBTM after a detailed study of microcomputers, non-volatile memories, communication standards, real time clock (RTC), rechargeable batteries, battery charging circuits and thermal printers.

The HCS12 and ATMEL AVR microcontrollers were considered during initial design stage. The RISC architectural advantage of AVR will be more effective than HCS12, in programming methodology, open source software WinAVR C compiler used for build process of the source code and AVR studio is used for debugging. The entire system in single embedded controller may slow down operation in real time, hence two AVR controllers are used.

The master controller (ATmega128) is interfaced with all peripherals such as keypad, memory, display section, RTC, power management and printers. The external EEPROM is used to store the key information such as ticket details, stage details, fare details, password and other key information. The RTC PCF8583 keeps the date and time needed for the system. The two wire interface (TWI, in some cases it is referred as IIC) of mega controllers used for communication between EEPROM and RTC. The matrix keypad interfaced through timer interrupt to avoid key debouncing.

The display section of EBTM equipped with 128X64 bit graphic LCD, thus the system can be operated in bilingual ie English and Arabic. The fonts are coded with suitable font maker software, then the entire program and language pack is downloaded into a slave controller (ATmega16). The display section receives message to be displayed through TWI interface, refreshed in standard refreshing to avoid flicker. This system supports various types of tickets such as child, an adult, group, luggage, season, special and pass. The system connects to PC through RS232 port to download the route information and upload the ticket details. This interface also has an encryption to avoid tampering of data from the hand held system.

Due to time restriction for technical project, the front end software is not a part of our current work, an avenue for another project. In addition to that this project will talk about future works such as fully automated ticket vending machine, GPS implementation, RFID interface for pass holders, etc.

The challenges in this work are learning of AVR architecture, tool chain, font design, graphics display driver, TWI interface and integration of the system. Our work will facilitate Omani nationals to work in their native language, and also bridges the technology advancement in this sector. We are pleased to develop a commercial model of the same with financial support from some institution within Sultanate of Oman.

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### ABSTRACT

In this undergraduate research project we will build electronic portal that will manage knowledge base for the Oman industries and citizens in different regions. We will classify these industries on basis of functions like consultancy, process and production base and manufacturing industry. The project presents how to integrate all these industries in the portal to make it easier to find information about these industries. Industries can look into suitable information for manpower requirements and suppliers etc. Portal development frenzy is sweeping through commerce and it helps the industry to grow and develop. Our project is to build portal for Oman industries. It collects all industrial estates information in single access point, which provides smoothing way for accessing and collect information. The portal is a specialized application server that provides business logic for industries. It designed by using web developer application, the portal server provides development and runtime infrastructure. A portal server often works in conjunction with a citizen and industrial estate. Industries portals are single-point Web browser interfaces used within organizations to promote the gathering, sharing, and dissemination of information throughout the enterprise.

However, traditional data-driven approaches to portal and intranet design often ignore the information needs and practices of users. As a result, industrial portals suffer from usability problems such as poor navigation and inappropriate display of information that prevent or inhibit use of these systems, circumventing their promise as an information management tool. To address this issue, this research project paper explores the potential of portals as an underlying infrastructure for organizational information access and use, and posits the need for a new direction in portal design that calls for an awareness of the contexts in which people are situated, the problems they typically face, and the way organizational actors utilize information to help resolve their problems..

It provides useful way for citizens to apply for jobs, access to portal information, know news about MSM, currency, stock news and add their profile to can upload there CV and other information. In otherwise, it is useful for industries to represent their information in the portal and dealing with another industries and citizens. The portal provides another service for their members and visitors such as available jobs, gulf industries news, Muscat Security Market, stoke news and currency news.



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### ABSTRACT

A phenomenon appears in a sensor network when a group of sensors continuously produces similar readings (i.e. data streams) over a period of time. This involves the processing of hundreds and maybe thousands of data streams that are received in real-time. This project focuses on the automatic detection of phenomena like air pollution and oil spills and seeks to determine the correlation between such phenomena.

Sensor data rates continue to increase dramatically as sensor technology improves. Consequently, analyzing data streams becomes ever more challenging. Fast online response is a must for applications that involve multiple data streams, especially when the number of data streams is large. This project proposes an efficient scheme for detecting clusters of similar streams. The project also propose an algorithm for detecting correlation between phenomena. This algorithm uses a Discrete Fourier Transformation (DFT) to reduce stream dimensionality. Each stream is represented by a point in a multidimensional grid in the frequency domain. The algorithm uses an improved unsupervised grid-based clustering technique to detect similar streams and to form clusters. Moreover, this project proposes an incremental update mechanism to avoid the recalculation of DFT coefficients when new readings arrive and thus minimizes the processing time.

This project provides solutions for distributed environments for faster processing. The distributed environment is implemented on the top of a hierarchal topology. Each group of sensors has a group head (square shape in the figure) which is yet another sensor with more resources than the regular sensors. Sensors send their readings to the corresponding group head for partial processing. Consequently, group heads send summary and results to the sink. The sink will combine the received information from all group heads to form the detected clusters. The sink may send messages to group heads to ask they there are sensors reporting similar values as those reported by clusters detected by other group heads. After detecting all clusters, the sink computes the correlations between the detected clusters.

We will conduct experiments on synthetic data streams data to measure the performance of the proposed distributed clustering and correlation detections as compared to the traditional clustering techniques and the correlation detection techniques. At the same time, we will measure that the accuracy of the proposed techniques and compare it with the traditional clustering and correlation techniques.

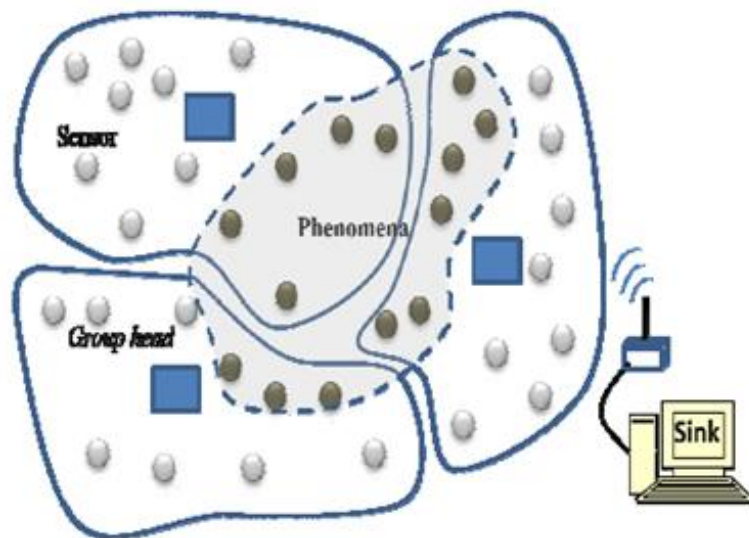


Figure : Sensors Network

## Real-Time Air Pollution Monitoring System

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### ABSTRACT

The Sultanate of Oman is an independent country in the southeastern quarter of the Arabian Peninsula. The climate in Oman is dry, extremely hot and humid throughout most of the year, with very little rainfall. The climate varies from region to region. So the weather in Oman has effective by a lot of resources such as human activities, natural and industrial resources. As the result of these resources can be make a lot of pollution in the air.

Sohar region has seen rapid development in recent years to become one of the most industrially developed regions in the Sultanate of Oman, including the development of various industries such as petrochemical, Aluminum, Power, and steel industries. This development has positive and negative impacts on the environment. The negative impact on the environment highlights the growing need for the existence of regulations governing the monitoring of environmental pollution and to improve the living environment of the area of Sohar and the surrounding residential and agricultural areas.

Air pollution is the most serious environmental problems caused by the direct negative effects on human health and the environment.

The proposed project aims to build Real-Time Air Pollution Monitoring System. This system will be developed as a web application to monitor the collected data of air pollution, and then to be analyzed by following a series of phases to detect the damage caused by air pollution. The proposed phases are including Processing, Analyzing, and Monitoring phase. This system will be connected to mobile chemical sensor to obtain real readings, and then the readings will be passed through number of processes to be monitored and analyzed in real-time. The Processing phase will be started with Data Migration process to transform the collected readings from different formats into the required format that accepted by database of the system. Then, another process will be followed which is called Data Cleaning process focuses on detecting and correcting corrupt or inaccurate records from a record set in the database. This process is mainly used in databases. Furthermore, Data Standardization process takes a place. This process is achieving agreement on common data definitions, representation, and structures to which all data types must conform. Therefore, this process provides our system with the flexibility and ability to collect data with different data units and formats, and then immediately will be adapted to the standard units used in our system which is (g/m<sup>3</sup>) that is recommended and followed in The Sultanate of Oman.

After the Processing phase, the Analyzing phase takes the responsibility that including Data Visualization and Reports process. This process gives the ability to display updated graphs and statistics as well as generating updated reports based on different criteria. The last phase in our proposed project is Monitoring phase, which has the responsibility of observing the collected data in real time and issuing alerting messages in case of exceeding the normal average of the standard gases.

## E-government Services Security and Trustworthiness from a User's Perspective: A Case of Oman

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### ABSTRACT

Nowadays, people concern about technology more than before and looking for ways that make the life easier, faster and more convenience to them. Most of the people around the world are using computers to do their transactions and perform their jobs. Also, many countries are moving toward e-government. E-government means that doing governmental duties, business and social process in digital way using computers, mobiles and any kind of information and communication technology (ICT). Nowadays governments are transforming in order to join modern societies and upgrade the nation's lifestyle. However, taking the decision to move toward e-government is not an easy task. Governments will take very big responsibility to adopt this and enable nations to adopt themselves to use it effectively. Security of the Information Systems and user's data is a significant thing that government should concern about. Countries may destroy their huge ICT infrastructure as well as people's confidence in using such systems if it fails to adopt security measures or trends in their current systems.

Oman is one of those countries that started to implement e-government gradually. The huge changes in the technology environment have forced people and organizations to adopt themselves to deal and interact with these rapid changes. Consequently, governments also apply the technology to facilitate the life for nations. In Oman, Government started adopting the technology since 2002. However, the security will be the main focus and concern always tied with such changes. E-government is the most significant change which requires modification in strategies and plans. The main concern towards this adoption is the implications related with security and privacy concerns. Oman Governments adopts many security related recommendations in order to prevent violation of security and privacy of their citizens.

The purpose of this research project is to identify the risks and related preventive practices that end users can implement to safeguard their computer systems. In our research we tries to highlight the development of e-government in Oman and how Oman is changing and transferring to digital world and how the technology helps Omani citizens to safeguard their systems from such threats. Our research also aims to study the security issues tied to this change and examine to measure level of security and trustworthiness required to adopt such prevention measures. We will conduct analytical survey that will be distributed among Omani citizens, private, government, non-government organizations which aims to collect the information related to their security level they are providing to their customers. Also from customers' end what security level they are getting from their providers. Our survey will used to collect information regarding current security practices following by any organization or persons, level of expertise, level of awareness, level of knowledge, standards followed etc. All quantitative and qualitative data will be analyzed using SPSS program and later it will be organized into different segments to find out what level of security preventive practices are being followed and what are required to get user's satisfaction toward privacy which helps to achieve trustworthiness.

Our research finding will help government, non-government bodies and also by Omani Citizens to get awareness of such preventive measures which are required to use e-services offered by government of Oman. Our findings will also help in protecting such e-services by developing security prevention standards that all organizations should follow. In our research we will try to identify such risks and their prevention by adopting latest ICT security trends from users' perspective rather than provider's end.

## Data Mining an Important Mechanism for Prediction And Prevention Of Gestational Diabetes Mellitus

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### ABSTRACT

The growth in the information industry has lead to the practice of maintaining information on paper become questionable. In every organization today, paperwork has been replaced by Information Systems (IS) supported by databases. IS provide various advantages over maintaining paperwork such as providing for the authenticity of information; keeping data safe from theft and unauthorized intervention and manipulation; protecting integrity of data etc. While IS provide all these advantages, it must be noted that these IS depend on databases for storage of data as well as quick retrieval of required information. Databases are designed to offer an organized mechanism for storing, managing and retrieving information. Irrespective of the kind of industry, thousands of transactions are recorded and stored in databases each day. Healthcare Industry alone generates mountains of administrative data regarding patients specifying about clinical trials, patient's history and electronic patient records. This data is a strategic resource for health care institutions that results in accumulation of data in the field of health care. This data is growing by the day where the generation of huge amounts of data has created a need for discovering meaningful patterns and rules leading to a situation that is "data rich but information poor". Medical informatics plays a very important role in the use of clinical data. Pattern recognition plays a key role for the diagnosis of new diseases and the study of different patterns found when classification of data takes place. It has been estimated that an acute care hospital may generate five terabytes of data a year. Even to a layman it would be apparent that data in such massive amounts need to be properly categorized, classified and summarized. This information is very valuable to the industry if utilized in a proper method. This is where data mining comes into the picture. Indeed to manually sort through mountains of data to find important relationships and information is wearisome and more often than not erroneous. Data mining provides tools like association, classification, clustering etc that assist in uncovering vital information. Data mining as a part of information systems is being used in many different contexts such as Information industry, marketing industry as well as healthcare industry. Use of databases and data mining in the healthcare sector is gaining more importance than before, because data mining enables practicing health specialists to perform more accurate diagnosis based on past information of similar patients.

For this study, we have chosen to illustrate the envisaged advantages of the application of data mining to a special kind of diabetes i.e. Gestational Diabetes Mellitus (GDM). We propose that the use of various data mining contrivances will aid in controlling, predicting and preventing GDM.

## **MASTER OF SCIENCE (M.S.) IN INFORMATION TECHNOLOGY WITH SPECIALIZATION IN CYBER SECURITY**

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### ***Introduction***

The College of Information Technology at Zayed University offers a Master of Science (M.S.) in Information Technology program that includes advanced work in information technology with a specialization in cyber security. The program's focus is on the development of concepts, knowledge and skills to enable successful participants to become experts in the area of information security, internet crime prevention, and digital crime investigation. The goal of this program is to develop highly qualified technical experts to meet the demands of the national, regional and international workplace for information and network security.

***Cyber Security is the protection of data and systems  
in networks that are connected to the Internet.***

### ***Learning Outcomes***

- Perform a needs analysis of an enterprise to determine the appropriate levels of security needed for systems and data;
- Identify the management and technical controls that can be used to architect an enterprise security structure to protect the confidentiality, integrity and accessibility of critical data;
- Understand the IT essentials necessary to deal with computers, storage devices and computerized data in the context of a crime scene.

#### **Year One**

- Research Methods
- Information Security
- Linux Security
- Information Security Policy, Ethics & Law
- Network and Internet Security
- Cyber Forensics

#### **Year Two**

- Information Security Management
- Advanced Topics in Cyber Forensics
- Small Scale Digital Device Forensics
- Penetration Testing and Advanced Hacking Techniques
- Database and Enterprise Application Security
- Independent Research or Cyber Security Project or Elective

### ***Delivery Mode***

- Twelve 6 week courses grouped into 4 semesters over an intensive 24-month time frame (3 courses per semester with a 1-2 week break in-between)
- Instruction is conducted in-classroom over 2 weekday evenings - no weekends!!
- Strong emphasis on practical (laboratory) work
- Strong emphasis on face-to-face interaction with highly qualified instructors to facilitate the learning process

### ***Contact Information***

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