

SCS'18

Conference »Program

Smart Cities Symposium 2018 Program



Critical milestones are due

	Due (edit)	Conference	Task	Responsible	Explanation	Notes	Reminded	Completed (mark complete)	Completed by
	Mar 2, 2018	SCS'18	Proceeding services set up	chair, publication	March 2018 Chairs determine what kind of proceeding-related EDAS services they need.			late	

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Sunday, April 22			Monday, April 23		
8:00 - 8:30	R1:	Registration	8:00 - 8:30	R2:	Registration
8:30 - 9:00	SO:	Short Opening	8:30 - 9:00	S8:	Cyber Physical Infrastructure for Smart Cities-2 & IoT-enabled Smart Cities-2
9:00 - 9:45	S2:	New Technologies for Smart Environment-1	9:00 - 9:45	S7:	Smart Urban Planning & Interactive Architecture
9:45 - 10:00	S1:	Cyber Physical Infrastructure for Smart Cities-1	9:45 - 10:00	SB4:	Short Break
10:00 - 10:15			10:00 - 10:15	KS3:	Keynote Speaker-3
10:15 - 10:30	SB1:	Short Break	10:15 - 10:30		
10:30 - 11:00	MOC:	Main Opening Ceremony of the Smart Cities Symposium 2018	10:30 - 11:00	KS4:	Keynote Speaker-4
11:00 -			11:00 -	S9:	Cloud Computing Applications for Smart Cities & New
				S10:	Smart

11:30		<i>Technologies for Smart Environment-3</i>	<i>Transportation System-2</i>
11:30 -	KS1: <i>Keynote Speaker-1</i>		
12:00			
12:00 -			
12:15	KS2: <i>Keynote Speaker-2</i>		
12:15 -			
12:30			
12:30 -		PS: <i>Poster Session</i>	
13:00	LB2: <i>Prayer & Lunch Break</i>		
13:00 -			
13:40		LB2: <i>Prayer & Lunch Break</i>	
13:40 -			
14:10	S4: <i>Smart Transportation System-1</i>		
14:10 -	S3: <i>New Technologies for Smart Environment-2</i>		
14:55			
14:55 -	SB3: <i>Short Break</i>	S11: <i>Big data analytics for Smart Cities</i>	
15:15		S12: <i>Infrastructure in Smart Cities</i>	
15:15 -			
15:25			
15:25 -	S6: <i>Smart Health Care</i>		
16:00	S5: <i>IoT-enabled Smart Cities-1</i>	CS: <i>Closing and Recommendations</i>	
16:00 -			
16:30			

Sunday, April 22

Sunday, April 22, 08:00 - 08:30

R1: Registration



Room: S45-Zain E-Learning Center-Ground Floor

Sunday, April 22, 08:30 - 09:00

SO: Short Opening



Room: S45-101-Zain E-Learning Center

Sunday, April 22, 09:00 - 10:15

S1: Cyber Physical Infrastructure for Smart Cities-1



Room: S45-108-Zain E-Learning Centre

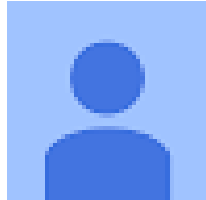
Chairs: Adel F Ahmed (King Fahd University of Petroleum and Minerals, Saudi Arabia), Mazen Ali (University of Bahrain, Bahrain)

Cyber Security Challenges in Financial Institutions: A Comparative Study

Sameer AlJishi and Ahmed Tarafa (University of Bahrain, Bahrain)

Financial institutions use and dependence on technology and digital systems is fast increasing to reduce costs, introduce innovative solutions and gain competitive edge over rivals. Innovation introduces new digital technology and infrastructure, which increase the dependency on digital systems. At the same time the cyber threat landscape towards digital systems/assets and these institutions, in particular, is rapidly increasing and getting more complex. Threat actors are becoming more organized, sophisticated, and cyber-crime has been commercialized. WannaCry, one of the recent large -scale cyberattacks with global impact was an example of how vulnerabilities can be used in attacks for financial gains. In this paper, a comparison will be carried out of a sample of financial institutions, operating in different market segments, to:

- List major security issues facing these organisations,
- How they implement security controls to deal with the threat landscape,
- How they deal with advanced threats
- Propose solutions to enhance the institutions' preventative and detective controls to reduce their cyber threat exposure



Lightweight Identity-based Cryptographic Framework for Smart Vehicles: Cryptographic Proof

Sarah Al-Shareeda and Fusun Ozguner (The Ohio State University, USA)

Existing vehicular standards adopt a heavyweight authentication framework to achieve the needed security requirements. However, the embraced framework has high computation and communication overhead because of its certificates and digital signatures; therefore, Identity Based cryptographic (IBC) authentications have been

considered as better alternatives with less overhead. Most IBCs rely on pairings operation on elliptic curves in their underlined calculations, but pairings is a time-consuming operation. Hence, building pairingless IBC authentication schemes become a must. In this paper, we build a new pairingless IBC authentication scheme by fine-tuning a mixture of three available IBC frameworks. We rigorously prove the security of the scheme and show its effectiveness in comparison with the available approaches in terms of computation complexity and communication overhead.

Presenter bio: Sarah Al-Shareeda is a recent PhD graduate from the Department of Electrical and Computer Engineering, The Ohio State University and a Fulbright Science and Technology Award's fellow. Her research interest is in security and privacy, cryptography, vehicular networks, smart transportation systems, wireless sensor networks, and cyber physical systems.



Children safety using smartwatch with anomaly detection approach model

Ahmed Alnaser (University of Bahrain, Bahrain); **Wael M El-Medany** (University Of Bahrain, Bahrain)

Children safety is a big concern to parents. Whether their child is feeling depressed, being attacked or bullied by other kids, at health or physical risk or even being accompanied by an unauthorized person. The currently available smartwatches designed for kids are either using a threshold-based approach which requires pre-configuration or they require intervention to activate the emergency reaction. These approaches lack in providing personalization for each user data and their protecting actions are based on the preconfigured rules only. In this research, we discuss the child safety issues and introduce a design for a solution based on anomaly detection approach through a smartwatch which is designed for children protection. Anomaly detection approaches can be seen in domains such as big data, intrusion detection and in sensor networks which are discussed in this research. In our approach, we are utilizing the anomaly detection approach for the data collected from the hardware non-invasive sensors embedded into the smartwatch to create personalized rules for each user. These rules are continuously compared to the live data to isolate the discovered anomalies. This approach design ensures much better protection decisions comparing to the currently available solutions.

Presenter bio: Ahmed E. Al-Naser received the Bachelor's degree in computer science from the University of Bahrain, Bahrain in 2004. He is currently working toward Master's degree in cybersecurity from the University of Bahrain. He has been working in the information technology field since 2004.



A Recruitment and Human Resource Management Technique Using Blockchain Technology for Industry 4.0

Onik Md Mehedi Hassan (Inje University, Korea); **Mahdi H. Miraz** (AMA International University BAHRAIN, Bahrain); **Soo Kim** (Inje University, Korea)

Application of Information Technology (IT) in the domain of Human Resource Management (HRM) systems is a sine qua non for any organization for successfully adopting and implementing Fourth Industrial Revolution (Industry 4.0). However, these systems are required to ensure non-biased, efficient, transparent and secure environment. Blockchain, a technology based on distributed digital ledgers, can help facilitate the process of successfully effectuating these specifications. A detailed literature review has been conducted to identify the current status of usage of Information Technology in the domain of Human Resource Management and how Blockchain can help achieve a smart, cost-effective, efficient, transparent and secure factory management system. A Blockchain based Recruitment Management System (BcRMS) as well as Blockchain based Human Resource Management System (BcHRMS) algorithm have been proposed. From the analysis of the results obtained through the case study, it is evident that the proposed system holds definite advantages compared to the existing recruitment systems. Future research directions have also been identified and advocated.

Presenter bio: Dr. Mahdi H. Miraz is an Assistant Professor of Network Engineering at the School of Computer Studies, AMA International University BAHRAIN (AMAIUB). Prior to joining AMAIUB, he had been serving as the Director of UoH Cisco Network Academy as well as a Lecturer, School of Computer Science & Engineering, University of Hail, KSA since 2009. He obtained his PhD in Computing (Usability Engineering) in 2016, MSc in Computer Networking in 2009 as well as BSc (Hons) in Computer Networks all from Glyndŵr University, Wrexham, UK. He is an ex-cadet of Barisal Cadet College (BCC), Bangladesh, where he completed his secondary and higher secondary education. His research interests are in Networking Technologies & Algorithms, Cloud Computing, Internet of Things (IoT), Human-Computer Interaction (HCI) & User Interface Design, Usability, Web Accessibility, Universal Usability, Cross-cultural Usability & IS (Information System) issues, M-Learning (Mobile Learning) & E-Learning.



A Framework for Evaluation of Cyber Security Challenges in Smart Cities

Belgaum Mohammad Riyaz (AMA International University, Bahrain); **Zainab Alansari** (AMA International University, Bahrain & Universith of Malaya, Malaysia); **Ruchin Jain** (AMA International University, Bahrain); **Jawdat Alshaer** (Al-Balqa Applied University, Jordan)

Cities are transforming to smart as various devices, technologies, services, connections, blocks, and storages are all readjusting to smart in contrast to the traditional ones. All such interconnected devices are said to be the Internet of Things (IoT) which grants the users a convenient life. At the same time, it leaves behind challenges to handle as these devices are loosely linked and the information is transmitted through the network. In this study, a review of various components forming a smart city with the challenges and factors influencing them are considered. A general objective of the study is to identify the different areas of smart city which are affected by cyber security challenges and find out the rank of each area. The data for this research is obtained from the questionnaire, experts' views and paired comparisons of the prior studies and by using the Fuzzy Analytic Hierarchy Process approach, find the weight of each factor and sub factor and their rank accordingly. Amongst the nine-factors, the "Smart Security" factor with the weight of 0.198 is the most important, and the "Smart Building" factor with the weight of 0.058 is the least significant area influenced by cyber security challenges in smart cities.

Presenter bio: Mohammad Riyaz Belgaum received his BS in Commerce & Computers from SriKrishnadevaraya University, India in 1998 and MS in Computer Applications from Sri Venkateswara University, India in 2001 and Master of Engineering in Computer Science Engineering from Sathyabama University, India in 2006. He is currently a PhD candidate at University Kuala Lumpur, focusing on Cloud Computing services ranking. Since 2012, he has been a faculty member of the Computer Science at AMA International University, Bahrain. His research interests focus on Cloud Computing, Mobile Ad hoc Networks, IoT and Big Data.



S2: New Technologies for Smart Environment-1

Room: S45-106-Zain E-Learning Center

Chairs: Norrideen Mansour (University of Bahrain, Bahrain), Isa Salman Qamber (UOB, Bahrain)

Maximum Power Point Tracking of Photovoltaic Systems by Accurate Prediction of Maximum Power Voltage

Ahmad Al-Subhi (King Fahd University of Petroleum and Minerals, Saudi Arabia); **Ibrahim Elamin** (KFUPM, Saudi Arabia)

This paper proposes a simple and efficient methodology for maximum power point tracking (MPPT) of photovoltaic (PV) systems. The proposed MPPT methodology is based on building an accurate mathematical relationship between standard test conditions (STC) variables and weather conditions as input parameters, with the maximum power voltage as an output parameter, without requiring estimating the equivalent PV circuit model parameters. By accurately predicting the maximum power voltage, the optimal duty cycle can be then simply determined using the DC-DC converter equation. Diverse SIMULINK library PV modules have been adopted in simulations in order to collect the data necessary for building the model. The data are then transferred to EUREQA software for training process and model building tasks. Accurate mathematical model for the voltage at maximum power is then formulated as a function of PV module STC variables given in the module data sheet, as well as the temperature and irradiance values. The predicting capability of the proposed maximum power voltage model is tested by comparison with different PV modules from SIMULINK library and with some recent published research adopting different algorithms. The proposed model is then applied to a grid-connected PV system incorporated with perturb and observe (P&O) algorithm for achieving MPPT. The simulation results are in good agreement with the results obtained using all algorithms considered in comparison.

Presenter bio: Ahmad Al-Subhi is a lecturer at Electrical power technology department at Yanbu Industrial College in Royal Commission of Yanbu. He is currently a PhD student at Electrical Engineering Department at King Fahd University of Petroleum and Minerals (KFUPM). His research interests include power system modeling and forecasting, control of

renewable energy sources and DC grid analysis and investigation.

Presenter bio: Dr. Ibrahim El-Amin is a Professor in Electrical Energy and power systems at the electrical Engineering, King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. He received his BS in Electrical Engineering from University of Khartoum, Sudan, his MS and PhD in power systems from the University of Manchester, Manchester UK. Dr. El-Amin is a certified ABET(USA) and NCAAA program evaluator.. He evaluated many academic program in the Saudi Arabia and USA. He is a member of KFUPM Committee on Assessment and Accreditation. He is also a member of ABET Steering Committee, and has delivered various seminars on topics related to ABET accreditation and assessment. He has led the team that prepared the teaching and learning standard for the preparation of KFUPM NCAAA institutional accreditation document. Dr. El-Amin worked with Qiyas in the preparation of outcome examinations for engineering graduates. He provided consultation services and research projects to Ministry of Water and Electricity, ECRA, SEC, and many others.. Dr. Ibrahim's research interests include power system, renewal energy and power quality.



A proposed solar-hydro system in Bahrain

Mohammad Zeki Khedher (Jordan University (Retired))

A proposed solar-hydro system in Bahrain Professor Mohammed Zeki Khedher Keywords: solar system, hydro-electric system, pumping station, solar-hydro system Hydro pumping stations are the largest storage of energy over the world. Other techniques for storing energy are still much behind the hydroelectric power stations. Pumping stations are cost effective to save power from availability at certain time of the day to the peak loads at other time. At the same time, solar energy systems are spreading all over the world very fast, due to the decrease of cost of solar panels. Solar energy are only available at day time. Hence the combination of hydro pumping stations and the solar systems seems to be a good combination. Such systems started to be used in some parts of the world. A proposal for a solar-hydro integrated power generation in Bahrain is proposed here. With the large variation in electric daily load curves between day and night and the availability of sunshine during the day in Bahrain, it becomes clear that new ways of generation of electric power is possible. The solar system can provide electric energy during the day and the hydroelectric pumping stations can offer a benefit of storing such energy to other time of the day, so that water is pumped up from the downstream lake or sea, to the upper lake at low values of load and availability of sunshine and water is let to flow downward generating electricity at peak load period or at night in general. In Bahrain, with good availability of sunshine and nearby sea water, an integrated solar-hydro system seems to be cost effective. The paper investigates the possibility of such system by showing the benefits of such system and investigates the possibility of implementing it.

Presenter bio: Professor Mohammed Zeki Khedher is a Professor of Electrical Engineering at Mosul University and then Jordan University till he retired at 2015. He is a life senior Member IEEE. He is Director of Al-Mishkat Research Center. He is Editor in chief of The International Journal of Islamic Applications in Computer Science and Technology. Author of more than 100 scientific papers and 20 books



Feasibility Study of a Standalone DC House: Energy Savings Opportunities and Capital Costs Assessment

Ahmad Al-Subhi (King Fahd University of Petroleum and Minerals, Saudi Arabia); **Ibrahim Elamin** (KFUPM, Saudi Arabia)

The advancements in power electronics technology have resulted in the excessive emerging of various DC appliances. This necessitates investigating the feasibility of adopting a complete DC house that combines all such DC appliances in one simple network. An essential point of view is to compare such DC network with a corresponding conventional AC network as well as hybrid networks in terms of energy consumption and cost analysis. This paper discusses the design, analysis and comparison of different low voltage AC and DC networks. The analysis is presented for a standalone house, in which several distribution schemes are proposed and analyzed. The proposed layouts present preliminary supplying AC appliances by an AC source. On the other hand, another configuration discusses designing a complete DC network consisting of DC sources and loads. In addition, hybrid systems are also proposed in which combinations of different AC and DC sources and loads are incorporated into the same network. The proposed configurations are studied and evaluated in terms of several points of view including energy consumption, systems sizing, required components and capital costs assessment. Different test scenarios are carried out for all proposed architectures and all findings and conclusions are analyzed extensively in this paper.

Presenter bio: Ahmad Al-Subhi is a lecturer at Electrical power technology department at Yanbu Industrial College in Royal Commission of Yanbu. He is currently a PhD student at Electrical Engineering Department at King Fahd University of Petroleum and Minerals (KFUPM). His research interests include power system modeling and forecasting, control of renewable energy sources and DC grid analysis and investigation.

Presenter bio: Dr. Ibrahim El-Amin is a Professor in Electrical Energy and power systems at the electrical Engineering, King Fahd University of Petroleum and Minerals (KFUPM), Dhahran, Saudi Arabia. He received his BS in Electrical Engineering from University of Khartoum, Sudan, his MS and PhD in power systems from the University of Manchester, Manchester UK. Dr. El-Amin is a certified ABET(USA) and NCAAA program evaluator.. He evaluated many academic program in the Saudi Arabia and USA. He is a member of KFUPM Committee on Assessment and Accreditation. He is also a member of ABET Steering Committee, and has delivered various seminars on topics related to ABET accreditation and assessment. He has led the team that prepared the teaching and learning standard for the preparation of KFUPM NCAAA institutional accreditation document. Dr. El-Amin worked with Qiyas in the preparation of outcome examinations for engineering graduates. He provided consultation services and research projects to Ministry of Water and Electricity, ECRA, SEC, and many others.. Dr. Ibrahim's research interests include power system, renewal energy and power quality.



A General Methodology Made Cleaned PV Energy Panels for Bahrain and UK

Isa Salman Qamber (UOB, Bahrain); **Mohamed Al-Hamad** (BASTCO, Bahrain)

The GCC countries has a good location for the solar energy with high intensity of the solar radiation. This means that renewable energy provides many benefits for our climate, health and our economy. Photovoltaic PV becomes the new competitive energy resources of the planet and it can be engaged in both Distribution and Transmission systems. In the present study, considering design of solar cell for both Kingdom of Bahrain and United Kingdom (UK) with the same specification. The Panel Generation Factor (PGF) considered satisfying the specification of the cells, which depends on the climate. For both Kingdom of Bahrain and UK the total (kWp) of PV panel capacity, number of PV panels needed for design of 110 Wp PV module and Solar Charge Controller Rating are calculated based on PGF of each country.

Presenter bio: Isa Salman Qamber currently he is a Professor in the Electrical Power Systems Reliability (University of Bahrain). He published more than eighty Scientific Research papers in International refereed journals and Conferences. He obtained his BSc in Electrical Engineering, King Saud University in 1982. He obtained his MSc in Electrical Power Systems Analysis, UMIST in 1984 (UK). He obtained his PhD in Markov Modeling of Equipment Behavior, University of Bradford in 1988 (UK). He was the Dean of Scientific Research, the Dean of Applied Studies (University of Bahrain) and also the Chairman of Electrical and Electronics Engineering Department (University of Bahrain). Professor Qamber is a member of professional societies such as IEEE (USA), CIGRE (France), Society of Academics and Bahrain Society of Engineers. He was the founder of IEEE Bahrain Section and the Chairman of the section and currently the honorary chair of the section.



Design and Implementation of Energy Management Systems for Bahrain Smart Cities

Abdelrahman Said and **Nadeen AbdulAziz** (University of Bahrain, Bahrain); **Wael M El-Medany** (University Of Bahrain, Bahrain); **Amal Abu Hassan** (University of Bahrain, Bahrain)

Consumer electronic device control is one of the key challenges in smart cities development. This paper introduces the design and hardware implementation of smart energy management systems to be applied for Bahrain smart cities development. The system is capable of monitoring the energy consumed by the appliances, and accordingly limits the overall consumption not to exceed a certain stated threshold. Therefore, the user gets foreknowledge of their own energy consumption before getting the official electricity bill. The design is based on using Arduino UNO micro-controller, ACS712 current sensor which measures the alternating current (AC) drawn by an appliance, and Xbee transceiver which provides wireless communication with the coordinator node.

Presenter bio: Nadeen Osama is a freshly graduated student on 2018 from university of Bahrain (UoB). She holds a bachelor's degree in computer engineering with first place best graduation project: Smart Energy Management System (SEMS). She participated in several events as exhibitor. In addition, she has the IEEE student membership.



Sunday, April 22, 10:15 - 10:30

SB1: Short Break  TOP

Room: S45-Zain E-Learning Center-First Floor

Sunday, April 22, 10:30 - 11:30

MOC: Main Opening Ceremony of the Smart Cities Symposium 2018  TOP

Room: S45-101-Zain E-Learning Center

Sunday, April 22, 11:30 - 12:00

KS1: Keynote Speaker-1  TOP

Human Firewall - The ultimate defense for Smart Cities

Mirza Asrar Baig. Company: CTM360® Designation: Founder & CEO

Room: S45-101-Zain E-Learning Center

Chair: Fuad Al-Ansari (University of Bahrain, Bahrain)

Cybersecurity challenges are mounting rapidly as the threat landscape evolves. New ideas, tools, processes and systems are often touted as game-changers; however the most vital factor for overall success is seldom discussed: people. Humans are the front-face to all the new technologies that are ultimately connected as a part of a new cyber age & smart cities. Training and testing is effective to a certain extent but actual awareness, practice and adoption is where true cyber security can be achieved. In his talk, Mirza Asrar Baig, Founder & CEO of CTM360, will discuss the basic ingredients for ultimate defense against threats in the cloud for smart cities.

Sunday, April 22, 12:00 - 12:30

KS2: Keynote Speaker-2  TOP

Satellite Subsystems ... From the Software Prospective

Janice Man, Satellite Systems and Applications (SSA), IET Technical Professional Network (TPN).

Room: S45-101-Zain E-Learning Center

Chair: Lamyia Al jismi (University of Bahrain, Bahrain)

What would happen if we cannot communicate via mobile? How would Formula One fans react if they cannot watch the Bahrain F1 on 8th April from their home countries? Life would definitely turn difficult if we didn't have Satellite, an object which is up in the space and in an orbit, which provides services to us. This presentation aims at introducing the Satellite subsystems from the software point of view so that the audience can look at this technology from another angle. It also introduces software functionalities of some subsystems and illustrates how they work together when they are deployed to the space.

Sunday, April 22, 12:30 - 13:40

LB2: Prayer & Lunch Break



Sunday, April 22, 13:40 - 14:55

S3: New Technologies for Smart Environment-2



Room: S45-108-Zain E-Learning Center

Chairs: Ibrahim Elamin (KFUPM, Saudi Arabia), Zouhir Bahri (University of Bahrain, Bahrain)

Design and FE simulation of a new UWB Antenna for underground communications in Oil and Gas Industries and Smart Cities

Ali Bostani (American University of the Middle East & Microwavesoft, Canada); **Girish Awadhwai** (Institute of Technology, India); **Amal Almutairi**, **Farah Ahmad**, **Anwar Alotaibi** and **Hamdah Alenezi** (American University of the Middle East, Kuwait)

Dealing with tiny things in size of insects as a real life application is not an imagination anymore but an accurate and scientific way that proves engineering can do anything. Tending to have two connected ring shape Micro-strip antenna for an Ultra Wide Band (UWB) antenna as the wanted aim, and it will be illustrated well in this paper. Therefore, because of feed line, ground ring inner radius and ring outer radius that has been optimized in order to obtain the frequency domain analysis of the projected antenna. As a result, here creativity that engineering enhances on us, makes us challenges all the obstacles and nature circumstances to make proposed antenna that has the good capability which can be used for UWB purposes in oil industries and fields. According to FCC, the allocated operational bandwidth is nearly 1 GHz for the UWB, and as a range, it's from 2.3 GHz to 10.9 GHz; therefore along it, the return loss (S11) is less than -10 dB. Presenting the simulated return loss, radiation pattern and current density for different frequencies in this paper was the goal wanted to be achieved for this research file

Presenter bio: Dr. Ali Bostani has been an assistant professor at the American University of the Middle East Since March 2015. He is the founder and CEO of MicrowaveSoft in Montreal, Canada since 2013. He obtained his Ph.D. in Electrical Engineering from McGill University in Canada in 2012. His field of research in PhD was computational electromagnetics and more specifically Finite Element methods and analysis of passive RF structures. He obtained his MSc in 2008 from INRS-EMT, Montreal, Canada and his research focus in his Master's was ultra wideband antennas and Electromagnetic band gap structures. Dr. Bostani started his career in industry in 2010 while he was still a PhD student. He worked as a research scientist in EMWorks company where they were developing a full wave solver for high frequency simulations.



Renewable Energy using Integrated Solid Waste Management System for Smart Cities

Lewlyn Lester Raj Rodrigues (Manipal University & Manipal Institute of Technology, India); **Sumana Raghu Vishnu Jagadeeshi** and **Sriram K V** (Manipal Academy of Higher Education, India)

Technological advancement, economic growth and urbanization has resulted in an exponential rise of waste materials causing serious threat to health and safety of citizens around the world. It is in this context Integrated Solid Waste Management (ISWM) system, a holistic approach of combination of scientific methods and techniques to convert Waste-to-Energy (WTE) is gaining importance in designing smart cities as eco cities. This article provides an overview of ISWM system, its benefits on environment and challenges in making smart cities as cleaner, greener and leaner. A perspective of ISWM system of select cities across the globe is considered as case studies to incorporate the best practices. A state-of-the-art approach of ISWM system is discussed by presenting a model to treat wastes as a renewable source of energy.

Presenter bio: Dr. Lewlyn L. R. Rodrigues is Head of Humanities & Social Sciences and Professor in the Mechanical and Manufacturing Engineering Department at Manipal Institute of Technology, Manipal. He has B.E. (Mechanical Engineering), M.Tech. (Production Engineering Systems Technology) and Ph.D. (System Dynamics). His areas of research interest include System Dynamics, Total Quality Management, Innovation/Knowledge/Technology Management, Manufacturing, and Human Resource Management. Dr. Rodrigues has over 175 papers in various journals and conferences, has over 575 citations and is the Reviewer of JKMP and several International conferences. He has successfully guided nine Ph.Ds. and currently guiding three Ph.Ds. He can be contacted at rodrigusr@gmail.com, Mobile: +91-9900710677.



Smart Solar Irrigation System

Ashraf A Zaher (American University of Kuwait - College of Arts and Sciences & IEEE, Kuwait); **Hidab Hamwi**, **Mona Albathal**, **Aisha Almas** and **Salma Al-Baitamouni** (American University of Kuwait, Kuwait)

Recently, we witnessed a fast growing trend in electricity and water consumption in various places. Among them are the agricultural irrigation processes, where considerable amounts of water and electricity are wasted. Economical irrigation systems have been developed in the past, but they either resulted in a costly budget, or simply used traditional, nonrenewable, sources of electricity. Irrigating big-size farms requires huge efforts to keep all crops well maintained, in contrast to old irrigation systems that don't uniformly distribute water to all crops. To avoid consuming unnecessary amounts of water and electricity, we came up with a better designed irrigation system, which is the Smart Solar Irrigation system. The automated solar irrigation system is designed to be both water and electricity efficient. It is powered by solar panels, to make it eco-friendly, which can be implemented either on large or small scales. Our source of electricity comes from three monocrystalline solar panels that are 285W each and produce around I_{sc} -9A per panel and V_{oc} -40V. They are used to charge two Gel batteries that are 12V and 150Ah each. The two batteries are connected in series to provide 150Ah and 24V. Using the Gel batteries ensures a longer life-time and most importantly an environmentally safe leakage-free operation. Moreover, they are capable of storing the energy that is produced by the solar panels. A controller for the solar charge, along with a 24V to 12V step-down transformer is used to ensure that our system is going to run on 12V DC. To design our project, we will start by creating an interface, which will be connected to the control unit through a wireless connection via an Xbee USB Explorer and an Xbee 100-meter range wire antenna. An Arduino-Mega microcontroller is used to organize the process of our system that detects a dry soil, using moisture sensors. The designed system operates a water pump, which will supply water to a reservoir, located at a specific high elevation. The level of the water is controlled via a sensor that turns the pump On or Off, depending on a preset hysteresis cycle. Potential energy of the stored water is used to allow water to flow, autonomously, and to irrigate the crops using a drip tape that will slowly and efficiently distribute water to all crops. This has the advantage of not flooding the plants, resulting in saving water. Furthermore, a real-time monitoring system will be available to detect if the system has any faults, using a short current detector, which will allow the microcontroller to effectively control the operation of the water pump. In addition, a digital thermometer, and a temperature control system, will be integrated into the project to notify the user of the soil temperature and to provide a supervisory control function to the duration the water irrigation for the crops. Finally, the user can switch on/off the system from their indoor computers/phones, and feedback can be sent either by SMS or E-mail. One of the most important contributions of the proposed design is the elimination of the need to routinely check the irrigated areas, as the user will receive both real-time and on-demand notifications for the complete operation.

Presenter bio: Aisha Almas is currently an undergraduate Computer Engineering student in her Senior year and is expected to graduate in the summer of 2018. Her high school educational background was based on a British scientific curriculum which led to her interest in the field of technology and the environment a.k.a Renewable Energy. She has attended an internship at Kuwait Institute for Scientific Research (KISR) in the summer of 2017 where she was inspired by the ideas of using solar energy to create her Smart Solar Irrigation System.

Presenter bio: Dr. Hidab Hamwi is currently an Assistant Professor in Kuwait Institute for Scientific Research (KISR). She finished her Ph.D. in Electrical Engineering from the State University of New York, Buffalo, USA, in 2008. She finished her M.Sc. in Electrical/Communication Engineering and B.Sc. in Electrical Engineering, from Kuwait University in 1996 and 2002, respectively. Before joining KISR, Dr. Hidab was Senior Manager of Student Affairs at the Australian College of Kuwait (ACK). She demonstrated leadership in many academic and industrial foundations, including Patents and Trademarks, Ministry of Commerce and Industry in Kuwait. In addition, Dr. Hidab has a long record of working as an Adjunct Professor in many academic institutions in Kuwait. Her teaching and research interests include Renewable Energy Systems, Power systems, Control, and Communication systems.



Bahrain Intelligent Street Lighting System - A Study to Retrofit Bahrain Street Lighting

Mohammed Al khalidy (UoB, Bahrain); **Norrideen Mansour** (University of Bahrain, Bahrain); **Bassam Jaffer** (UoB, Bahrain)

Currently most of the street lighting systems in Bahrain use non-dimmable High-Pressure Sodium lamps (HPS) along with an on/off control system. This system is not cost effective, may lead to unnecessary energy use in some regions, and lowers the life spans of lamps. Considering the above problems, it has become increasingly important to develop a system that is more efficient and cost effective. In recent years, with the advanced technology of high quality energy-saving LED lamps at lower cost, led to great interest worldwide in using LEDs in street lighting. The merits of the LEDs is their dimming capability, which allow adding an intelligent system for monitoring and controlling their lighting level and energy consumption. In this study, a retrofitting strategy to convert current Bahrain street lighting system into smart system is proposed. The smart street lighting system will incorporate dimmable Light Emitting Diodes (LEDs) streetlights, motion sensors, light sensors, and microcontroller. The aim of this work is to illustrate an evaluation and analysis of the current and proposed lighting systems in terms cost, energy consumption, lifespan, maintenance, efficiency, etc. The proposed system is implemented and evaluated on a locally built prototype of a relevant Bahrain Highway and the results were successful. These results support a possible large-scale implementation of the proposal.

Presenter bio: Mohammed Al Khalidy received his M.Sc., Electrical and Electronics Engineering, University of Technology, Iraq, 2002 and his Ph.D. in Electrical and Electronics Engineering, University of Technology, Iraq, 2007. Doctor Al Khalidy IEEE senior member. He was a Senior Project Engineer, Al-Karama Public Company (Industrial Company), Iraq, Baghdad, 1997– 2006. Deputy Director for Electrical Department and an Assistant Professor with the Electrical Engineering Department, Al-Mustansiriyah University, College of Engineering, Iraq, Baghdad, 2006 – 2009. Assistant Professor with the Electrical and Electronics Engineering Department and a Manager of Academic Accreditation Unit, GU, 2009–2014. Since 2014. Doctor Al Khalidy serving now as Assistant Professor with the Electrical and Electronics Engineering Department, University of Bahrain. He has many published researches, In 2012 he published his first book “Wheeled Mobile Robot”, Lambert Academics Publishing GmbH & Co. KG. Doctor Al Khalidy research interests include Industrial Electronics, Intelligent Systems and Robotics, Aerospace control and Guidance Systems. Image processing and Sustainable Energy.



Resistor-less Low-Power Voltage Reference

Yaser Othman (Abu Dhabi University & Sharjah University, United Arab Emirates); **Jolu Ninan** (Abu Dhabi University, Abu Dhabi, UAE, United Arab Emirates); **Anas Al Tarabsheh** (Abu Dhabi University, United Arab Emirates)

A low power resistor-less voltage reference with V_{ref} of 440mV with a total power consumption of 1.2 μ W is presented in this paper. The operational temperature range is between -10°C to 90°C with a temperature coefficient of 246ppm/ $^{\circ}\text{C}$. The proposed circuit has a PSR of 50dB attenuation for frequencies upto 1MHz, and accepts voltage supply in the range of 1.4V to 3.0V. The design utilizes an all MOSFET approach operating in the strong inversion region. The design process selected is the standard 180nm CMOS process with simulations performed using LTspice.

Presenter bio: Eng. Yaser Othman is a M.Sc. Electrical and Computer Engineering student at Abu Dhabi University. His fields of interest are IoT, Embedded Systems and Image Processing. he is honored with many awards in innovation and technology in United Arab Emirates. He is the first place winner in Ministry of Finance Hackathon 2016, first place winner in MAC (Mobile Application Contest) 2016, second place winner in Think Science Competition 2015 and again second place in 2016, receiver of BCS (British Computer Society) award in 2016 and many other awards and prizes.



S4: Smart Transportation System-1

Room: S45-106-Zain E-Learning Center

Chairs: Vasileios (Basile) P. Spyropoulos (Technological Education Institute of Athens & University of West Attica, Athens, Greece), Mohammed Al khalidy (UoB, Bahrain)

Artificial Intelligence Enabled IoT: Traffic Congestion Reduction in Smart Cities

Safeeullah Soomro (AMA International University Bahrain, Bahrain); **Mahdi H. Miraz** (AMA International University BAHRAIN, Bahrain); **Mirza Abdulla** (AMA International University Bahrain, Bahrain); **Anupama Prasanth** (AMA International University, Bahrain)

The world has now entered in a new era of Computing, blessed with many prominent technologies including Artificial Intelligence (AI) and Internet of Things (IoT). In an IoT world, sensor enabled objects (things) are connected together via the Internet to participate in performing a particular task mainly by sending and receiving data from one to each other for the digital communication. Artificial intelligence empowers agents (machines or devices) to perceive the surrounding environments leading to take calculative decisions, followed by performing efficient actions in order to maximizing the chances of successfully accomplishing a desired task or goal. In this research, we combine both IoT and AI to reduce traffic congestions in a smart city environment. A detailed literature review has been conducted and a simple solution based on AI Algorithm has been proposed. Future directions of the research has also been identified and advocated.

Presenter bio: Professor Dr. Safeeullah Soomro holds B.Sc (Hons) computer Science and M.Sc in Computer Science from University of Sindh, Jamshoro Pakistan. He earned his PhD in Computer Science from Graz University of Technology, Austria. He has done Postdoc from Europe Dr. Soomro has joined AMA International University as (Professor) Associate at the College of Computer Studies. Previously he played roles as a Professor, Associate Dean and Dean at Indus University, SMI University and IBT. He carried out research at Graz University of Technology. He has been involved in research and teaching since 1998. He is an author of more than fifty national and international publications in conference proceedings, books and journals.

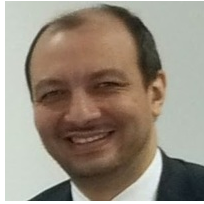


Traffic Signs Identification by Deep Learning for Autonomous Driving

Wael Farag (American University of the Middle East, Kuwait)

In this paper, we have proposed and have developed a comprehensive Convolutional Neural Network (CNN) classifier "WAF-LeNet" to be used in traffic signs recognition and identification. The implemented CNN architecture is a deep fifteen layer network that has been selected after extensive trials. The CNN got trained using Adam's optimization algorithm based on scholastic gradient descent technique. The learning process has been carried out by using the well-known "German Traffic Sign Dataset". The data has been portioned into training, validation and testing sets. Moreover, more random traffic signs images have been collected from the web has been collected and further used to test the robustness of the proposed CNN classifier. The paper goes through the development process in details and shows the image processing pipeline harnessed in the development. The proposed approach proved successful in identifying correctly 96.5% of the testing data set and 100% of the robustness data set.

Presenter bio: Wael Farag earned his Ph.D. from the University of Waterloo, Canada in 1998; M.Sc. from the University of Saskatchewan, Canada in 1994; and B.Sc. from Cairo University, Egypt in 1990. His research, teaching and industrial experience focus on embedded systems, mechatronics, autonomous vehicles, renewable energy, and control systems. He has a combined of 17 years of industrial and senior management experience in: Automotive (Valeo), Oil & Gas (Schneider) and Construction Machines (Caterpillar) positioned in several countries including Canada, USA & Egypt. Moreover, he has 10 Years of academic experience at: Wilfrid Laurier University, Cairo University, and American University of the Middle East. Spanning several topics of electrical and computer engineering. He is the holder of 2 US patents; ISO9000 Lead Auditor Certified and Scrum Master Certified.



Traffic Microsimulation Model for Bahrain: A Step Towards Smart Traffic System

Uneb Gazder, Mahmood Hamid and Mohammad Yazan (University of Bahrain, Bahrain)

Traffic simulation programs are frequently used worldwide as a tool for analyzing transportation problems with minimum cost. The calibration of a simulation model is the main step for obtaining any representative results from the analysis. It is also an essential step towards obtaining smart solutions for traffic issues in the modern world. It can be used to test and verify the viability of innovative solutions for traffic congestions, accidents and many other related problems. Therefore, main objective of this study was to calibrate a microscopic simulation model using PTV VISSIM for Bahrain. Afterwards, a validation process was performed by comparing the simulation results with the real traffic data. The study location was in Avenue 27, Saar, Kingdom of Bahrain. Two, out of several intersections on this road, were examined in this study. A dynamic simulation was performed on avenue 27 using VISSIM software. Default values from VISSIM were tested for accuracy in terms of replicating real field data including; average travel time and average travel speed. The results with these values showed no significant discrepancy between the model simulation and the field observed values. Simulation model was used to calculate level of service for the study site at present as well as in future. It was found that both intersections were at level of service A, which indicates excellent quality of performance, presently as well as in future. Hence, modifications such as introducing a signal are not required soon.

Presenter bio: Mr. Mahmood Hamid is a student in department of Civil Engineering at University of Bahrain. He has done his senior design project in the field of traffic simulation. He has received further training from Ministry of Works and Al Zamil and Al Sahban real states. His software skills include Engineering Drawing (AutoCAD), Traffic Simulation (PTV VISSIM), Programming Skills (C++/MATLAB), Professional Photo Editing (Adobe Photoshop) and Microsoft Office (Word / PowerPoint / Excel). He is a member of Institute of Electrical and Electronics Engineers (IEEE), Student Advisory Committee- University of Bahrain (2016-17) and Institution of Civil Engineers (ICE)2015-Present .



Toward Smart Logistics: A New Algorithm for a Multi-Objective 3D Bin Packing Problem

Youssef Harrath, Jihene Kaabi, Houssam Eddine Bououdina and Amro Tariq Qasim (University of Bahrain, Bahrain)

The most important logistics requirements are the reception of the product on time, in the right place and in the best condition. These requirements may be satisfied by implementing a smart logistic process. One important problem that is faced in that process is the bin packing problem. The bin packing is an NP-hard problem which focuses on optimizing the number of bins for a set of items with varying volumes and/or weights. Bin packing problem is used in many applications such as job scheduling, shipping items and placing data on multiple disks. Although many algorithms have been developed to solve the bin-packing problem, some drawbacks have remained unsolved like efficiency of the algorithm vs. optimal number of bins. In this research, we propose a multi-objective 3D bin packing algorithm that focuses on optimizing the number of bins as well as balancing the weight inside each bin. The proposed algorithm was implemented and tested with data gathered from FedEx. The computational results showed that the algorithm is efficient for a small number of problems and runs very fast for up to around 25000 items. The algorithm also balances the weights between the bins almost perfectly.

Presenter bio: Jihene Kaabi is Assistant Professor in the College of Information Technology at the University of Bahrain. She received her Bachelor degree in Applied Mathematics from the Faculty of Science, Monastir-Tunisia in 1999. She obtained two Master degrees; the first in Operations Research, Combinatorial, and Optimization from Polytechnic Institute, GrenobleFrance in 2000 and the second in Automatic and Computer Science from the University of Science & Technique, Besançon-France in 2001. She received her Ph.D in Automatic and Computer Science from the University of Science & Technique, Besançon-France in 2004. Her research interests focus on scheduling, Production Manufacturing, Maintenance, Multiobjective Optimization, Genetic Algorithms. She developed many research papers in the field of optimization problems using genetic algorithms and other heuristic approaches.



The Design of a Drivable Airport Luggage Trolley

Seyed Ebrahim Esmaeili and Hesah Al Enezi (American University of Kuwait, Kuwait)

The impact of technology has undergone many developments and changes within a short period of time. The worldwide acceptance of this rapid change made people rely and depend more on technology. The innovation in the design of airport's luggage cart can propose a solution to different problems faced by travelers. This includes the lengthy check-in procedure and the tiresome task of moving around the airport carrying heavy luggage. The proposed drivable airport luggage trolley has a display that renders the information of the passenger's traveling destination and grant more information of the airport gates to save time. In addition, the user will be notified of any new update that might include a change in the time of flight or gate number. Furthermore, the proposed trolley can be easily driven and controlled by the user and is suitable for all ages. Also, proposed trolley offers a higher degree of security because it provides a safe mode lock for the luggage.

Sunday, April 22, 14:55 - 15:15



SB3: Short Break

Room: S45-Zain E-Learning Center-First Floor

Sunday, April 22, 15:15 - 16:30



S5: IoT-enabled Smart Cities-1

Room: S45-108-Zain E-Learning Cente

Chairs: Chitra Balakrishna (Edge Hill University, United Kingdom (Great Britain)), Luisella Balbis (Assistant Prof, Bahrain)

Machine Learning for IoT-enabled Smart Cities

Nazar Waheed (Military Technological College Muscat, Oman); Salman Saadat (Military Technological College, Muscat & IEEE, PMI, Oman); Waleed Ejaz (Ryerson University, Canada)

Internet of things (IoT) enabled smart cities consist of billions of connected nodes which are expected to generate a large amount of data. This exceedingly large number of IoT nodes and the huge volume of data generated by them present multiple challenges for the successful deployment of IoT solutions in the smart cities. These challenges include management of resources among the heterogeneous nodes, data gathering, information processing, energy efficiency and security of IoT systems. Recently, various machine learning techniques have been explored by the research community for performance enhancement of different IoT components in IoT-enabled smart cities. This paper provides a framework for the advancements in research on machine learning for IoT-enabled smart cities. Specifically, we focus on the machine learning techniques that are implemented in sensor networks, 5th generation (5G) cellular networks which is considered as the key communication technology for IoT systems, and cloud computing. Various classes of machine learning algorithms are analyzed for these components of IoT-enabled smart cities and future research directions are presented.

Presenter bio: I have done Master of Science in telecommunication engineering from University of Melbourne, Australia and my bachelor of science degree is in communication systems engineering. I am currently a PhD research fellow at Huazhong University of Science and Technology, China. I also have previous experience of working in academic, R&D and industry sectors. My research interests include resource & network management in cognitive radios, femtocell networks, LTE unlicensed and ultra dense networks.

Presenter bio: Waleed Ejaz (S'12-M'14-SM'16) received the B.Sc. and M.Sc. degrees in Computer Engineering from the University of Engineering and Technology, Taxila, Pakistan and the National University of Sciences and Technology, Islamabad, Pakistan, and the Ph.D. degree in Information and Communication Engineering from Sejong University, Republic of Korea, in 2014. Since 2014, he held academic and research positions at Carleton University, Ryerson University, and Queen's University in Canada. His current research interests include

Internet of Things (IoT), energy harvesting, 5G cellular networks, and mobile cloud computing. His professional activities include an Associate Editor of the IEEE Communications Magazine, IEEE Canadian Journal of Electrical and Computer Engineering, and the IEEE ACCESS. He is a registered Professional Engineer (P.Eng.) of the province of Ontario, Canada.



Electricity Generating and Monitoring System using IoT

Deepti Mehrotra (AMITY School of Engineering and Technology & Amity University, India); **Rashbir Singh** and **Vikas Deep** (Amity University Uttar Pradesh, India)

Due to the increase in population, there is a drastic increase in demand for electricity. This paper proposes a model for electricity generation which can be utilized both by urban and rural area people. As there are still many rural areas in India which do not have direct access to electricity so this proposal can help them to a great extent to generate electricity at their homes and utilize it when so ever they feel. In urban cities it can be used to reduce the consumption of electricity required for small tasks and a bigger model can be used to take control of heavy electricity consumption tasks. In this study, we proposed a model which uses the technology of IoT(Internet of Things) and robotics mechanism to develop a smart electricity generation bot.

Presenter bio: Dr. Deepti Mehrotra did Ph.D. from Lucknow University and currently she is working as Professor in Amity school of Engineering and Technology, Amity University, Noida, earlier she worked as Director of Amity School of Computer Science, Noida, India.. She has more than 20 year of experience in research, teaching and content writing. She had published more than 100 papers in international refereed Journals and conference Proceedings. She is editor and reviewer for many books, referred journal and conferences. She is regularly invited as resource person for FDPs and invited talk in national and international conference. She enjoys guiding research scholar and has many Ph.D. and M.Tech students.



Impact of IoT Device Saturation on Home WiFi Networks

Dylan Kauling (University of Ontario Institute of Technology, Canada); **May Al Taei** (Zayed University, United Arab Emirates); **Qusay Mahmoud** (University of Ontario Institute of Technology, Canada)

The number of smart home devices and their applications are increasing with little regard to the maximum capacity of the networks, which are supposed to host such devices. We explore how well various consumer-grade routers perform when a multitude of IoT devices are connected and several video streams are active at once. Evaluation results demonstrate entry-level routers are not capable of handling the workload produced by IoT devices. Routers that support Multi-Input Multiple Output (MIMO) technology and multi-band routers are recommended to compensate for these devices.

Presenter bio: May Al-Taei is Assistant Dean for Research and Graduate Studies, she is an Instructor in the College of Information Technology at Zayed University, Abu Dhabi. She received her Masters degree in Management Sciences from the University of Bath, in the UK. She is currently completing her PhD in Knowledge Management at the University of Birmingham, in the UK. Ms. May's research interests include knowledge management, entrepreneurship, service management, IT-Business alignment, innovation management, technical project management, and web service technologies. Prior to starting her PhD, Ms. Al-Taei served as the Director of the Institute for Technological Innovation, Abu-Dhabi office. She has received two of Zayed University's highest honors; membership in the Sheikhha Fatima Honor Society and the ATHENA leadership award. Ms. Al-Taei was selected for the "Young Ambassadors Study in the United States" Institute and participated in the "Gateway to Business" program at Georgetown University in the U.S. in which she won two awards.



IoT School Bus: Children Safety

Marquos Samuel Zaki, Khaled Alhussein and Ali Alquraini (King Fahd University, Saudi Arabia)

With the rising statistics of traffic accidents and child abduction, there is a need for a robust system that enables constant tracking for millions of children on their way commuting from and to schools. With emerging of Internet of Things (IoT) technology, in addition to Radio Frequency Identification (RFID), developing such system becomes feasible. This system (Fig .1) provides complete visibility children tracking. In this paper, we propose a complete low cost design and implementation of an IoT-based system that allows schools, parents and authority to track the movement of the children during their presence in the school bus, which guarantees comfort for parents and safety for children. The system is based on, a low cost Nano RFID reader and a GPRS module both interfaced with Arduino microcontroller. The Nano RFID reader is used as an interface for providing the reader with a mean to access the internet over 3G/4G network. We build Mysql database and deploy it on Heroku's cloud platform, which makes building applications and deploying them fast, secure, easy and scalable. We also develop a Java GUI; with secure login grant admin access, for a complete visibility and control over the system users on internet. The system is tested successfully on field using one of King Fahd University of Petroleum and Minerals (KFUPM) school buses.

Presenter bio: Marquos is a an engineering student at King Fahd University of Petroleum and Minerals. He is graduating in May 2018 with a Bachelors Degree of Computer Engineering. Marquos is passionate about commercializing technology-related products and a smooth transition to the market. Interests include business informatics, digital transformation and big data analytics. A wide span of hobbies but most prominently are learning languages, travelling and public speaking.



An Automated Greenhouse System using Agricultural Internet of Things for Better Crop Yield

Tharmaraj Charlet Jeauinita and Sarasvathi Ram (PESIT Bangalore South Campus, India)

Greenhouse deployment of farms gives hope for farmers on higher crop yield, through lowering risks against pests, insects and adverse climatic conditions. Automation of greenhouse benefits farmers in various ways by the detection of soil and water quality and automatic irrigation. Involving scientific process in this automation boosts the benefits on agricultural activities. The current status of the greenhouse can be collected and sent to the cloud infrastructure for further decision making. This paper deals with the design and implementation of a model for IoT based agricultural greenhouse automation system for better crop yield. The system uses light-weight MQTT protocol for device to device communication. This paper aims to leverage an IoT based precision agriculture system in a greenhouse and hence achieve the goal of reduced human intervention by automatically detecting and controlling various climatic factors such as soil moisture, air humidity and light intensity to automatically monitor the irrigation, aeration and lighting facilities of the greenhouse. This work describes a methodology that helps avoid manual reconfiguration of the system by the technician. From the data collected at the cloud, an analysis of various measuring parameters is also made, which will help for predictions on weather and crop yield, and decision making.

Presenter bio: She is currently working as Assistant Professor in the Department of Computer Science and Engineering in PESIT Bangalore South Campus, Bangalore, India. She completed her B. E in Computer Science and Engineering from St. Xavier's Catholic College of Engineering, Tamilnadu, India and M.E in Computer Science and Engineering from Noorul Islam College of Engineering, Tamilnadu India. She is pursuing Ph.D in Computer Science and Engineering in Visveswaraya Technological University, Bangalore, India. Her research interest is IoT.

Presenter bio: Currently working as Associate Professor in Department of Computer Science and Engineering in PESIT Bangalore South Campus, Bangalore, India. She has completed PhD in VIT University, Vellore, India. Her research interest includes Wireless Ad-Hoc, Sensor and Mesh Networks, Internet of Things, Cloud Computing, Network Optimization and Performance computing. She had nearly 12 research publications in reputed peer reviewed international journals and conferences. She served as Guest Editor for Special Issue on: "Emerging Trends, Applications and Services in Communication Networks" International Journal of Communication Networks and Distributed Systems- Inderscience Journal and as Editor for IGI Global "Handbook of Research on Applied Cybernetics and Systems Science"



Room: S45-106-Zain E-Learning Center

Chairs: Abdulla Alqaddoumi (University of Bahrain, Bahrain), Wael M El-Medany (University Of Bahrain, Bahrain)

Micro-implants evolution towards Smart Healthcare as reflected on relevant filed Patent-applications

Vasileios (Basile) P. Spyropoulos (Technological Education Institute of Athens & University of West Attica, Athens, Greece)

Brain implants that deliver electrical pulses tuned to a person's feelings and behavior are being tested in people for the first time, by the Defense Advanced Research Projects Agency (DARPA). The work, presented at the Society for Neuro-science (SfN) meeting in Washington DC, could eventually provide a way to treat severe mental illnesses that resist current therapies; however, it also raises ethical concerns, because the technique could give real time access to a person's inner feelings. Using a brain implant to deliver electric pulses that alter neural activity has been successfully employed to treat movement disorders such as Parkinson's disease and it is hoped that constant stimulation of certain brain regions might ease chronic depression. The aim of this paper is to contribute to the discussion about the applicability of emerging CNS-implantable electronic micro-devices, as reflected on numerous retrieved and evaluated relevant Patent Applications and to consider eventually some ethical issues, associated with these emerging Technologies.

Presenter bio: Born: 1953, Thessaloniki, GR, BSc. Univ. Athens, GR (1976), PhD. Physics, Univ. Heidelberg/Univ. Saarland, DE (1982). Pos. CERN, Geneva, CH, Radiology & Clin. Chem. Inst. Univ. Heidelberg, DE, Head, BME-Dep. Public Hosp. Constr. Auth., Athens, GR, & Patent-Examiner, Europ. Patent Organ., Munich, DE. Since 1987 full Prof., Biomed. Eng. Dept., Technol. Educ. Inst. of Athens, GR. He serves/ed as Visit. Prof: Nat. School of Publ. Health, Athens, Univ. Patras Med. School, Univ. Crete, Nat. School of Publ. Admin., Athens, Army Med. Corps School, Athens, Dep. of Informatics, Univ. of Athens, Med. School, Univ. of Heidelberg, DE, Techn. Univ. of Ilmenau, DE, Nat. Nuclear & High-Energy Physics Inst. (NIKHEF), Amsterdam, NL, Accel. Physics Lab. Univ. of Illinois at Urbana-Champaign, IL/USA, and Harvard Med. School, Boston MA/USA. Head BMT-Lab. Activities: Health-Care ICT, BMT, Hosp. Mngt, Med. Decision Supp. & Rad. Protection. 420 Papers in Intern/Nat Scient. Journals/Confs. 14 Books, E-class.



A Proposed Framework for Health Care System in Bahrain

Nabil Hewahi (UOB, Bahrain); **Abdul Fattah Salman**, **Amine Mahjoub** and **Khaled Zehar** (University of Bahrain, Bahrain)

Home-based health care systems are becoming one of the most important areas in smart city applications. In this paper we investigate the possibility of developing a home-based health care system for patients who suffer from heart complications and blood sugar in Bahrain, and propose a framework for this purpose. The framework proposes connecting and transferring the patient readings to the hospitals and ambulance in case of emergency, and gives a notification to the take care person through SMS. Two databases will be used; one in the patient's mobile and the other is in the ministry of health servers. The proposed framework will relay of various sensors such as heart beat, temperature, blood sugar and ECG sensors. Some of these sensors are commercially available and others are to be developed in the next stages of the system development. The framework considers faint patients and deal with their situation. The expected end product should not be expensive and can be tolerable by the patients.

Presenter bio: Nabil M. Hewahi, obtained his PhD degree in Computer Science from Jawaharlal Nehru University, New Delhi, India in 1994, and M.Tech degree in Computer Science and Engineering from Indian Institute of Technology, Bombay, India in 1991. He is now with the university of Bahrain. Dr. Hewahi is a full professor of Computer Science (Artificial Intelligence) since 2006. He published over 60 papers in well known journals and conferences. His main research interest is Intelligent Systems including machine learning and knowledge representation.



Brain Computer Interface for Wheelchair Control in Smart Environment

Haleema Al-Turabi and **Hessa Al-Junaid** (University of Bahrain, Bahrain)

Brain Computer Interface (BCI) offers a solution to independent mobility for people with moving difficulties. This paper proposes a BCI to smart control of a wheelchair. The paper describes the experience of developing a complete BCI system consisting of hardware and software parts to instruct a wheelchair by human intention to move to different directions, left, right, backward, and forward using non-invasive EEG brain waves. Three different machine learning algorithms are used to classify human intention

to move to the desired direction, K-nearest neighbour algorithm, support vector machine algorithm, and artificial neural network. The highest accuracy achieved is 79.2% for support vector machine algorithm. The results prove that the system can be used for medical purposes successfully and the concept can be extended for other applications.

Presenter bio: Halima Al-Turabi graduated from University of Bahrain with B.Sc. degree in Computer Engineering 2018. Since 2012, Halima worked on many projects related to health monitoring and artificial intelligence.



Smart Assistive System for Severely Disabled Patients

Sarah Masaad, Safiya Jassim, Layla Mahdi and Zouhir Bahri (University of Bahrain, Bahrain)

A smart assistive system is designed and implemented to provide severely disabled patients with a fair level of autonomy and ease of communication. The system is based on an interactive, custom-tailored, artefact-mitigated and fault-tolerant Brain-Computer Interface (BCI) and is designed to work in real-time using an elaborate MATLAB code, Arduino microcontroller, and Emotiv wireless EEG headset with 14 sensors. The system differentiates between involuntary eyeblinks (considered artefacts, hence removed) and deliberate rapid eyeblinks (considered synchronizing signals) used for distress calling, start/stop signalling, as well as fault-tolerance owing to the confirmation of commands before their execution. Two classes of thoughts, custom-tailored to the capabilities of each patient, are used to navigate through an adjustable menu of commands that caters for the individual needs of the user. Independent Component Analysis (ICA) and Correlation are used to detect and mitigate the deleterious effect of the artefacts corrupting the EEG signals intended for classification. A Neural Network operating on sub-band-power-based features extracted with the Wavelet Transform is used as the classifier with a success rate ranging from 82% to 90%. The system can flexibly be adapted to suit various scenarios involving binary load control (on/off of TV, light, A/C, etc...) as well as multilevel control (up/down level of bed, TV volume, room temperature...etc.). The merits of this system have been successfully demonstrated in practice, showing its potential contribution to smart hospitals and patient-care facilities.

Presenter bio: Electronics Engineering student at University of Bahrain

Towards Robotics Advanced Learning (An analysis and Understanding of Eye-Electroencephalography)

Anam Naeem (University of Bahrain, Bahrain); **Ebrahim Abdulla Mattar** (University of Bahrain & X-chair of Electrical and Electronics Engineering, Bahrain)

This research's framework has been directed towards the use of Electroencephalography(EEG) for observing what an individual is thinking when watching a given scene. While doing that, there are several inside applications and implications that can be developed by analyzing the thoughts related to an eye sighting. To detect what is going on during an eye sighting machine pattern recognition routine have been used. This recognition was achieved by using Principal component analysis(PCA) and Multi-Layer Perceptron (MLP) learning mechanism.

Presenter bio: Anam Naeem is an Electronics Engineering graduate from the University of Bahrain. Team work and leadership skills have always been her main focus making her a part of many professional organizations. Anam is currently looking for opportunities to work in an environment, future projects & researches related to her field. She enjoys cooking, traveling and meeting new friends.



Monday, April 23

Monday, April 23, 08:00 - 08:30



R2: Registration

Room: S45-Zain E-Learning Center-Ground Floor

Monday, April 23, 08:30 - 09:45



S7: Smart Urban Planning & Interactive Architecture

Room: S45-108-Zain E-Learning Cente

Chairs: Sh. Fay Alkhalifa (University of Bahrain, Bahrain), Ali H Zolait, AZ (University of Bahrain, Bahrain)

Development of Lightweight Concrete Using Saudi Scoria Aggregate - A Preliminary Study

Muhammad Nasir (Imam Abdulrahman Bin Faisal University, Saudi Arabia)

Widening of eco-friendly materials is a critical concern in the Kingdom and all over the world. The growth of concrete demand is rapidly increasing in the construction industry. The global market is seeking more in the development of non-traditional, sustainable and economical concrete such as lightweight concrete (LWC). In order to keep up with the rising demand of concrete, new environmentally friendly resources must be available to produce lightweight concrete. Local waste materials such as Scoria rock (SR) are largely available in the kingdom of Saudi Arabia and can be found in the western region. Concrete is the most mandatory material for infrastructure developments. The LWC may be considered as a potential replacement of normal weight concrete (NWC) as it might reduce the dead load of the structure which will result in less volume of structural elements and most importantly its foundations. This eventually will cause in reduction of construction cost. The main objective of this study is to develop sustainable and environmentally friendly construction material using local waste by identifying compatible lightweight concrete waste materials and develop mix proportions and evaluate various aspects depending on the compressive strength of LWC. The properties such as bulk density, absorption, specific gravity etc. of the Scoria light weight aggregate have been investigated. Lower bulk density and specific gravity of the lightweight aggregate Scoria than normal weight aggregate proves its potential for using in lightweight concrete development with reasonable workability. The proposed 28-day LWC strength was comparable to NWC registering 35 MPa as well as 10% reduction in unit weight. The LWC material is set to hit the construction industry market and draw attention to be widely employed in the Middle eastern region and KSA at large.

Presenter bio: Muhammad Nasir is lecturer in Civil and Construction Engineering Department at Imam Abdulrahman Bin Faisal University, Saudi Arabia. He completed his M.S. in Structure and Materials from King Fahd University of Petroleum and Minerals in 2014. His area of interest is Concrete Technology.



Smart Assistive System for Laborers

Bilal Zahid (University of Bahrain, Bahrain); **Omar Al Dirini** (University of Bahrain & INNSYS International, Bahrain); **AbdulRahman Buti** and **Zouhir Bahri** (University of Bahrain, Bahrain)

A smart assistive system for laborers is designed and built with a novel integrated three-fold objective. First, it provides workers in excessively hot conditions with some head cooling comfort. Second, it monitors the workers' health state via his/her heart pulse rate. Third, and in case of danger or emergency, it allows the supervisor to communicate with and locate the worker in distress. Towards this goal, a standard helmet was retro-fitted with a heat sink and a Peltier device both lined for a better thermal insulation and uniform head cooling. Two Java-based mobile applications were developed, one for the worker, the other for the supervisor. The former monitors the worker's position and his/her heart rate every 30 seconds and sends this information in real time to the supervisor's mobile application via Google's Firebase Realtime database. An Arduino microcontroller is used to interface the heart sensor and the Peltier unit to the worker's mobile application. If the heart rate is found to be out of safe bounds (pre-set by the supervisor), an alarm message is triggered in both applications and a direct communication is attempted between both parties. In case of failure, the worker's location may be displayed by the supervisor using Google Map for rescue purposes. With an initial cost estimated at \$50, the potential benefits of this prototype system were successfully tested achieving a cooling difference of about 4 degrees between the worker's head and the ambient temperature. With a custom-made helmet and outfit design

involving a more efficient thermal insulation and a cooler unit, the merits of this smart system may be extended to higher levels of safety and comfort contributing to a smarter working environment in cities.

Presenter bio: Omar Al-Dirini is an Electronics Engineer by profession, he has graduated from University of Bahrain in 2017. He got he's job just 2 weeks from graduation at INNSYS International SPC at a Business Analyst in the ERP/ POS of retail and restaurant sectors. After 5 months, he was promoted to be the project manager on of the biggest projects for INNSYS International in Bahrain. At the same time, he is leading the functional support team at INNSYS International for all eCommerce projects. He has a very high profile in leadership and Entrepreneurship. He has reactivated the IEEE University of Bahrain Student Branch in 2015. In two 2016 he has started an initiative for its first time in the GCC region the "IEEE GCC Students and Young Professionals Congress". He served as the V.Chair of this congress. In 2018 he was elected to be the Chair of the Middle East Students and young Professionals Congress 2019, which will take place in Bahrain.

Presenter bio: AbdulRahman Buti is an Electronic Engineer who is graduated from the University of Bahrain in with the best Senior Project award across the university. His 4-year former experience in Database Administration got him to carry it on to another level, professional certificates. He started on with Oracle Certified Associate "OCA" certificate which is the keyword to gain one of the most important certificates to any database admin; "OCP". But being a database admin isn't as easy, it surely requires a fair amount of knowledge in Networking. Hence, he got the most known Cisco Certified Network Associate "CCNA" certificate and followed it with Cisco Certified Network Professional "CCNP" right after. Going back to databases, he is now on his way to gain Oracle Certified Professional "OCP" certificate. Talking about self-development, he decided to dive deep into Network Engineering field by applying for Masters in a leading university in the UK, more precisely Birmingham City University.



Conceptual Design of Architecture Revisited

Wael Abdelhameed (University of Bahrain, Bahrain)

There has been a controversy for decades regarding applying digital media in the early phases of architectural design or in initiating an architectural design. Each point of view has its own proofs and justifications. However, with employing BIM in the architectural design process, new approaches appeared in the conceptual design phases. Those approaches maintain that BIM is changing the architecture industry. The current design tasks the architects employ during conceptual design have been questioned particularly after the emergence of BIM potential. There is a need to propose re-conceiving the modus operandi of current architectural education in terms of foundation issues, conventions, and fundamental pedagogies. The conventional design processes that depend upon initial abstractions and tacit knowledge do not benefit from the emerging BIM potential. The research presents certain benefits that digital media and BIM would offer during conceptual design. Examples from academia, students' designs, and from industry, practical projects, are presented to prove the research objectives.

Presenter bio: Dr. Wael Abdelhameed has a Ph.D. in CAAD and Architecture Education. He has been Associate Professor at UoB since 2014. Before joining UoB, he held teaching and research positions at South Valley University (Egypt), Fulbright Commission (USA), and Arizona State University (USA). His research areas are Digital Media use in designing; Virtual Reality; BIM use in early design stages. He has published more than 25 papers and articles. He has been a member of the Technical Committee for International Fulbright Science and Technology (IFST), Ph.D. award and Postdoctoral Scholarship, Fulbright Commission of Egypt, since 2006. He was a guest speaker of 1st, 2nd, 3rd, 4th and 5th Virtual Reality Symposium, Tokyo, Japan 2007-2014; and a keynote speaker at CAD'12 conference, Niagara Falls, Canada.



Potential of volcanic waste as eco-friendly aggregate to produce Lightweight Concrete

A. B. M. Saiful Islam (Imam Abdulrahman Bin Faisal University, Saudi Arabia)

Widening of eco-friendly materials is a critical concern in the Kingdom and all over the world. The growth of concrete demand is rapidly increasing in the construction industry. The global market is seeking more in environmentally friendly and sustainable solutions for materials, in this study it is lightweight concrete (LWC) or "Green Concrete". In order to keep up with the rising demand of concrete, new environmentally friendly resources must be available to produce lightweight concrete. Local waste materials are largely available in the kingdom of Saudi Arabia and can be found in the western region e.g., Scoria (SR). Concrete is the most mandatory material for infrastructure developments. The LWC may be considered as a potential replacement of normal weight concrete (NWC) as it might reduce the dead load of the structure which will result in less volume of foundations. This eventually will cause in reduction of construction cost. The main objective of this study is to develop sustainable and environmentally friendly construction material using local waste by identifying compatible lightweight concrete waste materials and develop mix proportions and evaluate

various aspects depending on the compressive strength of LWC. The properties such as bulk density, absorption, specific gravity etc. of the Scoria light weight aggregate have been investigated. Lower bulk density and specific gravity of the lightweight aggregate Scoria than normal weight aggregate proves it potential for using in lightweight concrete development with reasonable workability. The LWC material is set to hit the construction industry market and draw attention to be widely employed in the Arabian countries.

Presenter bio: Muhammad Nasir is lecturer in civil & construction engineering department at Imam Abdulrahman Bin Faisal University, Saudi Arabia. He completed his M.S. in Structure and Materials from King Fahd university of petroleum and minerals in 2014. His area of interest is Concrete Technology.

Designing Interactive Built Environment: A Need to Introspect Design Studio Approach

Anamika Jiwane and Farial Khan (University of Bahrain, Bahrain)

The rapid development of technology is pushing us towards places which can offer ever changing experiences made possible via digital interactivity. With this growing trend, we have to understand that; 'designing built environment' is all about 'designing the interactive experiences'. Thus 'Human experience' should be the sole objective of our design process. The users are demanding more and more out of their experiences and designers have to supply more and more opportunities to reach those demands in personal ways. Therefore, the study identifies the need that the designers need to work across various disciplines and parameters during the design process. To cope up- they need to explore new skills to design spaces which are not only attractive but also simulative to the users, so that, the users can participate in their environment. Based on this, the study puts up a question- is our current design studio approach capable to deal with these challenges of creating interactive environment? Is it encouraging our students to think 'out of box experiences' for physical spaces? According to American dictionary, 'interaction' is defined as a process which allows two or more things to have an effect on each other. Referring to this, interactive built environment can be defined as a design approach that is based on balanced mutual relation of multi aspects- (emphasizing human and physical aspects) which should lead to a time specific and place specific human experiences. The need of repositioning the role of designer is understood and therefore, the authors of this study would like to propose 'a design studio approach' that will focus on evolving design solutions to offer opportunities (tools and interface) to the users to become designers of their spaces. The available literature on interactive design brings attention to designing with empathy-to understand how the users feel, respond and react to the surrounding environment. Therefore, this study doesn't see the approach based purely on technology as most of the designers assume and hence conclude with a deliberate opinion- 'instead of bringing users to interact through computational technology, what if the interaction happens through a golden ratio among people-context- culture?' 'How it would be if it isn't only (or necessarily) digital, but truly a multi aspect- multidisciplinary design?' The study will collect the qualitative data through the discussion with faculty and students in design studios at the department of architecture and interior design, University of Bahrain. A small experiential study with graduation studio would be added along with the literature and existing case studies-revealing the need of interactive built environment-with or without digital technology.

Presenter bio: Anamika Vishal Jiwane is currently working as a Senior Lecturer at the Department of Architecture and Interior Design, University of Bahrain. She is an architect with Masters in Urban Planning from VNIT, India. She also holds a Post Graduate Certificate in Academic Practice (UOB) and has been awarded fellowship from Higher Education Academy, UK. She has been in teaching profession of Architecture and Design since last 17 years. She has been keen interest on experimenting with different teaching models and performing action research to bring about healthy learning environment in Design studio. Her areas of research interest are Sustainable Development, Community Participation and Participatory Approaches, Rural Development and Design Education. She has published several Papers in International Journals and presented at significant Conferences. She has also participated in slum redevelopment and rural planning projects in India as a volunteer to render community services.

Presenter bio: Farial Khan is currently working as a Senior lecturer, at Department of Architecture and Interior Design, University of Bahrain (UoB). She has 25 years of teaching experience in Architecture, Interior Architecture and Interior design. She is an architect holds a Bachelor and Master's degree in Architecture from Bangladesh University of Engineering and Technology (BUET) with a specialization on architectural conservation. She also holds Post Graduates Certificate in Academic Practice (UoB) and has been awarded fellowship from The Higher Education Academy, UK. Her research focuses on Architectural Conservation, Environmental issues and Green Architecture, Sustainable Architecture and Design Education. She has published several journal papers at International level and participated and presented research papers in different seminars and conferences. As an editorial assistant, she has assisted in research work to produced three books for publication on architectural conservation and historical preservation in Bangladesh with the grant of Getty Foundation, USA. She was also appointed as Middle Eastern Regional Director (2016-18) by DCA (Design Communication Association, Montana, USA) to initiate new DCA activities in Middle East.



S8: Cyber Physical Infrastructure for Smart Cities-2 & IoT-enabled Smart Cities-2



Room: S45-106-Zain E-Learning Center

Chairs: El-Sayed M El-Alfy (King Fahd University of Petroleum and Minerals, Saudi Arabia), Sarah Al-Shareeda (The Ohio State University, USA)

Designing Cyber Security System for Smart Cities

Nandita Sengupta (University College of Bahrain, Bahrain)

Managing resources in an effective and efficient way is the main theme of smart cities. Different data collection sensors from various sources are used to manage the resources. Information and Communication Technology are the backbone of smart cities. Better life style is provided to the public of smart cities by providing smart transportation, smart governance, smart mobility, smart infrastructure, smart healthcare, smart technology. Cloud based IoT plays an important role for smart cities. Accessing secure and safe data can make the cities smart. Maintaining cyber security is very important for smart cities. Here, in this paper, two phased cyber security system is designed for cloud-based smart cities. In the first phase, hybrid encryption is proposed and in second phase, machine learning based intrusion detection system is proposed to provide complete cyber security system for smart cities.

Presenter bio: Dr. Nandita Sengupta is working as assistant professor, Head of Information Technology Department and academic advisor for IT Program at University College of Bahrain. Dr. Sengupta has obtained her PhD in Engineering (Computer Science and Technology), Master of Technology and Bachelor of Engineering from Indian Institute of Engineering Science and Technology, Shibpur India. Her area of specialization is in Data Mining and Network Security. She has experience of 11 years in Industry and 17 years in Academics. She joined UCB in September 2007. She taught various courses in undergraduate and graduate level. Some of the courses of undergraduate level which she taught are Computer Network, Network Security, data Warehousing and Data Mining, Artificial Intelligence, etc. Dr. Sengupta is actively engaged with academic research. She has around 35 publications in international conferences and reputed journals which are peer reviewed and available in digital library of IEEE, Elsevier, Springer. She is member of editorial board of International Journal of Computer Science and Business Informatics. She is actively involved in reviewing various research papers submitted for international journal and conferences. She is Fellow member of IACSIT (International Association of Computer Science and Information Technology), Life Member of "Computer Society of India" and member of "The Institution of Engineers(India)". She received "Amity Best Young Faculty Award" from Amity International Business School, Noida, India on the occasion of "The 9th International Business Horizon INBUSH 2007".



Challenges of Deploying Wireless Sensor Networks in Smart Cities for Healthcare Applications

Sara Alromaihi (University of Bahrain, Bahrain); **Wael M El-Medany** (University Of Bahrain, Bahrain)

As technology improves at an astounding rate, cities have to improve their services in terms of safety, healthcare, transportation, and the overall welfare of their residents. Wireless Sensor Networks (WSNs) play a major role in the infrastructure of a smart city by gathering and processing data from distributed sensors to implement smart services, such as traffic control, environment monitoring, and waste management. However, the most challenging part is securing data from various attacks while maintaining low-complexity techniques and algorithms. Considering security concerns to the deployment of WSNs as the main source of data collection and transmission, attacks are classified to identify a suitable scheme of defending against them. This paper provides a two-fold contribution to analyze security and privacy in the context of smart cities for healthcare applications. Thus, on one hand an overview of different WSN applications and their cyber vulnerabilities are presented. On the other hand, a comprehensive evaluation of possible approaches to mitigate the problem of cyber attacks is described.

Presenter bio: Sara Alromaihi is an MSc. in Cyber Security student at the University of Bahrain with experience coding in three languages and research interest in information security. Sara graduated with a BSc. in Computer Engineering in 2017. From her start as an engineer and continuing through a wide range of security and IT courses, Sara has been investigating the areas of system security, relevant legal frameworks and the wider context of cybercrime and prevention measures.



Toward a Smart Restaurant with Context Management

Nesrine Koubai (University of Science and Technology Houari Boumediène, Algeria); **Fayçal M'hamed Bouyakoub** (University of Sciences and Technology Houari Boumediene, Algeria); **Meriem sabrine Halilali** (University of Science and Technology Houari Boumediène, Algeria); **Islam Mohamed Amine Medad** (University of Sciences and Technology Houari Boumediene, Algeria)

In this paper, we discuss in an internet of things environment our solution regarding context management in the area of food services. We propose a system that allows to automate the different services offered in a restaurant and to connect the various equipment of this restaurant, in order to simplify and facilitate the work of employees using

this system.

Presenter bio: Nesrine Koubaï, currently PhD Student at the University of Science and Technology Houari Boumediene, Algiers, Algeria. Area of Interest are Internet of Thing, Context management, Context awareness.



Scalability Evaluation of Block Cipher Modes of AES Standard

Ibraheem Al-Hejri and El-Sayed M El-Alfy (King Fahd University of Petroleum and Minerals, Saudi Arabia)

Information security has attracted a growing interest due to the increasing number of hacking activities. Cryptography plays the major role to provide the information security against malicious attacks on confidentiality, integrity and authentication. Several symmetric-key cryptographic algorithms and standards have been proposed over years. With the emergence of Internet of Things and sensor networks, increasing volume of data is generated. Encryption/decryption algorithms can consume a considerable amount of computing resources such as memory utilization and CPU time, which is a critical issue in such environments. In this paper, we evaluate and compare the scalability of common modes of operation for block ciphers of AES Standard according to the recommendation of the National Institute of Standards and Technology (NIST) in terms of encryption time, decryption time, and throughput with variable data packet size.

Presenter bio: El-Sayed El-Alfy is a Professor in Information and Computer Science Department, King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia. His current research interests include Machine Intelligence and Information Security. He has been a co-founder/coordinator of the Intelligent Systems Research Group at KFUPM and actively involved in several funded research projects. He has published numerous in reputable journals and conferences in his field of expertise. He is a senior member of IEEE and has served on the editorial boards of a number of international journals as Associate Editor for IEEE Trans. Neural Networks and Learning Systems, Int'l J. Trust Management in Computing and Communications, Int'l J. Information Technology and Web Engineering, J. Emerging Technologies in Web Intelligence. He has also served as Guest Editor for a number of special issues and in the organization of several world-class international conferences.



Intrusion Detection System for the Internet of Things: A Review

Akhil jabbar Meerja (Vardhaman College of Engineering & SMIEEE, Secretary and Treasurer IEEE Computer Society, under IEEE Hyderabad Section, India); **Rajanikanth Aluvalu** (Vardhaman College of Engineering, India)

IOT is disruptive level of innovation which refers to network (N/W) of interconnected objects that have unique identifiers. IOT consists of thousands of personal area networks and LANs which are connected through border routes. Threats to IOT are increasing. Intrusion Detection System (IDS) is an important tool to protect host systems and the network. Applying traditional IDS will not ensure the security and privacy. This paper reviews latest literature on IDS on internet of things. IDS fulfil the gap of protecting the IOT. More IDS have to be designed to reduce the computational resources and to detect major attacks.

Presenter bio: Dr. Eng. M.A .JABBAR is a Professor Dept.of CSE , Vardhaman College of Engineering, Hyderabad, Telangana, INDIA .He did his Ph.D in computer science (data mining) from JNTU Hyderabad. He is having 17 years of teaching experience. He is a senior member, IEEE, and secretary, IEEE Computer society Hyderabad section and Life member Indian science congress association, Life member computer society of INDIA, Member ACM.Senior member Asia Pacific Institute of Science and Engineering(APISE). He published more than 30 papers in international journals and conferences. He is a reviewer for Springer, Elsevier, and IEEE Transactions on systems man and cybernetics, wiley, Sci Indexed journals. He served as a technical committee member for more than 30 international conferences. His Research interest includes data mining,big data analytics, bio informatics, cyber security, machine learning, attack graphs, and intrusion detection system.



Monday, April 23, 09:45 - 10:00

SB4: Short Break  TOP

Room: S45-Zain E-Learning Center-First Floor

Monday, April 23, 10:00 - 10:30

KS3: Keynote Speaker-3  TOP

Challenges For Healthcare IOT in Smart Cities

Dr. Chitra Balakrishna, MBCS, FHEA, CEH is an Associate Professor/ Senior Lecturer and a Programme leader for cyber security at Edge Hill University in the United Kingdom

Room: S45-101-Zain E-Learning Center

Chair: Aisha Bushager (University of Bahrain, Bahrain)

One of the important ingredients of Smart cities include healthier environment and improved quality of life and well-being of city dwellers. The societies are becoming more connected, networked and data driven, enabled but the Internet of Things. Consequently, the City mayors, policy makers and planners, in their effort to create smart and healthy cities, tend to depend more on information infrastructure to keep their citizens more informed, engaged and empowered. The same digital infrastructure enables citizens to actively contribute to, and become part of the drive for sustainable development, as well as to self-manage their own health and well-being to live longer and healthier. While the IoT as an enabler for connected healthcare offers tremendous opportunities, it also brings with it numerous challenges particularly deployment and security related concerns. This talk aims to address the future directions of IoT and Healthcare within Smart Cities context, the opportunities and challenges.

Monday, April 23, 10:30 - 11:00

KS4: Keynote Speaker-4  TOP

Smart Healthcare

Dr. Alzayani holds an MD degree and MSc in Health Policy from the Arabian Gulf University. He got his PhD in Public Health from the University of Connecticut in the United States

Room: S45-101-Zain E-Learning Center

Chair: Ebrahim Abdulla Mattar (University of Bahrain & X-chair of Electrical and Electronics Engineering, Bahrain)

New technologies have influenced many parts of our daily life. Today's healthcare system has also recognized the advantages of using Information and Communication Technology (ICT) to improve the quality of healthcare, turning traditional into smart healthcare. Smart Healthcare is defined by the technology that leads to better diagnostic tools, better treatment for patients, and devices that improves the quality of life for anyone and everyone. In this presentation we will go over these technologies and look at how would they transform the delivery of healthcare in our societies.

Monday, April 23, 11:00 - 12:15

S10: Smart Transportation System-2



Room: S45-108-Zain E-Learning Cente

Chairs: Bader Almannai (University of Bahrain, Bahrain), Abdul Fattah Salman (University of Bahrain, Bahrain)

Smart City Mobility: Investigation of RFID adoption within Transportation Management

Aisha Bushager and Mohamed Nayef Alrafaei (University of Bahrain, Bahrain)

Smart cities era requires changes in the life style of the citizens technically and technologically. Mobility is one of the main domains in smart cities, hence, transportation is the area of focus in this research. Embedding Radio Frequency Identification RFID tags into all vehicles driving in the Kingdom of Bahrain allows tracking and controlling traffic in addition to reducing it at the same time. The study aims at investigating the readiness and acceptance in Bahrain to establish RFID traffic control and enforce it upon all drivers, while measuring the level of awareness of security risk, privacy violation, and their alignment with legislation and policies in the country. Considering all aspects that might affect the decision of the citizen, the study focuses on understanding their willingness to use it, and which parts of the implementation is more acceptable than others. The results of the study show that the citizens are ready and accept the adoption of the technology to reduce and manage traffic, however, they were not quite concerned about the security and privacy issues related to this new technology. Further study is required in the future to spread awareness of the importance of information security and privacy while using new technologies.

Presenter bio: IT specialist working for ten years in Shura Council under the IT department, working mostly in IT upgrading projects. As an IT expert, I involve myself with any IT related solution and try my best to enhance or improve the project. While the actual development is not my strongest skill, the knowledge in software engineering and the limitation it holds had prepare me to talk with any developer on his professional level. As side projects, I create different projects to gain experience in different fields such as: (Events, marketing campaigns, business developments, market research, and creating online contents.



Next Step: Merging Smart Cars with Driver Cars

Mohammed Al Khalidy (UoB, Bahrain); Khaled Zehar (University of Bahrain, Bahrain)

Our proposal is to introduce an optimal model for a new technique that allows the ability to make an interactive communication between intelligent driverless cars (smart cars) and driver cars possible (V2V). Now a day with different prototypes of smart cars, intersection, is one of the issues that smart cars (cars that think) are facing. There are many proposals to solve this problem, one of the solutions is to deal with the smart car itself by stopping the car and checking the road intersection until it will find that the road is completely clear then it will move, like Google smart car. Of course, this is not an efficient way to deal with the problem because it will take a long time. Another proposal needs an intelligent transportation system to send instructions to all the cars within the intersection to control the traffic. Of course, intelligent transportation systems are essential and important to solve a problem like this but this means that intelligent types of equipment have to be installed all over the city and all the cars have to be intelligent. The transition from level 3 to level 5 can't be reached unless it has to pass through a transition period especially with a presence of driver cars. So, some of the problems cannot be solved just by using smart cars alone or even with intelligent transportation systems. In fact, it needs farther than this, it needs an integration between the smart cars and driver cars. In this transition situation, smart cars and driver cars have some responsibilities to make this integration successful. The proposed

technique empirically investigated, analyzed and verified to find the optimal case, acceptance and rejection indication, real-time complexity. The results performed by this technique demonstrated the robustness and reliability of this methodology for safety in the road intersection.

Presenter bio: Mohammed Al Khalidy received his M.Sc., Electrical and Electronics Engineering, University of Technology, Iraq, 2002 and his Ph.D. in Electrical and Electronics Engineering, University of Technology, Iraq, 2007. Doctor Al Khalidy IEEE senior member. He was a Senior Project Engineer, Al-Karama Public Company (Industrial Company), Iraq, Baghdad, 1997– 2006. Deputy Director for Electrical Department and an Assistant Professor with the Electrical Engineering Department, Al-Mustansiriyah University, College of Engineering, Iraq, Baghdad, 2006 – 2009. Assistant Professor with the Electrical and Electronics Engineering Department and a Manager of Academic Accreditation Unit, GU, 2009–2014. Since 2014, Doctor Al Khalidy serving now as Assistant Professor with the Electrical and Electronics Engineering Department, University of Bahrain. He has many published researches, In 2012 he published his first book “Wheeled Mobile Robot”, Lambert Academics Publishing GmbH & Co. KG. Doctor Al Khalidy research interests include Industrial Electronics, Intelligent Systems and Robotics, Aerospace control and Guidance Systems. Image processing and Sustainable Energy.



Toward smart bus transportation system in Kingdom of Bahrain: Real time rerouting algorithm

Youssef Harrath, Saffa Shaikh and Nasra Siddiq (University of Bahrain, Bahrain)

This paper studies the existing routes of public transportation in the Kingdom of Bahrain. The transportation service undergoes disruptions due to traffic congestions, constructive roads, bad weather conditions. In such cases, the bus needs to be rerouted in real time in order to perform its service efficiently. The main objective of the rerouting of buses is to minimize the time to reach the destination with the help of real time re-routing algorithm which will propose a solution to dynamically divert the course of the affected bus en route.

Presenter bio: Youssef Harrath is an Assistant Professor at the Department of Computer Science, University of Bahrain since 2010. He obtained his M.Sc. Degree in Operational research, Combinatorial, and Optimization from the International Polytechnic Institute, Grenoble-France in 2000. He received his Ph.D. in Computer Science from the University of Science & Technique, Besançon-France in 2003. Dr. Youssef has 15 years of teaching experience as Assistant Professor at University of Bahrain, King Fahad University of Petroleum and Minerals, Saudi Arabia, High Institute of Applied Computer Sciences of Lorraine: Nancy - France, National Institute of Applied Science, Rouen, France. His research is focused on Optimization, Design and Analysis of Algorithms, Genetic Algorithms, Scheduling, and Data Mining.



Design and Fabrication of a Dual Band Low Profile Antenna for Smart Tracking in Oil Fields

Ali Bostani (American University of the Middle East & Microwavesoft, Canada); **Abdullah Al-Khashan, Islam Mansour and Amro A. Nour** (American University of the Middle East, Kuwait)

Antennas are essential elements in development of wireless communication systems in different sectors such as, medical, communications, industrial, urban planning and even the oil and gas sector. Designing an antenna for global positioning systems requires several limitations to be taken care of, like the right bandwidth, the impedance matching at the operating frequency and an omnidirectional radiation pattern. In this paper, a printed antenna is proposed to be used for smart tracking and positioning of vehicles and equipment or the oil and gas fields, by providing the ability to easily track work from site to site. The antenna has been simulated by a full wave finite element based solver and the geometry is optimized for the best performance at 2 main operating frequencies reserved for GPS. The optimized antenna has been fabricated on the results of the measurement are presented as well.

Presenter bio: Dr. Ali Bostani has been an assistant professor at the American University of the Middle East Since March 2015. He is the founder and CEO of MicrowaveSoft in Montreal, Canada since 2013. He obtained his Ph.D. in Electrical Engineering from McGill University in Canada in 2012. His field of research in PhD was computational electromagnetics and more specifically Finite Element methods and analysis of passive RF structures. He obtained his MSc in 2008 from INRS-EMT, Montreal, Canada and his research focus in his Master's was ultra wideband antennas and Electromagnetic band gap structures. Dr. Bostani started his career in industry in 2010 while he was still a PhD student. He worked as a research scientist in EMWorks company where they were developing a full wave solver for high frequency simulations.



Framework for Route Optimization of Solid Waste Collection

Khalil Al-Jubori and **Uneb Gazder** (University of Bahrain, Bahrain)

Collecting, transport, disposal, and managing Municipal Solid Waste (MSW) within urban context is a challenge worldwide. It directly impacts; environmental, health and economic aspects of modern urban cities. MSW transport is the most expensive item in MSW management and in some cases might take up most of the municipalities' budget. This paper is aimed at developing a framework that can be utilized in planning and determining the optimum MSW transportation route. Samples from developed, developing and under developed countries were studied thoroughly. Selecting the optimal route depends on a whole array of information that include; cost, time, environment, etc. The proposed framework provides the advantage of both static and dynamic routing models. ArcGIS network analysis and multi-level criteria are used to locate the optimum route. Initial analysis shows that the proposed framework yields an acceptable semi-optimum route comparable to other commonly used algorithms such as net colony organization (ACO), backtracking search algorithm, mix-integer programming.

Presenter bio: Dr. Uneb Gazder is an Assistant Professor in Department of Civil Engineering at University of Bahrain. He completed his PhD from King Fahd University of Petroleum and Minerals in 2014. His area of specialization is transportation planning. He has authored/co-authored more than 25 publications/conference papers. His research areas include statistical analysis, artificial neural networks and transportation planning and safety.



Monday, April 23, 11:00 - 12:30

S9: Cloud Computing Applications for Smart Cities & New Technologies for Smart Environment-3



Room: S45-106-Zain E-Learning Center

Chairs: Jihene Kaabi (University of Bahrain, Bahrain), Fawzi Albalooshi (UOB, Bahrain)

The needed Merge of Augmented Reality Smartphone Application with CAS and SDI Library Services

Amerah Abdulrazzaq (University Of Bahrain, Bahrain); **Mayyadah Al-Ani** (Columbia College, British Columbia, Canada)

In this study two library services, current awareness service (CAS) and selective dissemination of information service (SDI), provided by University of Bahrain, were considered as examples to develop system prototype. The developed system uses Smartphone Augmented Reality (AR) technology to deliver up-to-date information about library services in an interactive way using multimedia to increase researchers' (faculty members and students) awareness. The potentials and other perspectives of the proposed system were discussed. Although it can be further investigated, the proposed system could be considered as a new model for current awareness services of any digital library. Findings revealed that Smartphone AR system provides information in a real environment, giving researchers instant assistance and awareness of their needs, and is a good personal learning tool. However, to make the delivery of Smartphone AR system more effective, suggestions for further investigations are provided like Measuring and reviewing acceptance to the application in terms of Awareness, timeliness, coverage ratio, and usage then collected and summarized by focus groups' thoughts and reactions.

Presenter bio: Mayyadah Al-Ani is Associate Professor in Computer Science at Columbia College in Canada. Prior to joining Columbia College, she taught at Douglas College, LaSalle College and University of Bahrain. Before that she was Assistant Professor at University of Baghdad. Mayyadah received her B.Sc. and M.Sc. in Computer Science from University of Baghdad and her Ph.D. from University of Technology. She has more than 32 research papers. Her research lies in the area of Artificial Intelligence. She has collaborated actively with



Cloud based IoT Smart Garden Monitoring System using Arduino Uno

Alauddin Yousif Al-Omary (University of Bahrain & University of Bahrain, Bahrain); **Haider M. AlSabbagh** (Basra University, Iraq); **Hussain Al-Rizzo** (University of Arkansas at Little Rock, USA)

Automation the process of monitoring the garden can transform garden irrigation from being manual and static process to smart and dynamic one. This lead to higher comfortability, water use efficiency and less human supervision. This paper proposes a cloud based Internet of Things (IoT) smart garden monitoring and irrigation system using Arduino Uno. The watering need for a plant can be adjusted by monitoring the soil moisture. Measuring the soil moisture of the plant can give information if the plant is ideally watered, over watered or under watered. The proposed system monitors and maintains the desired garden soil moisture content and light intensity using soil moisture sensors and light intensity sensor and send the reading continuously to ThinkSpeak IoT cloud. In the cloud the data gathered from the system is analyzed and when a target threshold of soil moisture is reached, an action is sent accordingly from the cloud to the garden automatic watering system to irrigate the garden. Arduino Uno microcontroller is used to implement the system control unit. IoT is used to keep the garden owner updated about the status of sprinklers. Information from the sensors is regularly updated on a ThinSpeak IoT cloud and a user can check the water sprinklers status at any given time. In addition, the sensor readings are transmitted to a Thing speak channel to generate graphs for analysis.

Presenter bio: Holds B.Sc. in Electronic and Communication, University of Mosul, Iraq in 1980 and M.Sc. in Communication Engineering from University of Technology, Iraq in 1986. He got his Ph.D. degree in system and information engineering from Toyohashi University, Japan, 1994. Since 2005, he is an associate professor at the Department of Computer Engineering, College of Information Technology, University of Bahrain. His research interests include Hardware/Software co-design Telematics system, Machine-to-Machine Communication, Mobile Network performance, ASIC and embedded system design using VHDL and FPGA. He has been actively involved in many research projects and published 2 books and more than 40 papers. He attended many International conferences and awarded best session paper in some of these conferences. He is a member of the Institute of Electrical and Electronic Engineers (IEEE), the Japanese Information Processing Society and the International Association of Computer Science and Information Technology (IACSIT). He was a Member of the UNESCO Project to establish a computer networks between the GCC's Inheritance and folklore centres started in April 2001 until April 2002. Dr. Al-Omary is the founder and managing editor of the International Journal of Computing and Network technology (IJCNT) published by the research deanship of University of Bahrain.



Enhanced Method for Recognizing Gender in Smart Environments from Gait Biometric

Amer Binsaadoon and **El-Sayed M El-Alfy** (King Fahd University of Petroleum and Minerals, Saudi Arabia)

Gender recognition is becoming an attractive research topic of increasing importance in demographic and medical studies applications. This paper presents an enhanced methodology for texture representation by a local Gabor-based phase quantization method, named LGPQ, and applies it for automatic human gender recognition using texture analysis of gait energy images (GEIs). Gait analysis and recognition is one of the recently explored areas in biometrics with several salient features from other biometric traits such as the ability to recognize at a distance even from low-resolution images. The proposed LGPQ has the advantage of capturing more information to encode the spatio-temporal variations in the Gabor transform of GEI. As a result, better gender classification can be achieved. The proposed method is evaluated using a support vector machine (SVM) classifier with a linear kernel. Moreover, it is compared to several texture-based methods on the CASIA B multi-view gait database. The experimental results demonstrate promising performance of LGPQ for gait-based gender recognition.

Presenter bio: El-Sayed El-Alfy is a Professor in Information and Computer Science Department, King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia. His current research interests include Machine Intelligence and Information Security. He has been a co-founder/coordinator of the Intelligent Systems Research Group at KFUPM and actively involved in several funded research projects. He has published numerous in reputable journals and conferences in his field of expertise. He is a senior member of IEEE and has served on the editorial boards of a number of international journals as Associate Editor for IEEE Trans. Neural Networks and Learning Systems, Int'l J. Trust Management in Computing and Communications, Int'l J. Information Technology and Web Engineering, J. Emerging Technologies in Web Intelligence. He has also served as Guest Editor for a number of special issues and in the organization of several world-class international conferences.



Electrical Characterization and Financial Viability of a Diesel -PV-Wind Hybrid PowerSystem with the Addition of Storage Devices for a Remote Area

Abdelhamed T. Mohamed and **Ahmed Mohamed** (King Fahd University of Petroleum and Minerals, Saudi Arabia)

This paper proposed a compound energy framework comprising of wind, photovoltaic and diesel generators, with the introduction of storage system, to provide the required demand for a continual electric load for a remote area in Saudi Arabia. The fundamental focus of the paper is to decide the ideal size of the mixture framework with storage devices which have the most reduced Net Present Value (NPC), and set it side by side with the framework without storage devices. The general enhanced outcomes from the examination had an on over renewable energy penetration of 39%, which brought about diminishment of the emanation of CO₂ by 8.95% from the traditional - without batteries-framework. Moreover, the proposed framework with batteries had a diminishment in the aggregate NPC by 12%. The widely known simulator for sustainable power source based systems; HOMER was utilized to contemplate the financial viability and to construct the proposed designed system.

Presenter bio: currently working as a Research Assistant at KFUPM, while pursuing MSc. degree at KFUPM. his major interest in renewable energies and smart cities development. Won The 1st prize in "Sustainable Building Design" Competition, at KFUPM, 2016. also, an active member and organizer for many major events relating to IEEE Sudan Subsection and Tedx UofK. in addition to the membership of the following sections of IEEE : IEEE Student Member IEEE PES Student Member IEEE IAS Student Member



Monday, April 23, 12:30 - 13:00

PS: Poster Session



Monday, April 23, 13:00 - 14:10

LB2: Prayer & Lunch Break



Monday, April 23, 14:10 - 15:25

S11: Big data analytics for Smart Cities



Room: S45-106-Zain E-Learning Center

Chairs: Youssef Harrath (University of Bahrain, Bahrain), Nabil Hewahi (UOB, Bahrain)

Deep Learning for Target-Dependent Sentiment Classification in Social Media

Shadi Abudalfa (King Fahd University of Petroleum & Minerals, Saudi Arabia); **Moataz Ahmed** (King Fahd Uni. of Petroleum & Minerals, Saudi Arabia)

There is currently a revolution in developing deep learning models for improving performance of many machine learning systems. This revolution has been expanded to sentiment analysis (opinion mining) as a promising research area. Throughout this paper, we swaged in various recent works that are performed for developing sentiment analysis systems by exploiting capabilities of deep learning models. We introduce a comprehensive literature review on predicting sentiments expressed towards particular topics (targets) in micro-blogs (such as tweets). This micro-specialization is referred to as target-dependent sentiment classification. To make our work more comprehensive, we evaluated also two more deep learning models that have not been used before in this research direction. Experimental results are shown along with summaries and discussions to emerge significance of developing deep learning based models in improving accuracy of target-dependent sentiment classification. Our findings highlighted some gaps that can be filled in future research and illustrates that there is a room for improvement.

Presenter bio: Shadi Abudalfa received the BSc and MSc Degrees both in Computer Engineering from the Islamic University of Gaza (IUG), Palestine in 2003 and 2010 respectively. He is a lecturer at the University Collage of Applied Sciences, Palestine. He is currently a PhD candidate in Computer Science and Engineering at King Fahd University of Petroleum and Minerals, Saudi Arabia. From July 2003 to August 2004, he worked as a research assistant at Projects and Research Lab in IUG. From February 2004 to August 2004, he worked as a Teaching Assistant at Faculty of Engineering in IUG. Abudalfa is a member of IEEE and his current research interests include artificial intelligence, data mining, data clustering, machine learning, and sentiment analysis.



Handling data analytics on unstructured data using MongoDB

Rajanikanth Aluvalu (Vardhaman College of Engineering, India); **Akhil jabbar Meerja** (Vardhaman College of Engineering & SMIEEE, Secretary and Treasurer IEEE Computer Society, under IEEE Hyderabad Section, India)

Nowadays the amount of data generated from various device sources and business transactions is very huge. Most of the transactional, business data generated is unstructured. Business organizations use the data to perform analytics for decision making. Performing Analytics on such huge unstructured data has become a challenge for organizations. Enough tools and techniques both with free ware and proprietary license release are available to handle structured data are available. In earlier systems, unstructured data is converted into structured data and then stored in Database Management System (DBMS) for performing further analytics. This is a time consuming process. As the amount of data being generated is increasing tremendously, it has become impossible to transform huge amounts of data into structured data. In order to perform analytics of the digital data, we require different business processes to handle unstructured data directly and efficiently. In this paper, a skillful mechanism is being proposed to handle unstructured data using MongoDB and perform required analytics. The experimental approach and the results are presented.

Presenter bio: Prof. Rajanikanth Aluvalu is an Engineering Teacher by profession having 14+ years of experience. Currently working as Associate Professor in the Department of Computer Science & Engineering, Vardhaman College of Engineering, Hyderabad. Pursued PhD in computer science & Engineering with cloud computing as major from GITAM University. Earlier worked with RK University, Rajkot as Associate Professor in Department of Computer Engineering. At RK University he worked as core team member in various educational transformations in teaching and Learning Process. His current research interests are in cloud computing, Big Data Analytics and Teaching & Learning, educational Technology. He had published various papers on cloud computing, Big Data Analytics in various international conferences and journals.



Protecting the handled information in the Smart Cities by freezing the accelerated information

Nasser Metwally (College of Science, University of Bahrain, Bahrain)

As an application of quantum information in the Smart Cities, we introduce a technique to freeze the accelerated information and consequently it is protected during the communication between the Smart Cities' users. It is assumed that, the two users share different dimension sizes of particles. This technique depends on local operations, where it is allowed that each particle interacts locally with a phase channel. We show that, the possibility of freezing the information of quantum channel between the users depends on the initial state setting parameters, the initial acceleration parameter strength of the phase channel. It is shown that, one may increase the possibility of freezing

the estimation degree of the parameters and consequently the secure communication in the Smart Cities, if only the larger dimension system or both particles pass through the phase channel. Moreover, at small values of initial acceleration and large values of the channel strength, the size of freezing estimation areas increases. The results may be helpful for Smart cities, where one can improve the efficiency sending information, encoding information, and secure communication

Presenter bio: Nasser Metwally is PhD in Mathematics, Munich University, Germany, 2002. He is a professor of quantum information at Aswan University, Egypt since 2015. Currently he has a position as an assistant professor at the University of Bahrain. He expertise in quantum information, teleportation, coding and cryptography, and quantum communication. He has published more than 66 international papers. He is a member of the mathematical Egyptian society.



Performance of Carbon Nano-Tubes (CNT) on Aging and Moisture Damage Behaviours in Asphalt Binder

Md. Arifuzzaman, P. E. (University of Bahrain, Bahrain); **Manir Zaman** (Universiti Teknologi Malaysia, Malaysia); **Rafiqul Tarefder** (University of New Mexico, USA)

The base binder was initially modified with 4% SBS polymer. Later on, three percentages by weight of CNT were mixed with the modified binders. A special functionalized (-NH₃) AFM probe with spring constant 3.44 N/m is used to conduct the study. The dry samples adhesion forces are found to be smaller as compared to CNT modified asphalt samples. The recommended dosage are proposed anything between 0.5 to 1.5% by weight to resisit moisture damage and aging in field.

Presenter bio: Ph.D. in Civil Eng'ng, 2010 University of New Mexico (UNM), Albuquerque, NM-87131, USA, M. Eng'g in Geotechnical & Geo-environmental Engineering, 2005, Asian Institute of Technology (AIT), Thailand., B.Sc in Civil Eng'ng, 2003, Bangladesh University of Eng'ng & Technology (BUET), Dhaka, Bangladesh



Social Sensing Applications and Case Study Using Acoustic Arabic Opinion Mining

Sadam Al-Azani (KFUPM, Saudi Arabia); **El-Sayed M El-Alfy** (King Fahd University of Petroleum and Minerals, Saudi Arabia)

Nowadays, the growth of online social networks increases attention to be harnessed into a range wide of related applications. However, the contents are static and doesn't response to the environmental changes efficiently. Social sensing concept aims at embed sensors within such platforms in order to gather updated large amounts of data to deal with real world applications with efficient response to the around environment. This paper reviews application domains of social sensing to provide context-aware services in smart cities including healthcare, wellness and safety, transportation, business and environmental monitoring. Moreover, it describes a case study to understand human opinions expressed in Arabic spontaneous speech. Thirty four features are extracted to discriminate each opinion from the speeches and several machine learning classifiers are applied to classify the opinions. To deal with a real-world problem, speakers diverse in several things including nationality, dialectics, ages, environments and topics.

Presenter bio: Sadam Al-Azani, PhD candidate in computer science at King Fahd University of Petroleum and Minerals (KFUPM), Saudi Arabia. He hold a master degree in computer science(2014) from KFUPM. He received the BSc Degree in Computer Science(2004) from Thamar University, Yemen. He is a lecturer in the Faculty of Computer Science and Information Systems at Thamar University, Yemen. He is interested in Artificial intelligence, Social Big data, Social sensing, Natural language processing, Machine learning.



S12: Infrastructure in Smart Cities



Room: S45-108-Zain E-Learning Cente

Chairs: Wael Abdelhameed (University of Bahrain, Bahrain), Alauddin Yousif Al-Omary (University of Bahrain & University of Bahrain, Bahrain)

Smart Cable Termination Rectification Program to enhance the reliability of Dubai Electric Infrastructure

Mohamad Hussin and Mohamad Hussin (DEWA, United Arab Emirates); Nagarajan Packirisamy (Asst. Maneger, United Arab Emirates); Ahmed Al Marzooqi (Mgr - Asset Mgmt S/S, United Arab Emirates)

This paper will highlight the medium voltage power cables termination rectification program as main pillar of network reliability, under asset management program of distribution power network of Dubai Electricity and Water Authority, to improve customer minute lost to be less than 2.5 minutes per year by 2021 through effective and smart life cycle management, therefore online and off line condition monitoring are used to detect the potential failure using state of the art technology, thus rationalize DEWA's resources and manage the risk of unplanned outages which lead to satisfy DEWA's consumers.

Presenter bio: Short biography Manager of Substations in the Distribution Asset Management Department in DEWA. Performing Asset Management cycle related to planning, acquisition, monitoring, and maintenance input and load diversion for better utilization of electrical equipment in the Distribution Network. Involve in strategy development and procedure enhancement for better utilization of equipment and linear processes. Member of many international organizations such as the Institute of Asset Management, the Institute of Engineering and Technology and the Institute of Electrical and Electronics Engineers. Contact / Job information / Contact number Manager - Distribution Asset Management Substations Distribution Power - Distribution Asset Management P.O.Box: 564 Dubai - UAE , email: a.almarzooqi@dewa.gov.ae Phone: +9714322-7447 • Fax: • Mobile: +971506688286



Permeability Characterization and Improvement of Bahraini Sabkha Soil using Lime

Md. Arifuzzaman, P. E. (University of Bahrain, Bahrain)

Sabkha is a native and substandard category of soil which is broadly found in some parts of Saudi Arabian region (coastal zones) and GCC countries. The saline character of this soil results many troubles in field with consequently possessing overwhelmingly challenging issue for the civil engineers. The current study focus on characterization of Bahraini Sabkha soil by conducting chemical analysis and utilizing added substance "additive" like: lime. The chemical analysis conducted was concerned to find the chemicals concentrations of Sabkha soil where the chemical characterization tests undertaken in this study were: soil pH, organic matter contents, carbonate content, calcium carbonate content, sulphite content, chloride content and total solids. The tests treated Sabkha samples utilizing 3%, 5% and 7% of hydrated lime. The fundamental characterization procedures like permeability testing was examine to examine the nature of sabkha soil appropriately. The penetrability test comes about appear a great agreement as the k esteem diminished with the increase of lime expansion. The relationship between penetrability coefficient and diverse percentages added of lime tends to decrease in compare to its unique esteem in unadulterated condition which was 11 cm/sec. Including lime to Sabkha sample in 3% had made strides the coefficient permeability to 1.5×10^{-6} cm/sec. Also, including 7% lime to the Sabkha sample decreased it to 1.3×10^{-6} cm/sec. But most diminish in permeability coefficient happens to be at 5% of lime where it come to 0.92×10^{-6} cm/sec. The esteem for R2 was found to be 0.7146 after statistical analysis.

Presenter bio: Ph.D. in Civil Eng'ng, 2010 University of New Mexico (UNM), Albuquerque, NM-87131, USA, M. Eng'g in Geotechnical & Geo-environmental Engineering, 2005, Asian Institute of Technology (AIT), Thailand., B.Sc in Civil Eng'ng, 2003, Bangladesh University of Eng'ng & Technology (BUET), Dhaka, Bangladesh



Towards A Technological Reference Model of Bahraini Smart Cities

Ehab Juma Adwan (University of Bahrain, Bahrain)

Reference architectural models are coherent representations/blueprints of the interaction existing between homogeneous/heterogeneous groups of systems, technologies, and stakeholders in complex business domains. Due to its complexity, the smart city domain should embrace a reference architectural model which facilitates coherent requirement's demonstration of the interacting application, and infrastructure's capabilities in a certain geographical area from one side and their relevant business users from the other side. In different countries and for different purposes, several reference architectural model initiatives have been proposed as smart city requirement collection's tools. However, those models lacked the coherency that should exist between its sub domains. This paper discusses the empirical findings of smart cities derived from the literature review articles, investigates Bahrain's readiness for smartness, and proposes the development of a Bahraini Smart City- Technological Reference Architectural Model (BSC-TRAM), based on the concept of enterprise architecture and the insights of federal enterprise architecture framework. The BSC-TRAM is a conceptual model that is used to collect the Bahraini ICT related capabilities from three domains; the business domain, application domain, and the infrastructure domain. Based on those domains and sub-domain components, the BSC-TRAM should facilitate the production of coherent and organized data collection tool from the entire areas of Bahrain.

Presenter bio: 1. Ph.D. College of Engineering, University of Bahrain, 2016. 2. Ph.D. Postgraduate PhD Courses (IS, SE and SWE), USA, 2009-2011. 3. PG.D. Postgraduate Diploma (CS Academic Practice)-U of York, UK, 2008. 4. M.Sc. College of IT, University of Bahrain, 2004. 5. B.Sc. College of Science (Electronics), American U In Cairo, Egypt, 1996. Research interest: Research is focused on Enterprise Architecture, Information Systems Architecture, System Analysis and design, Software and System Engineering, and ICT in Construction Engineering.



The Effect of Mobile Radiofrequency on Human body at Smart City

Mohammed Abdel Razek (King Abdulazize University, Saudi Arabia)

One of the pillars of a smart city is wireless connectivity, however, we did not take care of the risk of Electromagnetic fields produced by this connectivity. The increase in the application that runs on smartphones is considered as one of the key sources of growth in the smart city. With the growing of using these smartphones, the human body has more chances to be affected by Electromagnetic fields included mobile radiofrequency. However, low-frequency electric and magnetic fields have slightly energy absorption and no measurable temperature rise in the body, EMF with frequencies above 100 kHz can cause fairly absorption of energy and temperature increases. Mobile phones use electromagnetic radiation in the microwave range, which has generated concern about possible negative effects of radiofrequency signals delivered to the human body. This paper studies the effects of cell phone radiofrequency on the human body. It presents the weaknesses point in the human body could be affected by the radiofrequency.

Presenter bio: Dr. Mohammed Abdel Razek is a Professor of Computer Science at King Abdulaziz University. He holds a Ph.D. in Computer Science - Artificial Intelligence - from the University of Montreal, Canada in 2004, titled "intelligent e-learning systems", and he was a member of the GRITI group, led by Prof.Claude Frasson. Dr.Abel Razek's work lies mainly at applying artificial intelligence techniques on e-learning, e-commerce, digital library, and others. He has more than 50 papers published in the International Journals, conferences, and workshops. During his work as assistant prof. at Faculty of Science Azhar University, Egypt, Dr. Abdel Razek founded the information systems and networks unit which is linking (42) faculties buildings in the campus. He was the director of the e-services project to design, develop some information system such as coordination system, and e-university system. In 2007, Dr.Abdul Razek was one of the teamwork who established 17 e-learning centers at 17 Egyptian universities during his work at National E-learning Center (NELC) as part-time. By the end of 2007, Dr. Abdel Razek has joined The National Authority for Quality Assurance and Accreditation of Education (NAQAAE) and he shared a teamwork to write the e-learning standards. Dr.Abel Razek has been added to Who is Who in the world in 2009. Now, he is working as a consultant for e-learning quality assurance at the deanship of distance learning, King Abdulaziz University, Saudi Arabia. Currently and beside his job, Dr.Razek is working as a consultant for the vice president of Development of the university.



Conceptualizing Smart City in Indian Prospective

Deepiti Mehrotra (AMITY School of Engineering and Technology & Amity University, India); **Renuka Nagpal** (Amity University, India); **Arpita Chaturvedi** (Amity University Uttar Pradesh, India)

The world is facing problems in their urban lives which could be resolved by moving the cities towards smarter urban spaces by using modern technology. A city that uses Information and Communications Technology (ICT), good real estate and other means to improve the quality of life for sustained living are categorized as Smart city. India aims to develop its cities into a smart city but due to its different economic and diverse culture the implementation of its Smart city Mission (SCM) would be different than in

any other developed nation. To enforce these developments as per Indian standards, our urban areas have to identify its strengths and ensure is comparative advantage in certain key parameters. Thus, according to the 'Smart city profiles' published by the Niti Ayog six core parameters are considered: Mobility, Economy, Environment, People, Living and Governance, which need to map with smart city indicators (SCI) for optimizing the planning of transforming city to smart city.

Presenter bio: working as Assistant Professor in Department of Computer Science, Amity School of Engineering and Technology, Amity University ,Uttar Pradesh. Completed PhD in the field of Computer Science and Engineering from Dr APJ Abdul Kalam Technical University, Lucknow. She completed her M.Tech in CSE from Guru Jambheshwar University Science and Technology, Hisar. She has published more than 20 in Journals and Conferences. Her area of interest include software Engineering,Soft Computing and MCDM Techniques.

Presenter bio: Dr. Deepti Mehrotra did Ph.D. from Lucknow University and currently she is working as Professor in Amity school of Engineering and Technology, Amity University, Noida, earlier she worked as Director of Amity School of Computer Science, Noida, India.. She has more than 20 year of experience in research, teaching and content writing. She had published more than 100 papers in international refereed Journals and conference Proceedings. She is editor and reviewer for many books, referred journal and conferences. She is regularly invited as resource person for FDPs and invited talk in national and international conference. She enjoys guiding research scholar and has many Ph.D. and M.Tech students.



Monday, April 23, 15:25 - 16:00

CS: Closing and Recommendations



Room: S45-101-Zain E-Learning Center

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