A novel and Secure Smart Parking Management System (SPMS) based on integration of WSN, RFID, and IoT

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***Abstract*- Nowadays, finding a secure parking lot in modern cities deemed as very hard and time-consuming task. Leaving negative implications on traffic congestion, air pollutions, climate changes, etc. are also creating difficult situations to find the secure parking lot on required time. Thus, Smart Parking System (SPS) deemed inevitable option to solve those issues and build a comprehensive smart transportation system. Toward this end, this paper aims to design a secure and smart parking monitoring, controlling and management solutions based on the integration of Wireless Sensor Network (WSN), Radio Frequency Identification (RFID), Adhoc Network, and Internet of Things (IoT). Considering cyber securi-ty issues in IoT environment, we adopt a lightweight crypto-graphic algorithm that meets IoT device requirements in term of computational cost and energy consumption. Fog computing has been adopted to process and manipulate sensitive data within the edge of the network and accelerate response time for any emer-gency circumstance. The proposed model provides real-time in-formation for detecting parking lots and reservation, e-payment solutions to mitigate traffic congestion, parking management optimization and enhance user experience while preserving user privacy and security.**

A Smart Home Appliances Control System Based On Digital Electronics and GSM Network

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***Abstract*—In current era, the Internet of Things (IoT) is becoming an important part of our daily life. It is employed in a variety of applications like smart cities, intelligent transportation, smart grid, wearables, etc. The aim of this project is to contribute to the evolution of Internet of Things (IoT) application in smart homes. It uses DTMF (Dual Tone – Multi-Frequency) connection to control the home appliances remotely via a GSM network. It overwhelms the confines of conventional wall switches, have to be functioned physically. The idea is to employ a DTMF decoder through which home appliances can be controlled by dialing a predefined number, via smart phone, for a specific load. It allows to operate the system globally via cellular phone. The system receives commands from a smartphone, decode it via a DTMF decoder and generates a digital output which passes through a CMOS based active low decoder and Flip Flops to activate or deactivate an intended load in the home. The load activation and deactivation activities are also logged on the cloud. It is done by observing the Flip Flops status via a front-end controller and passing this information to the server via a Bluetooth liaison. The server then updates the system status on the cloud via the Thingspeak liaison. The front-end electronics Truth Table and logic diagrams are presented. The system modules are modeled with Multisim and MATLAB. The simulation results have shown a proper system operation.**

An ARM Based Wireless Sensors Network for Monitoring of Plants Health

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Abstract – In current era, with the latest technological developments, the Internet of Things (IoT) is becoming an important part of our daily life. The aim of this project is to use the IoT with an intelligent wireless sensors network in order to monitor the health of plants and to observe the population of larva in a remote crop field. In this framework, a wireless sensors network is proposed to detect larva and measure other system parameters like Acoustic Complexity Index (ACI), temperature, humidity and soil moisture. The sensors' data is collected by the front end sensing node, developed with a STM32F407VG board, via a serial port. The STM32F407VG board is based on the ARM processor. The data from the node is transmitted to a base station by using a wireless ZigBee interface. The base station collects data from a group of sensor nodes. This data is transmitted to the Central Processing Unit (CPU) via the USB liaison between the base station and the CPU. On CPU this data is analyzed via the MATLAB based specifically developed application. The findings are displayed and stored on the CPU and are also logged on the cloud via Thingspeak liaison. It allows accessing this data globally at any time. It is done to realize a timely interaction and cure of the intended crop field. The system parameters are adjusted in order to achieve the effective modules integration and performance. The proposed system operation is tested with an experimental setup. Results have confirmed a proper system functionality.

An efficient censoring scheme for lifetime of connected solid-state lighting based on entropy measures

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Abstract— Beyond energy saving, LED connected lighting systems allows for real-time data streaming, generating intelligence and creation of intelligent buildings systems. Lifetime experiments is crucial for such a connected system, as early termination would lead to big errors in estimating the lifetime model parameters, and late termination would waste time and cost. In this paper sup-entropy is applied in quantifying the amount of information in censored solid state lighting (SSL) luminaire experimental data that has Weibull distribution with respect to complete data. We use a quantity called efficiency of the censored sample as an indicator of the quality and goodness of the censoring scheme. This allowed us to determine the suitable termination time of the experiment subject to a desired efficiency. An intensive simulation study is conducted to validate our procedure.

AWiFi-based Energy Monitoring Prototype for Data Acquisition in Internet of Things

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Abstract— Energy monitoring is one of the important applications arising from research in Internet of Things (IoT) as well as the Smart Grid. Smart meters form an important element in energy monitoring systems and they provide insight into total energy consumption of a smart household. In this work, a WiFi-based energy monitoring prototype is developed to assist in obtaining periodic updates of energy data consumed by the smart household. Wi-Fi was selected as the technology of choice due to high availability in homes. Experiment was setup such that simultaneous measurement from both ELIVE and Billion sensors. To analyze the observed cumulative distribution function for the measured variables with a theoretical distribution. This work employed statistical Kolmogorov-Smirnov procedure. Based on the summary statistics, the prototype ELIVE performed better than an off-the-shelf device which was used a benchmark. Statistical techniques and results are presented in this paper which were obtained after analysis of energy data and statistical comparison between the proposed prototype and the benchmark.

Blockchain for Government Services – Use Cases, Security Benefits and Challenges

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***Abstract*— Public sector and governments have been actively exploring new technologies to enable the smart services transformation and to achieve strategic objectives such as citizens satisfaction and happiness, services efficiency and cost optimization. The Blockchain technology is a good example of an emerging technology that is attracting government attention. Many government entities such as United Kingdom, Estonia, Honduras, Denmark, Australia, Singapore and others have taken steps to unleash the potential of Blockchain technology. Dubai Government is aiming to become paperless by adopting the Blockchain technology for all transactions by 2021. The Blockchain is a disruptive technology that is playing a vital role in many sectors. It's a revolutionary technology transforming the way we think about trust as it enables transacting data in a decentralized structure without the need to have trusted central authorities. Blockchain technology promises to overcome security challenges in IoT enabled services such as enabling secure data sharing and data integrity. However, it also introduces new security challenges that should be investigated and tackled. In this paper, we review the literature to identify the potential use cases and application of Blockchain to enable government services. We also synthesized literature related to the security of Blockchain implementations to identify the security benefits, challenges and the proposed solutions. The analysis shows that is huge potential for Blockchain technology to be used in to enable smart government services. This paper also highlights future research in the areas of concerns that required further investigation.**

Developing Intercultural Competencies through Virtual Reality: Internet of Things Applications in Education and Learning

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Abstract*—The 21st century workplace is an increasingly intercultural and collaborative environment. As a result, soft skills are being recognized as deficient in science, technology, engineering, and math (STEM) graduates. Our program, Purdue Polytechnic Leadership Academy seeks to improve essential workplace skills for STEM students through virtual reality (VR) simulations that immerse students in intercultural leadership case studies. Experiencing something from a distance is a new type of collaborative technology enabled by the internet of things known as telehora. Students will actively participate in the virtual environment, both responding to and looking around in the virtual environment. Students will experience firsthand how the choices they make within the modules change the outcomes of the case. Once developed, the modules can be deployed in traditional and online classrooms or as self-study. The modules can be scaled to provide a safe and replicable experience for large student cohorts, with potential to expand to multiple universities and industry. Students are unable to gain these experiences through formal education by other means, making the experiences good candidates for VR application. Virtual reality combined with sensors for emotion tracking represent a novel educational application of Internet of Things hardware. We will compare efficacy of high-cost VR hardware to low-cost VR and traditional computers, examining how student engagement and outcomes are affected by the different delivery mediums, thereby contributing to our understanding of these novel technologies. Research methods will include measures of intercultural competence, tolerance for ambiguity, facial emotion detection, and a combination of galvanic skin response and electromyography. This data triangulation will provide insights into the effectiveness of the interventions on traditional outcomes and give researchers a better understanding of emotion's role in intercultural leadership interactions. The provides an immersive and safe learning environment for students to participate in intercultural leadership scenarios that cannot be replicated in traditional classrooms.

Development of IoT Mining Machine for Twitter Sentiment Analysis:

Mining in the Cloud and Results on the Mirror

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***Abstract*— Microblogs sentiment analysis of people's attitudes, appraisals and emotions has become one of the most active research areas for business marketing, decision making, political campaigns, and alike. As people publish short snippets of texts through the social networks expressing their ideas, thoughts and opinions, an instant and reliable mining machine should be utilized. In this paper, we proposed an IoT mining machine for Twitter sentiment analysis. Firstly, we used Twitter's API for harvesting tweets in real time. Then, a mining engine was developed on the Raspberry Pi single-board microcomputer as an IoT platform due to its availability and connectivity. The IoT device was programmed for sentiment analysis and opinion mining using state-of-the-art Naïve Bayes classifier which after training was used to classify the trending tweets into either positive or negative. We used a gold standard dataset from SemEval 2017 for training our classifier which achieved 0.992 of accuracy. We aggregated the sentiments of tweets streamed in daily trend hashtags into visualized graphs. Finally, the visualized results from opinion mining were displayed on two-way smart mirror without any need for application installment. Our experimental results on the IoT mining machine demonstrate its feasibility and effectiveness.**

Energy Efficient IoT Home Monitoring And Automation System

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***Abstract*—Saudi Arabia has encountered a great economic growth in oil and gas resources in the past decades, and if domestic consumption rates continue in their current pathways, it is expected that there will be a contraction in oil exports, which will negatively affect Saudi Arabia's ability in the future to maintain the current high levels of spending in both investment and consumption. Residential consumption in Saudi Arabia accounts for 51% of total electricity sold in 2012. Therefore, targeting private residencies will reduce both the amount of fuel needed to generate electricity and the amount of greenhouse gases. This project aims to build a smart home system. This system will monitor and analyze the energy consumption, utilize lights when needed, program the temperature by keeping your house warmer than normal when you are away and setting the temperature as high as comfortable if needed. Then display the information to improve customer awareness by using colored LEDs to alert customers to different parameters, and turn their loads on and off based on the cost of electricity use as well as enable consumers to control some of their home appliances usage through a mobile application to reduce electricity usage and minimize energy waste.**

Estimating Data Traffic through Software-Defined Multiple Access for IoT Applications over 5G Networks

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Abstract— Wireless Connections and volume of the traffic are increasing with different applications over 5G environments. Thus, many researchers have estimated the increasing range of user's requirements within these networks. However, the traffic management will play a very important role in satisfying the user's needs in future wireless communications. In this research, the massive data traffic will be studied for enabling the best of IoT applications over a 5G network. Thus, the multiple accessing schemas are presented for managing the overall network traffic. Furthermore, the primary aim of this research is to provide an efficient estimation technique for managing traffic when multiple access is capable of handling variable delays and data priorities associated with the large volume of the traffic considered in the 5G networks. Thus, it can be modified to IoT applications within future IoT based 5G networks. Moreover, this research will be leading us to implement an estimated traffic solution for IoT applications over 5G networks. Thus, it comprehensively focuses on the traffic issues within large applications from the accessing steps till assuring the service delivery.

Factory Automation and Irrigation Control in an IoT Environment

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Abstract **The present paper investigates the possibility to control working and stopping of machines (composing a factory, an irrigation process and so on) controlled by a website via the internet from any place in the world. The idea is to send commands from a website to a factory (irrigation process) computer program control via a shared database in IoT environment. The attempt has shown very successful results both in a factory tar productivity for converting a panel board control to a computer program control and in a model irrigation system control from a website via a shared database.**

IoT Based Assistive Walker Device for Frail &Visually Impaired People

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***Abstract*—The frequency of falling among elderly and visually impaired people is constantly increasing. This problem affects a large number of people who need additional support to maintain balance and stability while walking. The objective of this study is to design a smart assistive walker device for frail & visually impaired people to reduce the risk of falling and the costly emergency interventions and hospitalizations. The proposed device is based on the concept of the Internet of Things (IoT) to determine and communicate the location and the path of the person for possible action. The device contains hardware and software parts. The former, covering the electrical part of the walker with three components: Sensor, controller, output, and the later contains two components; "Map" and "Find Me" Apps. The IoT treats the information received from the sensors (position, objects, and people around) and sends commands to the controller to guide the walker to fulfill the elderly needs safely. Using the IoT concept and smart device design, we expect a reduction in the number of falls and a contribution in the prevention of disability among elderly and visually impaired people.**

IoT based Mobile Healthcare System for Human Activity Recognition

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***Abstract*—Developments in information and communication technologies have led to the wider usage of Internet of Things (IoT). In the modern health care applications, the usage of IoT technologies brings physicians and patients together for automated and intelligent daily activity monitoring for elderly people. Mobile devices and wearable body sensors are gradually implemented for the monitoring of personal health care and wellbeing. One of the main technologies of IoT improvements in healthcare monitoring system is the wearable sensor technology. Furthermore, integration of IoT in healthcare has led to initiate smart applications such as mobile healthcare (m-Healthcare) and intelligent healthcare monitoring systems. In this study an intelligent m-healthcare system based on IoT technology is presented to provide pervasive human activity recognition by using data mining techniques. In this paper, we present a user-dependent data mining approach for off-line human activity classification and a robust and precise human activity recognition model is developed based on IoT technology. The proposed model utilizes the dataset contains body motion and vital signs recordings for ten volunteers of diverse profile while performing 12 physical activities for human activity recognition purpose. Results show that the proposed system is superior in performance with 99.89 % accuracy and is highly effective, robust and reliable in delivering m-Healthcare services during different activities.**

N-Shopping

Towards an autonomous Online Shopping system for NEOM megacity

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***Abstract*— A new way of living leads to new and advanced developmental area of innovation. In this paper, an online shopping system design for NEOM megacity project is proposed. The system is based on the use of self-regulating vans and middle stores. Self-regulating vans are employed for delivering the customer orders from different stores passing by the middle stores that appear as common intersecting points. The advantage of doing so is to speed up the delivery process by assigning the customer order to more than one van following the concept of relay race tracking. The relative issues to be addressed here is mainly an initial system design with each of its components being discussed based on the NEOM vision.**

Design of an IoT Smart Home System

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Abstract*—This paper basically deals with design of an IoT Smart Home System (IoTSHS) which can provide the remote control to smart home through mobile, infrared(IR) remote control as well as with PC/Laptop. The controller used to design the IoTSHS is WiFi based microcontroller. Temperature sensor is provided to indicate the room temperature and tell the user if it's needed to turn the AC ON or OFF. The designed IoTSHS need to be interfaced through switches or relays with the items under control through the power distribution box. When a signal is sent from IoTSHS, then the switches will connect or disconnect the item under control. The designed IoT smart home system can also provide remote controlling for the people who cannot use smart phone to control their appliances Thus, the designed IoTSHS can benefits the whole parts in the society by providing advanced remote controlling for the smart home. The designed IoTSHS is controlled through remote control which uses IR and WiFi. The IoTSHS is capable to connect to WiFi and have a web browser regardless to what kind of

operating system it uses, to control the appliances. No application program is needed to purchase, download, or install. In WiFi controlling, the IoTSHS will give a secured Access Point (AP) with a particular service set identifier (SSID). The user will connect the device (e.g. mobile-phone or Laptop/PC) to this SSID with providing the password and then will open the browser and go to particular fixed link. This link will open an HTML web page which will allow the user to interface between the Mobile-Phone/Laptop/PC and the appliances. In addition, the IoTSHS may connect to the home router so that the user can control the appliances with keeping connection with home router. The proposed IoTSHS was designed, programmed, fabricated and tested with excellent results.

Security and privacy for IoT and Fog Computing Paradigm:

Mining in the Cloud and Results on the Mirror

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***Abstract*— In the past decade, the revolution in miniaturization (microprocessors, batteries, cameras etc.) and manufacturing of new type of sensors resulted in a new regime of applications based on smart objects called IoT. Majority of such applications or services are to ease human life and/or to setup efficient processes in automated environments. However, this convenience is coming up with new challenges related to data security and human privacy. The objects in IoT are resource constrained devices and cannot implement a fool-proof security framework. These end devices work like eyes and ears to interact with the physical world and collect data for analytics to make expedient decisions. The storage and analysis of the collected data is done remotely using cloud computing. The transfer of data from IoT to the computing clouds can introduce privacy issues and network delays. Some applications need a real-time decision and cannot tolerate the delays and jitters in the network. Here, edge computing or fog computing plays its role to settle down the mentioned issues by providing cloud-like facilities near the end devices. In this paper, we discuss IoT, fog computing, the**

relationship between IoT and fog computing, their security issues and solutions by different researchers. We summarize attack surface related to each layer of this paradigm which will help to propose new security solutions to escalate it acceptability among end users. We also propose a risk-based trust management model for smart healthcare environment to cope with security and privacy-related issues in this highly un-predictable heterogeneous ecosystem.

The Impact of Social Networking Sites on Employees' Performance

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***Abstract*—Social networking sites are making rapid evolution around the world over the past few years. Presently, social networking sites became the daily routine activities of every employees' life and made a positive (negative) effect on their performance. Therefore, organizations are facing a big challenge to ensure the effective use of social networking sites to enhance employees' performance during working hours. The main objective of this research is to explore the impact of an intensive use of social networking sites on employees' performance through an intermediation of job satisfaction and organizational commitment factors. This research is based on female random samples of employees working at the King Abdul-Aziz University in 2016. The method used to collect the data was via online Google questionnaire. The forum was used to distribute the questionnaire and as a primary source of data collection. Descriptive, correlation and regression analysis have been employed to identify the influence of the variables to test hypotheses. This research concludes that the intensive use of social networking sites has the greatest positive impact on the employees' performance. It does enhance their job satisfaction which leads to organizational commitment. Moderate use of social networking sites leads to achieve a balance between the personal and the professional life of employees. It ultimately increases employees' overall performance over a long period of time. Using social networking sites has several benefits. It helps the employees to improve and enhance their skills, knowledge, productivity, communication between co-workers and promotes innovation.**

The Quest for Professional Development on Teaching and Learning Technologies (TLT) at Charles Sturt University: A Case Study

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ABSTRACT

This study provides a reflective overview of the professional development process as self-directed learning (SDL) under the Australian Government funded Endeavour Executive Fellowship program on teaching and learning technologies (TLT) for distance education/online learning (DE/OL) at Charles Sturt University (CSU). This paper describes various methods/inputs and strategies used to achieve the goals of the program in which the authors have been involved. Professional development is a means of enhancing knowledge, skills, expertise and attitudes, and therefore, human capital theory is used as a lens to reflect on the study. This study employs an Input-Process-Output framework. In this paper, the authors present a strategic approach for professional development of an educator from Bangladesh Open University (an ODL university from a developing country) on teaching and learning technologies at CSU (a dual mode university in Australia) addressing the emerging issues, challenges, positive avenues for professional development on TLT for ODL including key lessons learned.

Traffic Accident Detection Using Random Forest Classifier

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***Abstract*-The Internet of Things (IoT) has been growing in recent years with the improvements in several different applications in the military, marine, intelligent transportation, smart health, smart grid, smart home and smart city domains. Although IoT brings significant advantages over traditional information and communication (ICT) technologies for Intelligent Transportation Systems (ITS), these applications are still very rare. Although there is a continuous improvement in road and vehicle safety, as well as improvements in IoT, the road traffic accidents have been increasing over the last decades. Therefore, it is necessary to find an effective way to reduce the frequency and severity of traffic accidents. Hence, this paper presents an intelligent traffic accident detection system in which vehicles exchange their microscopic vehicle variables with each other. The proposed system uses simulated data collected from vehicular ad-hoc networks (VANETs) based on the speeds and coordinates of the vehicles and then, it sends traffic alerts to the drivers. Furthermore, it shows how machine learning methods can be exploited to detect accidents on freeways in ITS. It is shown that if position and velocity values of every vehicle are given, vehicles' behavior could be analyzed and accidents can be detected easily. Supervised machine learning algorithms such as Artificial Neural Networks (ANN), Support Vector Machine (SVM), and Random Forests (RF) are implemented on traffic data to develop a model to distinguish accident cases from normal cases. The performance of RF algorithm, in terms of its accuracy, was found superior to ANN and SVM algorithms. RF algorithm has showed better performance with 91.56% accuracy than SVM with 88.71% and ANN with 90.02% accuracy.**

VLSI design of energy efficient computational centric smart objects for IoT

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***Abstract*— Traditional standalone embedded system and its computational elements firmly connect with physical entities such as Input-Output devices and sensor networks in IoT applications such as medical monitoring, smart grids, smart cities, environmental monitoring systems which are gaining attraction among institutions and industries.A huge quantity of sensors are added to the IoT, and the processing of a large amount of data coming from Input-Output devices and sensor networks increases the energy consumption. To have more efficiency, the mobility of IoT based system requires low energy consumption.**

Smart devices perform the data offloading to external devices with increased communication effort, and this effort contribute to the overall power consumption of the smart devices. This power hungry nature of the communication infrastructure and computational resources using cloud computing is not very much suitable to design the future computational system.This nature changed the trend to shift the smartness of the things more adjacent to the things themselves and network edge (FoG) instead of towards the cloud.This shift can improve the computing capacity of the smart objects and limit energy consumption. This paper aims at exploring emerging approaches, ideas, and contributions to address the challenges in the design of energy efficient computational centric smart objects for IoT. A proposed energy-efficient Network on Chip (NoC) architecture for embedded high-performance computing is provided.