2022 International Conference on Data Analytics for Business and Industry (ICDABI 2022)

Virtual Conference
25 – 26 October 2022

IEEE Catalog Number: CFP22Y56-POD
ISBN: 978-1-6654-9059-7

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number: CFP22Y56-POD
ISBN (Print-On-Demand): 978-1-6654-9059-7
ISBN (Online): 978-1-6654-9058-0

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

Tuesday, October 25

Tuesday, October 25 9:00 - 9:20 (Asia/Qatar)

OPENING CEREMONY

Tuesday, October 25 9:30 - 10:00 (Asia/Qatar)

KEYNOTE SPEAKER 1

Tuesday, October 25 10:00 - 10:30 (Asia/Qatar)

KEYNOTE SPEAKER 2

Tuesday, October 25 10:40 - 12:00 (Asia/Qatar)

SESSION A1

10:40 ***Effective Strategies of Positive Reinforcement Learning For Non-complaint behavior...1***

Shawwal Rasheed and Sana Mazhar (Superior University Lahore, Pakistan); Muhammad Raza Naqvi (INP-ENIT, University of Toulouse, France)

This Research paper was conducted to test the effect of positive reinforcement on noncompliant behavior. And also, we compare the effectiveness of different kinds of reinforcements on the academic achievements. This accomplishes that positive reinforcement did reduce this student's non compliant behavior. In this study we test the effect of positive reinforcement on a boy which are facing ASD autism spectrum disorder and then after four weeks of observation when the complaint behavior was ignored, we implement positive reinforcement and as a result it is cleared that positive reinforcement reduce the non-complaint behavior. Positive reinforcement is different for every student but the theory of hypothesis regarding no difference in compliant behavior before and after and this implementation is wrong and be rejected, because t-test is showing a clear difference. It is suggested that further contemplates are directed in other evaluation and age levels, just as in an entire bunch setting.

11:00 ***Education 4.0: Explainable Machine Learning for Classification of Student Adaptability...6***

Raj Gaurang Tiwari (Chitkara University, India); Anuj Kumar Jain (Chitkara University Punjab, India); Vinay Kukreja (Chitkara University, Punjab, India); Neha Ujjwal (Chitkara University, India)

In India, online education is an important part of the educational system, but it grew even more popular during the Covid 19 epidemic since schools and universities were closed after March 2020. Students benefit from online instruction since they may record lectures and watch them as many times as necessary to grasp the material. However, the application of this technology in the sphere of education presents obstacles and ethical issues. Artificial Intelligence's prospects, advantages, and problems in education is be examined in this research. Several researches have shown that pupils might be hindered by online education, despite its widespread appeal and effectiveness. This study examines whether or not students are accepting of technology in the classroom. This article uses machine learning algorithms to classify the adaptability level of pupils. To predict the amount of student adoption of Industry 4.0 capabilities, we used a variety of machine learning techniques. With 93% classification accuracy, neural network and random forest techniques were shown to be the most effective.

11:20 ***Handling sparsity and seasonality problems simultaneously in session-based recommender systems using graph collaborative filtering...11***

Subhajit Bag (Indian Institute of Technology Kharagpur, India); Anmol Kumar (Indian Institute of Technology Kharagpur & IIT Kharagpur, India); Sobhan Sarkar (Indian Institute of Management Ranchi, India)

Session-based recommender systems have evolved as a new paradigm in recent years, intending to capture short-term yet dynamic user preferences to give more timely and accurate suggestions that are responsive to the change in their session contexts. However, sparse data for user-item interaction has been one of the significant essential issues as we need a colossal amount of memory to store those sparse data. Seasonality is another major issue in recommendation systems as there are many variations in the pattern of customers' interests at different time intervals. In our study, we resolve the above mentioned issues by using graph collaborative filtering and creating feature bins. As a case study, we used sequential data from YooChoose customers to validate the efficacy of our proposed methodology. Further, we use five state-of-the-art graph neural network models to get the best recommendation. The performance of those models is evaluated using the NDCG (Normalized Discounted Cumulative Gain) and ROC-AUC (Area under the Receiver operating characteristic curve) metrics. In our study, we find out that Residual Gated Convolutional Neural Network with four layers and Adam optimizer gave the best recommendations.

11:40 ***Factors that Impact Tension String Tennis Racket...16***

Husain Yusuf Hani, Salman Yusuf Hammad and Sawsan Hilal (University of Bahrain, Bahrain)

Tennis is one of the most popular sports in the world. It is an expensive sport that requires special equipment, such as racket, balls, and tennis strings. One of the problems with tennis is tennis strings that have to be changed in short periods due to the loss of their tension. Most tennis strings are not recyclable as their excessive consumption negatively affects the environment. This study aims at identifying the factors that impact the tennis strings. The data were extracted from the Tennis Warehouse University website that specializes in tennis and its equipment. After deleting missing values, the 80:20 ratio was used to split the data into training set and test set. To this end, three regression methods were implemented: least squares, ridge, and lasso. Among all regressors, only the String-to-String Friction and the Spin Potential were found to have insignificant impact on the tennis strings. The results showed that the polyester string can hold the tension more than other strings while the gut string is the worst. Furthermore, it's better to string the racket at 52 lbs than 41 lbs. Despite the interesting results obtained concerning the factors that impact the tennis strings, the study can be improved by including other variables such as the tennis racket type, the racket shape, the methods of strung the rackets, the types of the balls, and the string thicknesses.

SESSION A2

10:40 ***Bioactive Components of Commiphora Gileadensis Plant for Various Medicinal Applications: A Bibliometric Analysis...21***

Aiman A. Bin Mokaizh (Universiti Malaysia Pahang & Hadhramout University, Malaysia); Abdullah O. Baarimah (Universiti Teknologi PETRONAS, Malaysia & Hadhramout University, Yemen)

Herbal medicine is becoming increasingly popular all over the world. As an alternative to currently used antibiotics, there is a need to find naturally occurring substances from plants that contain bioactive components. Commiphora gileadensis is a significant medicinal plant that has been used historically and, in the future, where this tree species is important economically and medicinally. The medicinal potential of C. gileadensis stems from the presence of secondary phytoconstituents, which perform a variety of functions including antioxidant, antimicrobial, cytotoxic, anticancer, and antiviral. Several studies have been conducted to integrate the ecological and biological properties of C. gileadensis. However, no scientometric analysis has been attempted to investigate the holistic understanding of the plant. The goal of the study is to perform a bibliometric analysis of the C. gileadensis plant literature and provide an overview of research progress from 2010 to September 2022. There were 40 documents extracted from the Scopus database. The VOSviewer tool was used to visualize the literature by country, scientific journal, and keyword. The findings revealed that "Antibacterial," "Antioxidant," "Anti-microbial," "Anticancer," and "Sustainable Medicinal Plant" have recently risen to prominence as mainstream topics associated with this field, piqued the interest of academics, and may represent future research opportunities. Furthermore, based on the most keywords frequently utilized, seven important research domains linked with C. Gileadensis have been identified, including "Balm of Gilead", "Balm of Judea", "Apharsemon", "Opobalsamum",

"Mecca Balsam", "Besham (Becham)" and "Myrrha". As a result, explanations for research findings and recommendations for future studies on the integration of C. Gileadensis usage and its valuable bioactive components for multi-Medicinal applications have been provided.

11:00 ***U-Net Based Covid-19 Infected Lesion Detection and Deep Learning Based Classification on CXR...28***

Esra Balik, Buket Kaya and Mehmet Kaya (Firat University, Turkey)

The Covid-19 disease, named coronavirus, which emerged in China in December 2019, has become a pandemic in a short time all over the world. The fact that the Transcription Polymerase Chain Reaction (RT-PCR) test produces false negatives and the diagnosis time is long, has led to the search for new alternatives for the diagnosis of this virus, which can result in death, especially with the damage it causes to the lungs. Therefore, chest images have become suitable tools for diagnosis from chest images with data obtained from Computed Tomography or CXR imaging techniques. Deep learning studies have been proposed to provide diagnosis with these tools and to determine the infected region of Covid-19 and Pneumonia disease. In this paper, a two-stage system is proposed as segmentation and classification. In the segmentation process, infected regions segmented from the labeled data were determined. In the classifier stage, Covid-19/Pneumonia/Normal classification was performed using three different deep learning models named VGG16, ResNet50 and InceptionV3. To the best of our knowledge, this is the first attempt to sequentially design classification and segmentation systems into a more precise diagnosis. As a result of the study, 95% segmentation accuracy was obtained. Classifier models achieved 99%, 90% and 98% accuracy, respectively.

11:20 ***CoreMedi: Secure Medical Records Sharing Using Blockchain Technology...33***

Abhiram Puranik, Akanksha V Akkihal and Prasad Honnavalli (PES University, India); Sivaraman Eswaran (Curtin University Malaysia, Malaysia)

Individual medical records have a high priority of integrity and security, yet they are vulnerable to data breaches and manipulation. It's vital to communicate these data in a secure and safe manner. To overcome this problem, we propose the usage of blockchain technology to store and share medical data. Data stored on blockchain is immutable, verifiable and transparent(based on accessibility). Data being unchangeable on blockchain, the rate of fraud may be drastically decreased. With the help of smart contracts which are small pieces of code that run on blockchain, we have designed and implemented a Decentralized application (DApps) that enables patients/individuals to store and share medical records securely. Users may share their medical history, medications, and personal data with a specific medical personnel on the same blockchain network using CoreMedi, a Decentralized Web application. We implemented this application with React as frontend and the backend infrastructure uses Ethereum solidity smart contracts. The process of running a blockchain application is not simple because the users must be willing to spend crytpocurrencies as gas fees, as this is the way to maintain the network with no single organization having control.

11:40 ***Stimuli Effect to Site Attachment on Instagram and its Impact to Repurchase Intention on Online Travel Agencies During the COVID-19 Pandemic...38***

Muhammad Fanani and Muhammad Nurizki Mulia Putra (BINUS Online Learning Bina Nusantara University Jakarta, Indonesia); Yuniarty Yuniarty (Binus Online Learning, Binus University, Indonesia); Hartiwi Prabowo (Bina Nusantara University & BINUS Online Learning, Indonesia)

Increased use of social media, especially during the pandemic COVID-19, affects consumer behavior in making purchases, one of which is transactions made by followers of online travel agencies (OTA). This research was conducted to study the relationship between followers of Instagram account Online Travel Agency (OTA) and the Online Travel Agency (OTA) itself. The type of research design used is quantitative survey research using the SEM (Structural Equation Model) method and the analysis tool using Smart-PLS 3.0. The unit of analysis used in this study is the people in DKI Jakarta, Indonesia who have used Online Travel Agencies (OTA). The results showed Stimuli significantly affected Perceived Content Quality, Stimuli significantly affected Perceived Entertainment, Stimuli significantly affected Perceived Service Quality and Site Attachment significantly affected Repurchase Intention.

SESSION A3

10:40 ***A Multilayer Encryption Model to Protect Healthcare Data in Cloud Environment...42***

Kumeel Rasheed (Bahria University Islamabad, Pakistan); Ume Hani Naeem (Hayatabad Medical Complex, Pakistan); Muhammad Bilal (Bahria University, Pakistan); Filza Syed (Gajju Khan Medical College, Pakistan); Syed Saad (Universiti Teknologi Petronas, Malaysia)

21st Century is recognized as an era of cloud computing and it has become an integral part for any organization. It is equally suitable for all the organizations e.g. education, government, public sector, health care department There are two types of patient information i.e. protected/sensitive health information and general information. Protected information (Phone no, ATM, Security no, MR no etc.) requires more confidentiality as compared to general information. Therefore, for some protected health information without patient association (general disease name, symptoms) will be very helpful for research experiments. Health information is protected by achieving confidentiality, integrity and availability, when data is stored in cloud environment. In this thesis, we have suggested a multilayer encryption technique to ensure the confidentiality of data stored in cloud environment. This suggested technique will improve the security of cryptographic techniques when used in multilayered format. We have set up a local system for the experiment. We have used the RDBMS (Microsoft SQL Server) and Framework 4.5. A set of 500 dummy patient records is used to test the proposed techniques. The experiment was performed to check the confidentiality of the suggested techniques. This experiment shows us that multilayer encryption techniques is more suitable for public health sectors when data is in cloud environment.

11:00 ***Application of Smart IoT Technology in Project Management Scenarios...49***

Kumeel Rasheed (Bahria University Islamabad, Pakistan); Akhunzada Younis Said (COMSATS University, Pakistan); Mohammed Balbehaith (University of Portsmouth, United Kingdom (Great Britain)); Aimal Khan (COMSATS University, Pakistan); Vipin Kumar Oad (Gdańsk University of Technology, Poland); Syed Ammad (Monash University Malaysia, Malaysia)

The report presents a low-cost and flexible solution to control and monitor home and industrial appliances. The popularity of automation devices has increased greatly in recent years due to higher affordability and simplicity through IoT phone and tablet connectivity. For this purpose, we have developed the IoT Outlet: a stand-alone communication unit, used to connect outlets to the internet. The IoT Plug is a power switch which can be accessed via Wi-Fi connection. Users can plug devices into the IoT Plug to remotely switch power on/off, get information of device's power consumption and local motion status, using wireless commands from the web and Android application. To access IoT Plug, it is connected with a router in Wi-Fi access point mode and control the Plug. An Android-based IoT phone application and Website having the control panels, employs standard operations such as Get and Post requests that return responses to communicate between the remote user and the Plug using PHP MySQL Databases. The main purpose of the project is to save the electricity by setting the time scheduling through the controlling interface. Through this IoT device we can control and get feedback from any plugged device. There is a lot of need on large scale industries, laboratories, military fields and real life situation, where one wants to know the status of the electric operated devices. This project is the building block for the application such as wireless controlling of any appliance that can be plugged in with local voltages i.e. 220V.

11:20 ***An Integrated Framework for Crop Cultivation using Internet of Things and Computational Intelligence...56***

Pramod Mathew Jacob (Providence College of Engineering Chengannur & Chengannur, India); Jeni Moni (Providence College of Engineering Chengannur, India); Renju Rachel Varghese (Saint Gits College of Engineering Kottayam, India); Akhila Sreenivas K, Saleema D and Ayswarya K (Providence College of Engineering Chengannur, India)

Agriculture is one of the prime sources which determines a nation's prosperity and economic growth. But most of the farmers find it difficult to survive due to the following reasons like lack of enough labors, inappropriate and traditional methods are followed to monitor agricultural fields and plant growth etc. As technology has evolved, it is possible to automate the various phases of farming activities. There are many standard sensors available to remotely monitor the soil moisture content, pH content, fire detection in the field, intruder detection etc. All these sensors sense the information and is fed to a central coordinator which will process the data and initiate necessary actions. All these are done over internet and thus the concept can be called as Smart

farming using Internet of Things. It is also possible to analyze the image of plant leaf to identify the various plant dis-eases with the help of Machine Vision. Our model thus reduces the farmer's overhead using IoT and computational intelligence.

11:40 ***Enterprise Data Strategy: A Decentralized Data Mesh Approach...62***

Vijay kumar Butte (National University of Singapore, USA); Sujata Butte (University of Idaho, USA)

As the enterprises experience exponential growth of data, the centralized approach of data lakes is falling short of meeting dynamic business needs. This has given rise to a data mesh approach focusing on data as a product thinking, distributed domain driven architectures, federated governance and self-serving data infrastructure. In this paper we provide architectures and practical aspects implementation and making data mesh a success.

SESSION A4

10:40 ***POX Controller Evaluation Based On Tree Topology For Data Centers...67***

Jellalah Alzarog and Abubaker Abdullatif Alsunousi (Misurata University, Libya); Abdalwart Almhishi (Misrata University & HATIF LIBYA COMPANY, Libya); Tareg Abubaker Abulifa (College of Industrial Technology, Libya); Wisam Eltarjaman (University of Misurata, Libya); Salem Omar Sati (Misurata University, Libya & HHU GERMANY, Germany)

The Software Defined Networking (SDN) is considered a solution for Data Center Networks (DCN). When incorporating the SDN architecture in a DCN paradigm, this solution offers a centralized control that helps to simplify the management and reduce the issues of heavy traffic storage. This paper investigates the performance of deploying an SDN controller in DCN using QoS parameters such as throughput and delay. The paper considers the network topology of different hosts using the Mininet emulator. The paper evaluates the tree topology performance based on the overhead messages and the convergence time of DCN based on the number of hosts. The results show that the python SDN controller of POX is considered the best choice for DCN.

11:06 ***Parallel Implementation of KNN Algorithm for Dry Beans Dataset...72***

Salman Yusuf Hammad (University of Bahrain, Bahrain); Salman Bader Alhaddad, NA (University of Bahrain & Liverpool John Moores University, Bahrain); Husain Yusuf Hani and Abdulla Alqaddoumi (University of Bahrain, Bahrain)

In recent years, the interest in using machine learning to solve complex problems in different sectors using parallel algorithms has increased. The KNN algorithm is the most popular method to classify the dataset. The main problem in implementing this algorithm is how to quickly find K nearest neighbors. Accordingly, this research aims to study the effect of the parallel execution of the KNN algorithm by using different metrics such as speedup and efficiency. The performance of serial and parallel KNN algorithms was compared using different values of K and a different number of processers. The results show that The Message Passing Interface (MPI4py) improves performance by increasing speedup and decreasing execution time. Also, the impact of serial execution on the size of the dataset is discussed. It was found that as the size of the dataset increases, the serial time increases. Meanwhile, the use of seven processers in parallel execution with the KNN algorithm needs less time. In addition, as the number of processers increases, the speedup increases, and the efficiency decreases

11:33 ***Investigation on Machine Learning Algorithms to Predict High School Students Performance at Risk of Failure...77***

Fatema Almehaiza (University of Bahrain & BNET Bahrain, Bahrain); Layla Jaafar and Iyad Atoom (University of Bahrain, Bahrain); Nabil Hewahi (UOB, Bahrain)

Successful learning is dependent on the success of the learners; ensuring students' achievement is the responsibility of the educational system. Over the years, educational institutions have utilized Machine Learning (ML) technology to facilitate and support decision-making in a variety of learning areas. Predicting students' performance in the early stages of their learning

journey is one of ML's most significant contributions to educational institutions. Using ML technology, the institutes will be able to improve teaching and learning practices for students who are at risk of failing. The objective of this study is to build a model that can predict students' performance and identify students at risk of failure. The study examines the application of three ML algorithms in predicting: Logistic Regression (LR), Decision Tree (DT) and Random Forest (RF). The study used a sample size of 647 with one dependent variable and 33 distinct variables. The study found that RF performed better than LR and DT with an accuracy of 80.37%, recall of 87.98%, and F1 rate of 91.78%.

SESSION A5

10:40 ***Towards Secured Big Data Analytics in the Cloud: Two Case Studies...83***

Zainab Salman (University of Bahrain & IT College, Bahrain); Alauddin Yousif Al-Omary (University of Bahrain, Bahrain)

Securing and dealing with big data in the cloud has become a challenging issue. Best techniques, methods, and practices should be applied to ensure privacy and smooth cloud computations. Meanwhile, data analytics techniques play an important role in utilizing big data. This paper presents two different case studies that use the same datasets and perform the same processes, but they are implemented in different environments. Each case study has different scopes and aims to provide security and privacy for the data owner. Furthermore, a hybrid encryption algorithm is used to secure data using Elliptic Curve Cryptography (ECC) and Fully Homomorphic Encryption (FHE). Besides, clustering has been chosen as an instance of data analytics. Moreover, a distributed computing environment is defined to decrease the clustering time. Experiments show that the suggested distributed computing method can decrease the clustering time by up to 48 % in the first case study and by up to 8.3 % in the second case study.

11:00 ***Crash severity analysis in distracted driving using unlabeled and imbalanced data: A novel approach using Robust Two-Phase Ensemble Predictor...88***

Subhajit Bag (Indian Institute of Technology Kharagpur, India); Saptashwa Maity (Indian Institute of Technology, Kharagpur, India); Sobhan Sarkar (Indian Institute of Management Ranchi, India)

Distracted driving plays a pivotal role in road accidents. Therefore, prediction of the crash severity due to distracted driving is essential. Although several machine learning techniques exist for such prediction, it is difficult to use them in case of the unavailability of class labels and class imbalance issues. Moreover, there is a severe lack of research considering environmental factors and driver's behaviour to predict the crash severity. To address the issues, in this study, a robust two-phase ensemble prediction model has been developed, considering the geolocation information and driver's behaviour. An analysis of the unlabeled and high-dimensional data is generally challenging. We perform dimensionality reduction using t-SNE, followed by agglomerative hierarchical clustering to get labelled data. We have used Synthetic Minority Over-sampling Technique (SMOTE) to mitigate the class imbalance issue. Subsequently, we observe that some localities have much more severe crashes, so we develop a feature considering the geolocation information. Then, we create a novel predictor called Robust Two-Phase Ensemble Predictor (R2PEP) to predict the crash severity. The performance of the proposed model has been compared with five state-of-the-art algorithms using a dataset we obtained from the Nevada Department of Transportation. The comparison demonstrates the superiority of our model over the other models, with an accuracy of 99.6%.

11:20 ***The Effect of Organizational Culture on Knowledge Sharing: Case of Logistics Companies...93***

Adel Ismail Al-Alawi and Hala Elias (University of Bahrain, Bahrain); Arpita Mehrotra (Royal University for Women, Bahrain)

This research aimed to explore the extent to which organizational culture can affect knowledge sharing and its activities within an organization and assuring the significance of knowledge sharing in the organization's success. To reach our conclusion, quantitative and qualitative data have been gathered through a questionnaire distributed randomly on the society and an interview with the staff of Bahraini local logistics companies. The research reveals that organizational culture that promotes knowledge sharing positively affects organizational communications, individual performance, accurate decision-making, and interpersonal relationships among employees. In addition, results from the analysis show that organizational culture has both practical and statistical significance to enhance knowledge sharing effectiveness. Furthermore, trust, leadership, and personal mentality have a

significant role in shaping knowledge-sharing behavior. Time limitation for gathering the data from the interview with Bahraini local logistics companies staff and the questionnaire respondents delayed moving to the next phase of findings and the conclusion about this subject.

11:40 ***Design-Driven Innovation Role in Customers' Behavioral Intention Towards Businesses: A Perspective from the Foodservice Industry in Bahrain...98***

Adel Ismail Al-Alawi and Eman Al Saffar (University of Bahrain, Bahrain)

The primary purpose of this paper is to explore the relationship between design-driven innovation (DDI) combining interior design (ID), brand design (BD), packaging design (PD), and marketing content design (MCD) on customers' behavioral intention (CBI) toward restaurants within the foodservice industry in the Kingdom of Bahrain. This paper uses a quantitative method using a structured questionnaire targeting restaurant customers in Bahrain. Four hundred respondents participated in the survey. The results revealed a strong positive and significant relationship between DDI and CBI; when design tools drive innovation, the CBI will increase by 101.7%. It is also evident that ID increases CBI by 57.2%, followed by PD with a percentage of 54.2%, BD with a percentage of 52.3%, and MCD by 50%.

SESSION A6

10:40 ***Signal Synchronization of Traffic Lights Using Reinforcement Learning...103***

Ilhan Aydin (Firat University, Turkey & Firat, Turkey); Mehmet Sevi (Muş Alparslan University, Turkey); Gurbet Güngören and Halil Can İrez (Fırat University, Turkey)

Today, traffic problem is a serious problem, especially in big cities. The increasing number of cars with the increasing population further increases the traffic problem. This traffic problem increases travel times, increases fuel consumption, causes many accidents, and negatively affects human psychology. One of the reasons that increase traffic on the roads the most is traffic lights. Since traffic lights are used at most intersections, large traffic occurs at intersections. The signal periods of most traffic lights are predetermined using data from the intersection. However, these traffic lights are not adaptive to different situations that may occur on the road. In the study, we tried to make non-adaptive traffic lights adaptive using deep reinforcement learning. In the study, the signal periods of traffic lights were managed by using a reinforcement learning agent trained on simulation.

11:00 ***An Automated Intrusion Detection System with Audio Alert using Passive Infrared Sensor...109***

Pramod Mathew Jacob (Providence College of Engineering Chengannur & Chengannur, India); Jeni Moni, Amal Aji, Rashida Abdul, Dayana Mariyam John and Gopika G Pillai (Providence College of Engineering Chengannur, India)

Security is a prime concern of any individual all over the world. Home Intrusion is one of the main threats in any part of the world. Although there are mechanisms to prevent intrusions in an area using surveillance cameras and personal security systems, there arises the necessity of attention of an individual person throughout the surveillance time. This process is comparatively time-consuming and man power requirement is high in case of very large surveillance area like a factory, production area, farm field etc. So, we propose an automated solution to the above said problem using the concept of Internet of Things (IoT). Here, we deploy an intelligent system with an inbuilt speaker and sensors to monitor the given area. The various sensors and actuators are integrated with a central coordinator Arduino. The system will continuously monitor the area. The sensor input will be high, when an intruder is detected in the area and the speaker will automatically alert that area and an email alert is initiated. Thus, the user can take necessary actions to prevent that area from intruders.

11:20 ***Categorization of Asynchronous Motor Situations in Infrared Images: Analyses with ResNet50...114***

Gönül Sakallı and Hasan Koyuncu (Konya Technical University, Turkey)

Asynchronous or induction motors are frequently preferred in industrial applications concerning their cheap supply, strength and easy maintenance. However, the fault recognition of these motors constitutes a comprehensive examination with direct interference. As a consequence, the images obtained from infrared cameras and their analyses gain importance to remotely

detect the situation of motors. With this purpose, we handle a transfer learning approach named ResNet50 to categorize 11 different situations of asynchronous motors in infrared camera images. For performance assessment, hyper-parameters of ResNet50 are examined to maximize the success to be achieved. In experiments, two test methods (70%-30% training-test split and 80%-20% training-test split) are utilized to objectively evaluate the parameter adjustments and to obviously reveal the effect of training samples. As a result, it's proven that ResNet50 can achieve 100% classification accuracy for categorization of induction motor situations in experiments with both test methods.

11:40 ***Innovation in Construction: A new norm against Traditional Construction...119***

Muhammad Ali Musarat (Universiti Teknologi PETRONAS, Malaysia); Muhammad Babar Ali Rabbani (University of New Brunswick, Canada); Wesam Salah Alaloul (Bandar Seri Iskandar & Universiti Teknologi PETRONAS, Malaysia); Muhammad Altaf (Persiaran UTP, Seri Iskandar, Perak & Universiti Teknology Petronas, Malaysia); Abdullah O. Baarimah (Universiti Teknologi PETRONAS, Malaysia & Hadhramout University, Yemen); Khalid Mhmoud Alzubi (Universiti Teknologi PETRONAS, Malaysia & Albalqa Applied University, Jordan)

The construction industry is demonstrating expansion with time where the position of innovation in construction is significant. This paper performs a systematic review under the guidelines of the PRISMA statement where the Scopus database was chosen to extract the relevant articles based on the selective keywords. The output shows 67 articles that were reduced to 17 for a full review after applying the limitations. The final chosen articles revealed the reforms in the construction sector after the inclusion of innovation in the construction, mostly the digitalization of the industry. This review will help the construction industry stakeholders to get the inside of the construction innovation and recommended to educate the construction industry stakeholders so that after learning they can easily apply innovation techniques in the construction projects.

Tuesday, October 25 12:30 - 13:50 (Asia/Qatar)

SESSION B1

12:30 ***An Evolutionary Software Paradigm for Developing Internet of Things (IoT) Based Systems...123***

Pramod Mathew Jacob (Providence College of Engineering Chengannur & Chengannur, India); Jeni Moni (Providence College of Engineering Chengannur, India); Bibin Vincent (Providence College of Engineering, India); Prasanna Mani (VIT Vellore, India); Doney Daniel (Providence College of Engineering, Chengannur, India); Renisha P Salim (Providence College of Engineering, India)

Automation and development of smart things is one of the primary concerns around the globe. The bond established between various sensors and internet introduced the concept of Internet of Things (IoT). IoT is in evolutionary phase and hence it lacks a standard reference model for its various design aspects. IoT comprises of hardware, software and communication modules. Though IoT deals with heterogeneous devices and protocols, it is a herculean task for the developer to standardize the software architecture and testing models. This research work focuses on the software aspects of an IoT based system. We have developed a reference software paradigm for the IoT systems by considering the software architecture design phase and testing phase. We have evaluated our model in a smart farming environment by replicating some standard smart farming systems. The results show that our model can be used as a reference software paradigm for designing an efficient and effective IoT based system

12:50 ***Deep Learning Based Method To Detect Diseases In Leaves Of Cassava Plant...128***

Sakshi Sakshi (Chitkara University Institute of Engineering and Technology & Chitkara University, India); Sachin Lodhi (UIT (BU) Bhopal, India); Vinay Kukreja (Chitkara University, Punjab, India)

Cassava has been a prime source contributing to carbohydrate-rich food in many tropical developing nations. A kind of wreaking ailments in the form of diseases like cassava mosaic disease and cassava brown streak has caused havoc in the agricultural

sector. Early diagnosis of these leaf-infecting diseases can improve the yield of the crop. The modeling of an automatic disease classifier can be a savior for farmers in handling the spread of leaf diseases. This work cogitates major cassava diseases (cassava mosaic and cassava brown streak) to create a deep learning-based robust detection and classification model. The dataset is collected from a variety of standard online repositories. A novel approach to detection has been employed to the convolutional neural network to detect and classify the disease. The performance of CNN is evaluated in terms of accuracy achieved is 84.3% in the classification process.

13:10 ***Identification of Accident Path Elements using Supervised Learning: Observation of Diminishing Marginal Accuracy while using Cosine Similarity...135***

Satyajeet Sahoo (Indian Institute of Technology Kharagpur, India)

This study aims at identifying the Hazardous Elements and Initiating Events of Incidents occurring at a steel plant in India with respect to activities conducted by contractors. Accordingly, a supervised text model based on cosine similarity values is implemented to find out the Hazardous Elements and Initiating Events from safety text data. The accuracy of the test data annotations and variance of accuracy as number of training documents considered for annotation is increased, is monitored. The accuracy is observed to show diminishing marginal increments after a threshold.

13:30 ***Railway Track Defect Detection using Transfer Learning With EfficientNetB3...140***

Sakshi Sakshi (Chitkara University Institute of Engineering and Technology & Chitkara University, India); Sachin Lodhi (UIT (BU) Bhopal, India); Vinay Kukreja (Chitkara University, Punjab, India)

Regular railway track inspection is critical for ensuring safe and dependable train operations. Deformations, sediment issues, rail discontinuity, loose nuts and bolts, burnt wheels, superelevation, and misalignment developed on the rails as an account of inadequate maintenance, hasty investigations, and delayed detection pose a serious threat to the safe operation of rail transport. The traditional method of manually inspecting the rail track with a railway cart is inefficient and susceptible to human error and bias. In a country like India, where train accidents have claimed many lives, automating such approaches to avoid such accidents and save countless lives is not relatively rare. This study aims to contribute to the detection of cracks and interruptions in railways. This paper proposes an EfficientNet-B3 Model solution based on the pre-trained EfficientNet-B3 DNN network. A specialized branch has been incorporated into the network layer to compute the required weights, and the model possesses around 12 million parameters. These weights are automatically learned by training the entire DNN model end-to-end with the backpropagation algorithm. As a result, the network learns to detect the railway track zones effectively while suppressing regions irrelevant to the classification. The detection mechanism achieves an accuracy of 93.55% while classifying a dataset of images.

SESSION B2

12:30 ***Multi-Class Gastrointestinal Images Classification Using EfficientNet-B0 CNN Model...146***

Murat Ucan (Dicle University, Turkey); Buket Kaya and Mehmet Kaya (Firat University, Turkey)

Many diseases and cancerous cells can be detected using images taken by gastroenterology specialists. Accurate and rapid detection of gastroenterological diseases is very important for the treatment processes to be applied and for the patient's recovery. In this study, a data set containing data from 8 different diseases (Esophagitis, Dyed and Lifted Polyps, Dyed Resection Margins, Cecum, Pylorus, Z-line, Polyps, Ulcerative colitis) was used. A deep learning network was trained using the EfficientNet architecture and the test results were given in the study. In addition, comparisons were made with other studies using the same data set and the same parameters in the literature. Studies have shown that gastrological images can be successfully classified with an accuracy of 0.935. Class-based classification results are also shared in detail for 8 diseases in the results section of the study. The results showed that the trained architecture would contribute to minimizing human error in disease detection.

12:50 ***Comparison of Deep Learning Models for Body Cavity Fluid Cytology Images Classification..151***

Murat Ucan (Dicle University, Turkey); Buket Kaya and Mehmet Kaya (Firat University, Turkey)

Cytological examinations have an important role in the detection of cancerous cells. The use of convolutional neural networks

in the classification of medical images has become an increasingly popular topic. Detection of malignant cells with artificial intelligence methods will ensure that human errors are minimized. Within the scope of the study, it is recommended to perform cytological examinations faster and easier by using deep learning methods. In this study used Body Cavity Fluid Cytology Images dataset in which 693 images with size of 256x192 were used to evaluate the proposed method. The data set contains data of 14 malignant and 7 benign patients. Classification of cancerous cytological fluid samples was performed using AlexNet, GoogleNet and ResNet50 architectures. Afterwards, the results were compared with another study using the same data set in the literature. AlexNet, GoogleNet and ResNet50 architectures achieved 97.26%, %98.12, %99.13 classification accuracies, respectively. ResNet50 architecture achieved 99.13% accuracy, 98.75% sensitivity and 99.25% specificity. The results showed that the ResNet50 architecture achieved the most successful results in the classification of cytological images.

13:10 ***Fine-Tuned Faster R-CNN for Universal Lesion Detection...156***

Elif Merve Erzen and Ertan Bütün (Firat University, Turkey)

Universal Lesion Detection in computed tomography scan images is an important task for clinical diagnosis. Manuel and conventional medical methods are time-consuming and error-prone. Automated detection of lesions at an early phase is important to increment the chances of treatment. In this paper, we proposes a fine-tuned deep learning-based method using Faster R-CNN and 1cycle training for universal lesion detection more accurately. The learning rate is one of the most significant hyper-parameter to improve deep neural networks performance. Training with the well learning rate strategy can make a significant contribution to improve the model. The experiments showed that the proposed approach improves significantly Faster R-CNN performance for universal lesion detection.

13:30 ***Hybrid Machine Learning Algorithms for Polycystic Ovary Syndrome Detection...160***

Sara Abdulla Alshakrani (UOB, Bahrain); Sawsan Hilal (University of Bahrain, Bahrain); Ahmed M. Zeki (University of Bahrain & College of IT, Bahrain)

This study focuses on identifying Polycystic Ovary Syndrome (PCOS), which is a serious medical hormonal disorder condition that affects a woman's ability in childbearing age and causes infertility, diabetes, heart problems, endometrial cancer, and other related health issues as it raises the possibility of long-term problems. Therefore, early detection is of great importance. Taking into account Machine Learning (ML) and ensemble learning algorithms with their superior detection capabilities, especially in the medical field. The Hybrid Random Forest Logistic Regression (HRFLR), combined Extreme Boosting with Random Forest, Linear Support Vector Machine, Light Gradient Boosting Model, and CatBoost model are among the hybrid ML models used in this study. To support the unique techniques, the classification models have been investigated using the PCOS dataset containing physical and clinical parameters of women collected from 10 different hospitals across Kerala, India, and downloaded from the Kaggle repository. The top 14 physical and clinical features were selected to detect PCOS by using the univariate feature selection approach. Follicle No. (R) and Follicle No. (L) were found to be the most significant among all features. The evaluation metrics used to test all the models are Accuracy, Precision, Recall, F1-Score, ROC curve plot, Area Under the Curve Score, and K-fold Cross Validation (CV). Finally, results were discussed and compared to indicate that CatBoost outperforms other models, with an accuracy score of 92% also HRFLR obtained the best CV accuracy with 92% when K = 30, both applied on the top 14 features only using 80:20 data split ratio. Consequently, CatBoost is effective at detecting PCOS patients.

SESSION B3

12:30 ***Cryptanalysis of lightweight block ciphers using metaheuristic algorithms in cloud of things (CoT)...165***

Md Saquib Jawed (Aligarh Muslim University, India); Mohammad Sajid (Aligarh Muslim University, Aligarh, India)

The Cloud of Things (CoT) has transformed communication and network technologies by expanding the Imitation of IoT devices. The Cloud of Things is a fusion of Cloud Computing with IoT that provides endless storage, networking, and compute capabilities to IoT devices. Cloud of Things (CoT) has substantially boosted IoT applications in healthcare, automotive, agricultural, education, welfare, and businesses. Even though Cloud of Things (CoT) is scalable, faster, cost-effective, and remotely accessible, but it also faces many challenges like interoperability, compatibility, performance, longevity, and security.

Out of which Security is the biggest hurdle in adoption of Cloud of Things (CoT) because it directly involves user's private data. Researchers and academics are equally concerned, and proposed various lightweight block ciphers to secure the user's data. In this paper the relative cryptographic strength of some of those lightweight block ciphers is measured by performing Cryptanalysis using the Metaheuristic algorithms. For the Experiment purpose three lightweight block ciphers SIMON, SPECK, and PRESENT ciphers which belongs to different categories of Lightweight Block Ciphers and three metaheuristic algorithms Cuckoo Search (CS), Whale Optimization Algorithm (WOA), and Salp Swarm Algorithm (SSA) are chosen. The result of the experiments discusses about the cryptographic strength of lightweight block, the performance of the metaheuristic algorithms and also one interesting behavior of Whale Optimization Algorithm (WOA) for weak keys.

12:50 ***Hunger Games Search: A Scheduler for Cloud Computing...170***

Mohammad Qasim (Aligarh Muslim University, India); Mohammad Sajid (Aligarh Muslim University, Aligarh, India); Mohammad Shahid (Aligarh Muslim University, India)

Cloud computing provides a powerful and on-demand environment in the form of infrastructure as a service (IaaS), platform as a service (PaaS), and software as a service (SaaS). There are numerous challenges in the field of cloud computing, including resource allocation, task scheduling, task migration, VM placement, data privacy, and security, to name a few. Being an NP-hard problem, various meta-heuristic algorithms have been proposed in the literature to address the task scheduling problem in Cloud Computing. In this paper, a Transfer Function induced Hunger Games Search algorithm-based task scheduling algorithm is proposed to execute the various IoT tasks on the virtual machines in the cloud environment. Eight transfer functions, consisting of S-shaped and V-Shaped transfer functions, have been used to evaluate the effectiveness of the proposed algorithm. The proposed algorithm has been evaluated in different scenarios. The simulation study confirms the effectiveness of the proposed algorithm.

13:10 ***Exploring the Impact of Cloud Computing on Sustainable Development...176***

Muhammad Ehsan Rana (Asia Pacific University of Technology and Innovation, Malaysia)

Sustainable development is a strategy that brings into consideration both the immediate and long-term requirements, such as social and economic justice or environmental conservation and natural wealth. Cloud computing is the supply of computing environments, including analytics, software, networking, databases, storage and servers in order to provide faster creativity, scalable capabilities, and scale economies. Cloud service can be divided into 3 primary services which are Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). The cloud deployment model describes the unique sort of cloud infrastructure rights of governance, scalability, and accessibility, in addition to the cloud's purpose and nature. There are many different cloud features that bring advantages to sustainable development, such as easy maintenance, economical, resource pooling and large network access. Feature of AWS, Google Cloud and Microsoft Azure that aid in sustainable development was also elaborated on in this study. Last but not least, this study also elaborated on the potential challenges in cloud sustainability in terms of security, management, hidden expense and lack of expertise.

13:30 ***Cloud Computing as an Enabler in the Mobile Application Domain...184***

Muhammad Ehsan Rana and Vimal Mothi (Asia Pacific University of Technology and Innovation, Malaysia)

Cloud technology is at the forefront of digital transformation today, with most companies shifting applications to the cloud. Cloud Service Providers (CSP) facilitate this journey with a range of services that enables corporation to realize IT savings, whilst improving productivity, product availability and agility. As the mobile era has channel higher internet consumption in mobile, many companies focus on developing applications to engage with consumers as well as for business use. Using cloud technology, developers are able to rapidly build and deploy scalable mobile application capable of serving the needs of modern age consumers. This paper studies cloud computing and how it has act as an enabler in the mobile application domain.

SESSION B4

12:30 ***Exploring Wi-Fi WPA2-PSK Protocol Weaknesses...190***

Mohamed Ali Alhamry and Alauddin Yousif Al-Omary (University of Bahrain, Bahrain)

Many businesses and organizations prefer Wi-Fi networks in their offices, inside buildings, and in outside locations because they save cabling costs and provide the flexibility for employees. As more Wi-Fi connected networks go online, security becomes a greater concern for organizations and individuals. Although Wi-Fi networks are crucial to home networks and enterprise networks, their security is quite weak. Wi-Fi security protocols including Wired Equivalent Protocol (WEP), Wi-Fi Protected Access (WPA), and even Wi-Fi Protected Access 2 (WPA2) are vulnerable to hacking by exploiting their specific weaknesses or guessing passwords using dictionary attacks. This poses a serious risk to the security of a home or enterprise Wi-Fi network. A study of the Wi-Fi WPA2-PSK protocol's security flaws will be presented in this paper. It will try to define the concept behind WPA2-PSK, analyze the methods used to apply WPA2-PSK, and explore some weaknesses found in WPA2-PSK. In this paper, intensive literature review which aims to define, explore, and analyze WPA2-PSK protocol's security flaws will be presented and an experimental approach to perform some penetration tests to explore and mitigate some of WPA2-PSK weaknesses.

12:50 ***5G Security Threats...196***

Aysha Hasan AFaw (University of Bahrain & Ministry of Education, Bahrain); Alauddin Yousif Al-Omary (University of Bahrain, Bahrain)

This 5G technology is providing the broadband access in whole world, entertaining the user mobility with higher approach, Also ensured that a number of electronic devices such as the Internet of Things (IoT) are connected in a very reliable and affordable manner. Every technologist or technology enablers trying to inherit the useability of 5th generation technology in their products such as SDN (Software Defined Networking), NFV and cloud computing. In the implementation of this technology there are several challenges with respect to user's privacy and user's security. In this paper, we will discuss the security challenges and threats that can occur due to the implementation of this technology, most importantly we will overview the challenges for users' privacy. At the end of this paper, we will present some solutions regarding the challenges that can occur due to implementation of 5G. We will also discuss some directions that will give a guideline for further development and implementation for a secure 5th generation system.

13:10 ***Machine Learning Techniques for Intelligent Vulnerability Detection in Cyber-Physical Systems...200***

Shagun Sharma and Kalpna Guleria (Chitkara University Institute of Engineering and Technology, India)

Cyber-Physical Systems (CPSs) are crucial to industry 4.0 because they provide remote access and control of equipment, machinery, and systems by using the internet. This kind of control has the ability to change the world since it is effective in terms of communication, computing, actuators, and sensors. The CPS framework is quite complicated because it requires a lot of different components to finish its various jobs. Due to their critical nature, severe system damage, safety issues, and vulnerable behaviour, cyberattacks can happen. According to a study, social animals are now more worried about their safety due to the rise in CPSs assaults. To identify attacks against CPSs, access control techniques and cryptography are specifically used. The rise in attackers has made it more challenging to completely prevent cyber-attacks, necessitating the requirement for an efficient technique of CPS security. The use of machine learning and deep learning algorithms can protect CPSs from intrusions, deception, and serious harm. This article aims to provide a thorough overview of machine learning and deep learning methods used in various CPS interactions. This paper presents the most effective algorithm for detecting CPS attacks and identifies SVM as the outperforming algorithm to have the highest accuracy of 97.5%, which is quite good when compared to other potential solutions. A dataset made up of 144 data points of CPS attacks namely replay attack, packet dropped failure, modification of information along with low latency failure was used in the study, and it was further divided into training and testing the model in an 80:20 ratio. This report also aids academics and researchers in comprehending cyber attacks and the tools and algorithms used to combat them.

13:30 ***Analysis of Machine Learning and Deep Learning Intrusion Detection System in Internet of Things Network...205***

Ankita Anand (Chitkara University, India)

As technology advances, more demands in various sectors rise, making everything smarter. The Internet of Things (IoT) connects everything through an interconnected nodes also bringing improvements to many industrial or manufacturing industries, healthcare sectors, smart retail, agriculture etc. by pushing many more applications to their limits but are vulnerable to threats and attacks. As a result, security and privacy are required to make IoT secure. This article discusses vulnerabilities in different layers of IoT architecture where security is critically required, the use of Intrusion Detection System in IoT networks and how

machine and deep learning will help to overcome those assaults. The following paper also discusses the different types of Intrusion Detection datasets along with the issues and challenges in IoT.

SESSION B5

12:30 ***Comparison of SQL and NoSQL databases with different workloads: MongoDB vs MySQL evaluation...214***

Ticiana Capris and Pedro Melo (Polytechnic Institute of Viseu, Portugal); Nuno M. Garcia (Universidade da Beira Interior & Instituto de Telecomunicações, Universidade Lusófona de Humanidades e Tecnologias, Portugal); Eftim Zdravevski (University of Ss. Cyril and Methodius - Skopje, Macedonia, the former Yugoslav Republic of); Ivan Miguel Pires (Instituto de Telecomunicações, Portugal)

When choosing a database, one of the most significant decisions is the relationship between relational (SQL) and non-relational (NoSQL) data structures. While both are possible, there are some differences that users should keep in mind when making this decision. In most cases, since SQL databases are vertically scalable, what you can scale can change servers such as CPU, RAM, or SSD. On the other hand, NoSQL databases are horizontally scalable. Therefore, it is possible to support more traffic through fragmentation (data partitioning), i.e., by adding more servers to your NoSQL database. From this perspective, why is it still difficult to select the most suitable instance for a particular application that takes the least runtime? Since computer networks use a cloud as symbology for the data that will be transmitted over the internet. Therefore, it is necessary to perform a comparative study on SQL-oriented database engines to draw conclusions about which model to use. Since NoSQL databases are horizontally scalable, SQL has a form designed for another side of non-productive data and is provided in the form of organized data. Therefore, workload tools are also responsible for automating organizational processes, i.e., they perform tasks without manual employee attendance. They are inevitable for companies looking to apply continuous delivery strategies and improve the efficiency of service delivery to customers.

12:50 ***A Study of Online Scams Associated with Age, Gender and Loss of Value in Thailand...219***

Therdpong Daengsi (Rajamangala University of Technology Phra Nakhon, Thailand); Phisit Pornpongtechavanich (Rajamangala University of Technology Rattanakosin, Thailand & Industry and Technology, Thailand); Patsita Sirawongphatsara (Rajamangala University of Technology Tawan-ok, Thailand); Tharis Thimthong (Faculty of Information Technology, King Mongkut's University of Technology North Bangkok, Thailand); Nippol Sukniyom (Royal Thai Police, Thailand)

Online Scams have become a new normal risk for online shoppers and general people who access the Internet in this era. This paper aims to present a study of online scams, particularly related to age, gender and loss of value. The dataset for this study is from the ChalaOhn system, which is the website developed for protection against online shopping scams in Thailand. The dataset was considered, analyzed and visualized before presenting the results. For the major findings, it was found that more than two third (69.8 %) of the victims are 20-39 years old, while more than two fifth (42.7 %) of them are 20-29 years old. For the loss of value, 37.1 % is lower than $100. The mode loss of value was $28.6 (1,000 THB). These findings should be considered further to help online shoppers and reduce online scams.

13:10 ***A systematic literature review on the life cycle assessment of electric vehicle components with a second use: finding new research gaps...223***

Sakraan Sitcharangsie (Rajamangala University of Technology Phra Nakhon, Thailand)

Due to the increasing demand for electric vehicles, many countries should have the best end-of-life management options for their incoming waste. Extending the life of electric vehicle (EV) components with a second use was preferred, but there is limited information since it is a new area. There were arguments about whether a second use of retired EV components always increases environmental and economic benefits or not. Therefore, this study used a systematic literature review about the life cycle assessment (LCA) of electric vehicle components with the second use to gather all 23 relevant journals, summarize the topics,

and identify future research contributions. The results showed further research should use more primary data, especially from India and Southeast Asian countries. Future research objectives may be approached from multiple angles, such as economic, environmental, and technological. Thus, future research should consider combining LCA with other methods. More than three environmental impact assessments should be considered all at once, particularly those other than global warming, abiotic depletion, and eutrophication. Furthermore, this study concluded, in contrast to previous review articles, that the second use of retired batteries may not always increase environmental and economic benefits since they vary under different conditions. As a result, the life cycle assessment of EV parts with a second use is an intriguing research topic.

13:30 ***Oil Price Prediction using Deep Neural Network Technique Gated Recurrent Unit (GRU) and Multivariate Analysis...N/A***

Samaher Al-Janabi (Babylon University, Iraq)

The prediction of oil prices and determining the percentage of increase or decline in their prices is one of the most important factors influencing the economy of countries and an effective influence on the budget of any oil country, including Iraq, and a key factor in the labor market in general. Forecasting techniques represent an effective tool for discovering knowledge from large and complex databases in several areas, including oil prices. In this work, a forecasting model will be designed and implemented that determines oil prices based on seven basic characteristics. The proposed system is based on knowledge discovery techniques through data analysis (which includes 7 characteristics to six years). The proposed model consists of three main stages that start with a pre-processing of the data, especially since the data contains missing data with some characteristics, then the application of the prediction algorithm on the resulting data and ends with the evaluation of the model based on real data. The first stage focused on initializing the data and it includes converting the data within a specific range and finding the data that is outlier or missing. In the second stage, the model uses a deep learning technique, in which a deep neural network called the Recurrent Gate Unit and Multivariate Analysis (Deep Neural Network Technique Gated Recurrent Unit (GRU) and Multivariate Analysis) is used, which reduces the prediction error. This algorithm is characterized by the process of updating the values of the variable to be predicted, as well as addressing the weaknesses in prediction techniques that rely on neural networks computations. The algorithm was developed using the correlation metric as an alternative to traditional metrics for predicting continuous numerical values. In the third stage, the prediction model is evaluated based on a set of approved error measures, and we will try to prove the superiority of the results of the developed algorithm that depends on correlation in reducing error rates and training and testing time compared to the original algorithm

SESSION B6

12:30 ***Short-term Traffic Prediction Based-on Support Vector Regression...228***

Osman Dogukan Urkan and Meric Cetin (Pamukkale University, Turkey)

In this study, a traffic model has been developed in order for smart transportation systems to predict the traffic that will occur and make it easier to take action accordingly. In order to minimize the computational complexity in training, the Support Vector Regression (SVR) method, which is a machine learning method, has been preferred. The SVR model was trained using data collected from a busy intersection for Denizli province, and then short-term traffic prediction was performed. The hyper-parameter optimization of the model trained with four different directions and thirty-day data was made and the model accuracy was presented with several criteria.

12:50 ***Survey and Comparative Study for Drone Detection Using Deep Learning...234***

Ziya Tan (& Tokat Gaziosmanpaşa Üniversitesi, Turkey); Mehmet Karakose (Firat University, Turkey)

The widespread use of drones and the reduction of costs have made studies with drones popular. Especially the studies using artificial intelligence are followed carefully. The increase in these studies has paved the way for the integration of artificial intelligence algorithms such as computer vision, object tracking, and object detection into drones to perform more complex tasks autonomously. In addition, unmanned aerial vehicles are used in many useful tasks to eliminate illegal security threats such as border violations and drug trafficking. For this reason, the importance of drones is increasing day by day. In this article, the articles related to drone detection using state-of-art deep learning algorithms in the last 3 years have been reviewed and compiled. In particular, the methods used, suggested approaches, analysis methods, and the results obtained in these articles

are summarized. In terms of the algorithms used in the reviewed articles, it is seen that it is preferred more frequently due to the success of radio signals and the success of one-stage detectors in terms of detection methods.

13:10 ***Impact of Artificial Intelligence: Applications, Transformation Strategy and Future Potential...239***

Pankaj Pathak (Symbiosis International University & Symbiosis Institute of Digital and Telecom Management, India); Vimal Kamleshkumar Bhatt (Symbiosis Institute of Business Management, Pune & Symbiosis International Deemed University, Pune, India); Amita Jadhav (Symbiosis International Deemed University & Symbiosis Institute of Digital and Telecom Management, India)

In recent times Artificial Intelligence (AI) has climbed to the forefront of enterprises' technology priorities, owing to the presence of a large amount of data at disposal as well as the rapid advances in tools and capabilities. With the growing AI adoption, some companies are capturing value and generating revenue from AI at an enterprise level, while many cost reductions are at the functional level. But with the forthcoming stage of transformation, the companies need to go the extra mile beyond the traditional digital transformation. Quintessentially, the next wave of transformation would be focused on the broad use of AI across sectors but the key focus shifting to fully leveraging its products using advanced analytics and algorithms. Research methodology: A case study approach has been adopted to analyze different use cases of AI adoption in some sectors and the benefits of the same. Implications of the study: This paper will be useful for academicians and consultants in formulating AI design and build solutions. Uniqueness: The paper provides a systematic analysis of the literature, highlighting AI implementation in three sectors which are identified by categorizing them by near-term, mid-term, and long-term adoption maturity. The paper aims to provide a synopsis of elements for successful AI transformation and help in understanding how AI can add value into four categories i.e., objectifying, generating, stimulating, and offering successful application across the Retail, Energy, and financial industry.

13:30 ***Luggage Carrying Bot (LABO)...N/A***

Priyanka E Bhaskaran (Kongu Engineering College, India)

The major goal of the current project is to create the "LABO" luggage carrier, which might be user-friendly (Luggage Carrier BOT Using IoT). Since ancient times, people have been dragging their bags around. Imagine a piece of baggage that can track its location, convey its weight, and travel along a path. This has driven the project from the beginning such that it is operable and user-friendly. The goal of this invention was to address the issue of "Back-Ache Problem," "Spinal Cord Bends," "Muscle Strain," and other issues brought on by carrying heavy luggage on the back. In order to move the luggage carrier along several specified paths with the aid of DC motors, we employed an IR sensor that is attached to an Arduino Nano and interfaced with an L293d motor controller. If there are any barriers present, they can be found using an IR sensor. Using an IR sensor, we can identify potential impediments. If one is in front of the luggage, the ultrasonic sensor will pick it up and use that information to steer clear of it. The luggage-carrying robot is manually controlled via Bluetooth modules.

Tuesday, October 25 14:00 - 15:20 (Asia/Qatar)

SESSION C1

14:00 ***Classification of Covid19 Vaccine-Related Tweets Using Deep Learning...245***

Sanduni Nimanthika, Ashansa Wijeratne and Kuhaneswaran Banujan (Sabaragamuwa University of Sri Lanka, Sri Lanka); Banage T. G. S Kumara (Sabaragamuwa University of Sri Lanka, Sri Lanka & University of Aizu, Japan)

In recent years, the majority of the world's population has been impacted by the COVID-19 pandemic, but owing to the invention of vaccinations, the epidemic has been brought under control. After vaccination, some individuals publish their experiences on public channels. This study aims to assess, using social media, the adverse effects of the COVID-19 vaccination as perceived by the general population. Through the Kaggle repository, tweets pertaining to COVID-19 vaccinations were collected for this investigation. An author manually classified collected tweets into two categories: those connected to COVID-19 vaccinations' adverse effects and those not related to COVID-19 vaccines' adverse effects. Then, valid tweets were further classified into three

categories: personal experience, informative, and seeking advice. The authors then trained the data with four ML models. There are also SVM, LSTM, and ANN. The LSTM algorithm generated the greatest results, with an accuracy of 97.64%. In addition, the researchers conclude that the SVM may not be suitable for the planned research since it gave the lowest degree of accuracy, 80%.

14:20 ***Comparing K-Nearest Neighbors, Random Forest and Naïve Bayes Models to Classify Fetal Health Using Resampling Methods...250***

Yasmeen Mubarak Aldossary (University of Bahrain & Liverpool John Moores University, Saudi Arabia); Majeed Mohamed Ebrahim, NA (University of Bahrain & NA, Bahrain); Salman Bader Alhaddad, NA (University of Bahrain & Liverpool John Moores University, Bahrain); Ahmed M. Zeki (University of Bahrain & College of IT, Bahrain)

In order to preserve the lives of pregnant women and their fetuses, Cardiotocography (CTG) data is used to check the condition of the fetus and for early intervention if necessary. As a result of the existence of imbalanced classes of fetus's condition, the performance of some models is affected when applied to real data. Accordingly, this research aims to observe the effect of data resampling methods on models' performance by adopting the CRISP methodology. The performance of k-Nearest Neighbors (KNN), Random Forest (RF), and Naive Bayes (NB) models are compared using resampled data with several methods with the help of the CorrelationAttributeEval feature selection method for high dimension reduction. The results stated that NB and RF models' performance has not improved with the resampling methods, while KNN has significantly improved across all metrics. RF is considered to be a good classifier as it was the best, with an accuracy of 93.8%. NB was the only improved model using features selection with imbalanced data. Also, NB has the worst performance in terms of accuracy compared to KNN and RF.

14:40 ***Solving the 15-Puzzle using Heuristic Algorithm...N/A***

Esra Jasim Aljowder, Mohamed Khalid Almearaj and Abdulla Alqaddoumi (University of Bahrain, Bahrain)

High Performance Computing can be defined as the use of parallel processing for running advanced application programs efficiently and quickly Artificial Intelligence attempts to replicate the human ways of reasoning in computing. As a full replication may not be approachable at once due to is magnitude and complexity, research now targets commercial aspects of AI towards providing "intelligent" assistive services to the human users [1].Many problems, such as game-playing and path-finding, can be solved by different search algorithms. To be able to do so, the problems are represented by a search graph or tree in which the nodes correspond to the states of the problem[4]. A hyper-heuristic is an iterative search methodology that applies a set of low-level heuristics to solve a problem in an efficient and faster [6] [8]. With the development of computing power in the 20th century, people have been trying to teach computers to play or pretend to play games [10]. Puzzles and games attracted the attention of humans from ancient times starting from Chess to the ancient game of Go, people have found different techniques and strategies to master these games [10].The sliding puzzle is a simple but challenging case for demonstrating artificial intelligence concepts and parallel computing[1]. The results depicted different parallel time in every puzzle solving trial, the maximum moves reached were 24 with 0.456 seconds, while the maximum time reached was 0.719 seconds with 23 steps, although the steps are less the time resulted was longer.

15:00 ***Hybrid Engine Analysis for Green Air Traffic...255***

Ahmad Al Ramahi and Sharul Sham Dol (Abu Dhabi University, United Arab Emirates)

Since aviation is imperative for economic evolvement, it becomes requisite to address constant challenges aviation faces to preserve its progress. Throughout its journey, aviation has become a part of economic advancement as well as international connectedness. To maintain its distinction, a Green transportation system has been introduced to avoid polluting local and environmental conditions. Such systems are intended to provide a sustainable transportation method, using less energy, leaving minimal carbon footprints, and emitting less CO2 and other nocuous pollutants.

SESSION C2

14:00 ***Machine Learning as a Data Science Tool to Predict Absenteeism for Factory Workers...261***

Rajath J (Symbiosis Institute of Business Management Pune Symbiosis International(Deemed University) Pune, India); Deepika Pandita (Symbiosis Institute of Business Management Pune, Symbiosis International (Deemed) University, Pune, India)

Employee Absenteeism results in the loss of billions of dollars in revenue for organizations around the globe. Studies estimate a loss of 3% of scheduled labor hours due to these absences. Hence predicting these unforeseen absences would allow efficient workforce planning and lower overtime costs for organizations. This paper looks at the issue from the POV of the management in order to explore the absenteeism in blue collared workers employed at the R&D center of one of India's biggest FMCG companies and the use of Machine Learning algorithms to predict absenteeism. Here we make predictions by analyzing the data collated from various employment records in the company over 2 years (2017-2019) so as to bring in proper interventions that aim to curb these absences. Here we use various ML models such as Logistic Regression, XGBoost, Random Forest, and SVM to predict absenteeism and compare their accuracy in making these predictions.

14:20 ***Identification of Rice Varieties Using Machine Learning Algorithms...266***

Naresh Trivedi (Chitkara University Institute of Engineering and Technology, Chitakara Universitty, Punjab); Vinay Gautam (Chitkara University, India); Abhineet Anand (Chandigarh UNiversity, Punjab.); Raj Gaurang Tiwari and Prabhneet Kaur Sohanpal (Chitkara University, India)

Rice, one of the world's most extensively produced grain crops, has numerous genetic variants. These kinds are differentiated from one another based on their characteristics. Typically, these characteristics include texture, form, and color. With these distinguishing characteristics, it is feasible to categorize and assess the quality of seeds. Arborio, Basmati, Ipsala, Jasmine, and Karacadag, five rice kinds commonly grown in Turkey, were utilized in this study. The dataset contains a total of 7424-grain pictures. Several classification methods were applied with the pre-trained deep architectures. Using the models' confusion matrix values, statistical results of sensitivity, specificity, prediction, F1 score, accuracy, false positive rate, and false negative rate were calculated and tabulated for each model. The classification success rates were 99.7% for VGG16 CNN with logistic regression classifier. Based on the findings, it is evident that the classification models utilized in the study for rice varieties can be successfully applied in this field.

14:40 ***Comparing the Performance of Machine Learning Algorithms for Predicting Employees' Turnover...272***

Yasmeen Mubarak Aldossary (University of Bahrain & Liverpool John Moores University, Saudi Arabia); Majeed Mohamed Ebrahim, NA (University of Bahrain & NA, Bahrain); Salman Bader Alhaddad, NA (University of Bahrain & Liverpool John Moores University, Bahrain); Manar AlDossary (University of Bahrain, Saudi Arabia); Sawsan Hilal (University of Bahrain, Bahrain)

Employee's turnover has a direct impact on companies' performance due to losing qualified staff and invested costs on them, so predicting the ability of turnover or staying will help companies to reduce these effects. Therefore, this study aimed to predict the turnover by building a model using selected machine learning algorithms based on secondary data of a big data company. The algorithms were used, which are Logistic Regression, K-Nearest Neighbor (KNN), Decision Tree, and Random Forest have been improved with different methods for better performance like balancing data and important feature selection, then evaluated using selected metrics such as Area Under Curve (AUC). The Random Forest was characterized with the best performance with 80.2% accuracy and 72.4% AUC with the index of city development, the experience, and university enrolment being the most important features. However, the performance of the Random Forest classifier can be enhanced by including other important features besides those highlighted by the model.

15:00 ***Comparing CNN, ANN and DNN Methods for Dog Breed Image Classification using Machine Learning...N/A***

Esra Jasim Aljowder and Mohamed Khalid Almearaj (University of Bahrain, Bahrain); Nabil Hewahi (UOB, Bahrain)

Machine learning is a process of extracting useful information from unordered data[4]. It includes multiple disciplines such as computer science, engineering, and statistics and requires multidisciplinary knowledge[4]. ML is widely applied in the field of image recognition, classification and segmentation especially in massive image processing [4]. The main features of the image are separated, so that image recognition can be reasonably applied in various industries and fields such as dog breed image classification. The objective of this paper is to compare between convolutional neural networks, artificial neural networks and deep neural networks algorithms performance using python and the needed libraries for dog breed image classification. This paper contains a description of the applied models and correction of weight coefficients, selection of activation functions and operation on max pooling filter. In terms of accuracy, the best model was CNN with an accuracy of 100% followed by ANN with 99.6% and lastly DNN with 92.5%

SESSION C3

14:00 ***Explainable Artificial Intelligence in Human Resources: a Computational Study...277***

Marco Repetto (University of Milan-Bicocca, Italy); Davide La Torre (SKEMA Business School, France); Marc Poulin (Abu Dhabi School of Management, United Arab Emirates); Abdullah Abonamah (Abu Dhabi School Of Mangement, United Arab Emirates)

The application of Machine Learning in Human Resources is becoming increasingly common. The Human Resources industry is increasingly relying on Machine Learning to automate processes, improve efficiency, and enhance decision making. However, the use of Machine Learning in Human Resources is not without its challenges. One of these challenges is the lack of interpretability. Interpretability is essential in Human Resources because many of the decisions made in the field have a direct impact on people's lives. As such, it is important that these decisions are made in a transparent and understandable way. In this paper, we apply a model-agnostic technique for providing post-hoc explanations, known as Anchors, to a real-world dataset from the Human Resources industry. The dataset was used to create a predictive pipeline for employee attrition. Anchors were used to explain the predictions made by the pipeline. The result is a Human Capital Management system capable of explaining the reasons behind employee attrition, allowing the Human Resource professionals to enact retention policies promptly. Moreover, the results suggest that Anchors can be used to create a prescriptive pipeline that can be used to explain the reasons behind every single decision to leave the company, as they are easily interpretable by a non-expert. This system has the additional advantage of giving the Decision Maker the opportunity to act in a prescriptive way and retain valuable resources.

14:20 ***Bahraini Women in the STEM Fields: Sticky Floor, Broken Ladder, and Glass Ceiling...283***

Asma Ayari (Sakheer, Bahrain)

The Bahraini government aims to promote gender parity in the different sectors, especially in the STEM sector. However, statistical evidence indicates a high gender gap in science. This study was carried out to investigate the reasons beyond why women are underrepresented in STEM fields. The survey findings showed that 26.7% of female STEM students feel alone, while only 11.9% of male STEM students feel the same way. 76.16 percent of female STEM students and 91.33 percent of males felt that their peers respected them. We only found evidence that females rated themselves lower than males with the same abilities regarding how well they thought they did. Among them, 68.33% of males and 57.72% of females thought they were in the top 10% regarding math skills. This difference disappeared, though, when we looked at the top 20% of scorers, where more women said they were in the top 20%. It seems like the effect is only at the very top. Numbers show that men are more likely to enter STI-related professions than women. This gender gap is especially prominent in engineering, where there are significantly fewer female students than males. Increased funding for STEM programs in Bahrain's universities is necessary, focusing on closing the gender gap.

14:40 ***Analysis of cybercriminals and where they fall on the spectrum of crime...287***

Arbnora Miftari and Shkurte Luma-Osmani (University of Tetovo, Macedonia, the former Yugoslav Republic of); Florim Idrizi (State University of Tetova, Macedonia, the former Yugoslav Republic of)

This paper aims to open discussions and suggest new psychological studies that could change the perspective on cybercrime. Starting from the fact that the very nature of cybercrime is different from other types of antisocial behavior, cybercriminals, especially those that are responsible for high difficulty hackings, may not exhibit the same characteristics as the individuals we've

studied before the new era of technology.

15:00 ***An Innovative Model (UAV-FTMP) based on Optimal Fully Fuzzy Linear Fractional Transportation and Internet of Things...N/A***

Samaher Al-Janabi (Babylon University, Iraq)

The world suffers from a very large number of missing persons, ranging from about 250,000 to about one million people missing for various reasons in recent years. In the event of an emergency was an explosion in a particular place or fire, the security authorities quickly move rescue teams with their equipment in the place of the incident and this may cause a new emergency and the losses become doubled. Therefore, artificial intelligent techniques work to handle that problem, the process of finding and tracing missing persons as a result of a plane crash, fire, or explosion in a particular area is a humanitarian and religious, and national duty and is one of the most important issues in our country. Making their work safe and easy as well as reducing the material costs spent on such emergencies by the state. The idea of this work has been developed and implemented practically; it can represent a triangular problem, which included three heads. We have designed a system that collects data in real-time and analyzes it smartly and utilizes GPS to find missing persons and track their impact. The work suggests the structure of the UAV model includes several stages, the first stage is the construction phase of the drone structure, the second stage is uploading a map of the specific area in its natural state and building a database of the most important entities a variable in that region and its locations, then build a software system to collect the data in realtime and analysis it. Finally, the process of matching the real data from the system with the original database and generating reports identifying the location of missing persons based on the values of five evaluation measures; accuracy is 0.95, recall is 0.95, Precession 0.88, F is 0.9137, and Fb.is 0.893

SESSION C4

14:00 ***SQL Injection, Cross-site scripting and Buffer Overflow attacks detection using Machine Learning...292***

Nancy Boughannam (Lebanese International University, Lebanon); Nazih Salhab (France); Maher AbdulRahman (Lebanese International University, Lebanon)

The frequency and severity of web application attacks are increasing nowadays at an alarming rate. The abundance of electronic services on the internet enables cybercriminals to initiate novel attacks. Structured Query Language Injection, Cross-Site Scripting and buffer overflow are some examples of web attacks that raise a major concern. Numerous studies have been done to find measures to reduce the impact of these attacks, either by stopping them in their early stages or identifying them as they happen. In this paper, we investigate the aforementioned attacks and formulate a mechanism to predict these attacks by classifying them as malicious or benign. Accordingly, an adequate mitigation could be timely triggered ahead of the incident. Moreover, we implement and evaluate different machine learning-based techniques to proactively identify such attacks. Finally, we discuss their performance, provide our recommendations and share our lessons-learned.

14:20 ***An overview of Secure Communication in Smart Cities: Issues and Cryptographic Solution...297***

Irfan Alam (Dehi Technological University, India); Manoj Kumar (Delhi Technological University, Delhi, India)

Smart cities are one of the core infrastructures of the modern world. The primary goal of smart cities is to improve the quality of life of people and services. The main components of smart city infrastructure are Internet of Things (IoT) devices and Information and Communication Technology (ICT). ICTs and IoT devices have prompted many privacy concerns about communication in smart cities. The current study attempts to illustrate the fundamental ideas of security issues that address smart cities and reveal previously unknown cyber-attacks based on existing literature and recent targeted smart cities. Further, this study has uncovered and elaborated on several security issues. Cryptography is one of the most prominent methods for securing all types of communication. We have focused on all possible cryptographic concepts used in IoT security and smart cities scenario.It will also assist incoming researchers in formulating their proposals for developing robust security protocols to serve end users better.

14:40 ***DDoS attack defence mechanism using sFlow...302***

Neelam Gupta (Amity University Noida, India); Sarvesh Tanwar (Amity University, India); Sunny Behal (Shaheed Bhagat Singh State University Ferozepur Punjab, India); Sumit Badotra (Lovely Professional University, India)

An upcoming communication network is software-defined networking (SDN). The idea of keeping the control plane and data plane separate has given researchers a significant amount of space to experiment with novel ideas. Strong security is needed since the central controller handles all network control operations. SDN security becomes more important since this dynamic network architecture encounters a variety of design complexity and frequent open-flow flaws, such as problems with a control system, in addition to having a bright future ahead of it. It is becoming the new standard in modern networks, and as part of our research, we looked at what impact they might have on security and privacy. The most common cyberattack, known as Distributed denial of service (DDoS) attacks is another of the major problems facing modern networks, and DDoS attacks can be very difficult to defend against and causes the system resources to be depleted, making the services unavailable to fulfil valid requests. Open Daylight (ODL) and Ryu, two of the most potent and well-known SDN controllers, are experimentally compared in this study. The Mininet emulator is used for the experimentation. Wireshark is used to record and analyse live packets. Additionally, early DDoS attack detection in the controller is a crucial area for research. There are numerous methods suggested to find DDoS attacks. In this study, we suggest a one-level protection DDoS attack detection method for SDN controllers. sFlow is used to initially identify attacks.

15:00 ***Zero-day Attack Solution Using Threat Hunting Intelligence: Extensive Survey...309***

Yusuf Salah Almahmeed and Alauddin Yousif Al-Omary (University of Bahrain, Bahrain)

With the uprising advancement in technology each day the attack surface increase accordingly making it extremely hard to maintain and mitigate each new threat. One of the hard to deal with attack is zero-day attack. Threat hunting is used among other techniques to detect zero-day attacks. This paper addresses the main approaches, challenges, and benefits of threat hunting in addition to Security Information and Event Management (SIEM) and machine learning solutions as well as honeypot based solution used to mitigate zero-day threats.

SESSION C5

14:00 ***An Active Index for the Sri Lankan Stock Market: a better reflective alternative index...315***

Suharda Silva, Thisali De Silva, Kishan De Silva, Nilaxsan Rajenthiran and Sulanie D Perera (University of Moratuwa, Sri Lanka)

Insights provided from stock indices and their movements play an important role in making investment decisions. This paper aims at building an active index for the Sri Lankan stock market that better reflects the market changes while overcoming the issues in the existing indices such as not capturing the contribution of small-cap companies to the market and adding overvalued stock to the index through market manipulations. Further, the study focused on checking which of the two steps between stock selection and rebalancing has a greater impact on the overall movement of the index. The two machine learning integrated models discussed in the paper are designed based on two different approaches to building indices. However, the paper introduces an activeness-based stock selection criteria for both models. The models were able to generate indices that performed similar to the existing indices in the market with an equal or less number of components. All of this was achieved while minimising the drawbacks of existing indices.

14:20 ***A Study of FDI Inflow to ASEAN Economies (2022-2030)...320***

Somesh Sharma (Graphic Era Hill University, India); Manmohan Bansal (Invertis University, India); Ashish Kumar Saxena (IFTM University, India)

The world is observing a change in the flow of foreign direct investment. Developed countries are facing a fall in real world's foreign direct investment inflow in the world economy while the stake of emerging economies is increasing. ASEAN economies are the best destination for foreign investment because of their demographic, geographic, and economic conditions. In recent

times, the trade war between China and USA and the Pandemic have opened a plethora of opportunities for ASEAN economies. The past trend of inward flow of FDI showed an increasing trend in case of ASEAN economies in the foregoing years, while the forecasted rate of inward flow of FDI using best fit ARIMA model showed a rising trend and followed the historical trend over the period of current decade. The study's findings will help foreign investors show the future of the inward flow of FDI in ASEAN economies and help them make investment decisions.

14:40 ***A New Odd F-Weibull Distribution: Properties and Application of the Monthly Nigerian Naira to British Pound Exchange Rate Data...326***

Aliyu Ismail Ishaq (Ahmadu Bello University, Zaria-Nigeria, Nigeria); Abubakar Usman and Tasiu Musa (Ahmadu Bello University, Nigeria)

This study developed a new generalized family of statistical distribution known as the Odd F generalized family distribution. The compound Odd F-Weibull distribution was introduced from the Odd F generalized family. This distribution is an alternative to various current distributions, such as the Beta-Weibull distribution, Generalized Modified Weibull, Log-Logistic-Weibull, Fréchet-Weibull and Exponentiated Exponential-Weibull distributions. We obtained the distributions of quantile function, moments and information-generating function. Moreover, the parameters of its estimates were derived using the maximum likelihood approach. Furthermore, monthly Nigerian Naira to British Pound exchange rate data was analyzed to assess the viability of the proposed distribution. The findings demonstrate that the Odd F-Weibull distribution outperformed better than competitive distributions by having minimal corrected akaike information and Bayesian information criteria values.

15:00 ***Modelling and Forecasting of Nigerian Naira to Saudi Riyal Exchange Rate using ARIMA Framework...333***

Abubakar Usman (Ahmadu Bello University, Nigeria); Aliyu Ismail Ishaq (Ahmadu Bello University, Zaria-Nigeria, Nigeria); Tasiu Musa and Dalhatu Hamisu (Ahmadu Bello University, Nigeria)

This paper examines the pattern of monthly exchange rate of Nigerian Naira to Saudi Riyal. The monthly time series data on exchange rate of Nigerian Naira to Saudi Riyal cover the period from 2011 to 2020 was used in this research. Box-Jenkins method was adopted and the results shows that ARIMA (0, 1, 1) is the best performing model in terms of minimum selection criteria. The model is used to generate two months forecast of the Naira- Riyal exchange rate.

SESSION C6

14:00 ***LSTM Based Sentiment Analysis on Conversations in Health...336***

Ercan Uca (Firat University, Turkey); Sümeyye Yılmazer and Hakan Kızılhan (Dahi Information Technologies, Turkey); Kübra Şahin (Panates Information Technologies, Turkey); Sedef Demirel and Mehmet Karakose (Firat University, Turkey)

Sentiment analysis from health data is to classify texts in the field of health with sentiment analysis. Research analysis on emotion covers as many fields as politics, economics and health. Sentiment analysis from health data will contribute to human-computer interaction, since they perceive emotions in their machines and make them look like human beings. In this article, the existing data in the field of health has been classified by sentiment analysis. For the realization of this sentiment analysis, the deep learning model lstm deep learning model was used. LSTM has been very successful in processing long texts. In this method used, first of all, the data for model training was made ready with text processing methods. Model training was carried out with this data set, which was prepared with the LSTM deep learning model for model training. As a result of this model training, our success score was 94%, and when we compared it with the results of the articles and studies I examined in the literature, we see that our model gave a very good result. When this result is compared with other well-known classifiers, the efficiency of the proposed algorithm is convincingly proven.

14:20 ***Federated Learning through Goal Programming: a Computational Study in Cancer Detection...341***

Marco Repetto (University of Milan-Bicocca, Italy); Davide La Torre (SKEMA Business School, France)

In the era of big data, Federated Learning has emerged as a promising way of learning from scattered nodes. In its essence, Federated Learning is a distributed learning methodology allowing model training on a large corpus of decentralized data. Federated Learning can be a sound solution to the data silos problem in healthcare. However, not all Federated Learning approaches are privacy compliant, resulting in data leakages that prevent its usage in healthcare applications. This computational study investigates whether a privacy-compliant Federated Learning framework is suitable for cancer detection. To this end, we tested the Federated Goal Programming framework in the context of cancer detection. Under such a framework, the models are aggregated based on the cross-performance at each node. Data leakage is prevented since training happens only locally, and only the prediction rules are shared. We tested this approach under three publicly available datasets and different ML models. The results show that the Federated Goal Programming framework is suitable for cancer detection.

14:40 ***Big Data Healthcare in South Africa for IoT using Deep Learning...347***

Himanshi Babbar (Chitkara University, Punjab, India); Shalli Rani (Chitkara University, India)

People in South Africa are facing a shortage of medical services, making it difficult for them to receive the right care from the hospital. Patients in South Africa must pay more money to receive the proper treatments due to the low percentage of doctors and poor per capita income. To shorten the distance between patients and experts and enable patients to receive quality care at a lesser cost, contemporary information technologies must be applied. However, we can use electrical device interaction to resolve this serious issue. Machine learning is an effective method for data analytics with the vast data gathered from these devices due to its high accuracy, low processing costs, and low power dissipation. This study's foundation is a case study that incorporates the develops a novel framework, a database, a smartphone application, and an android-based application system that allows patients and doctors to communicate. Additionally, the platform assists in storing patient health information by applying machine learning techniques and generates the final prediction to obtain the appropriate medical care provided with the use of machines and physicians.

15:00 ***A Comparative Study of Heart Disease Prediction using Tree-Based Ensemble Classification Techniques...353***

Yasmeen Mubarak Aldossary (University of Bahrain & Liverpool John Moores University, Saudi Arabia); Majeed Mohamed Ebrahim, NA (University of Bahrain & NA, Bahrain); Nabil Hewahi (UOB, Bahrain)

In recent years, the prediction of heart disease has been one of the most complicated tasks in the medical field. Approximately one person dies per minute due to heart disease in the modern era. To help the healthcare industry experts give an early detection in preventing the progression of the disease, Machine Learning offers various algorithms and techniques to achieve this goal. This study compares the performance of tree-based models Random Forest, Decision Tree, Extra Trees, and Gradient Boosting using the Cleveland heart dataset. It investigates whether applying two different ensemble techniques Voting and Stacking, to tree-based models improves heart disease diagnosis performance. The obtained results revealed that the Extra Trees model outweighs the other three models with an accuracy of 92%, whereas the Decision Tree model has the lowest accuracy with 84%. Applying feature selection has enhanced the performance of Random Forest and Gradient Boosting models. As for the ensemble techniques, the Staking ensemble model had the same performance as the Extra trees, with an accuracy of 92%. In contrast, the Voting ensemble model has a lower performance with a 90% accuracy.

Wednesday, October 26 9:00 - 10:20 (Asia/Qatar)

SESSION D1

9:00 ***A Systematic Literature Review on Risk Analysis of Health and Safety in Oil Refinery and Onshore Pipeline Construction Projects...358***

Ahsan Waqar and Idris Othman (Universiti Teknologi PETRONAS, Malaysia); Nasir Shafiq (UTP, Malaysia); Muhammad Basit Khan (Universiti Technologi Petronas, Malaysia); Muhammad Shoaib Mansoor (University of Sargodha, Pakistan)

Oil industry construction is a very high risk from a safety and health perspective. Thousands of workers die while working in onshore oil refineries and pipeline projects worldwide, and despite many advancements in research and technology, fatal injuries are still happening. This study aimed to conduct the Systematic Literature Review (SLR) on risk analysis of health and safety issues construction workers face in onshore oil refineries and pipeline construction projects. Fifteen health and safety risk factors are ranked according to arguments from previous studies, with falling from height at the top and scaffolding failure at the lowest position. The mitigation techniques are discussed in the existing literature, and the study provides positive theoretical and practical implications for the workers in oil refinery and pipeline construction projects.

9:20 ***Risk Mitigation to Minimize Distribution Delays and Empty Stock at Industrial Jakarta Gas Station...366***

Nazaruddin Nazaruddin, Muhammad Rizki and Muhammad Luthfi Hamzah (Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia); Arini Anestesia Purba (Institut Teknologi Kalimantan, Indonesia)

Gas station Jakarta Industri is one of the distribution sites for fuel oil, such as Premium, Pertalite, Pertamax, and Pertadex. When suppliers send raw materials to refineries, industrial gas stations in Jakarta often experience vacancies due to distribution uncertainty. The risks that most often occur are the oil in the tank does not reach capacity, the delivery of raw materials is late, and the arrival of fuel to the gas station does not match the planned time. This study aims to generate risk mitigation priorities, with these mitigations helping to minimize the risk of distribution delays and fuel shortages. The method used in this study is the House of Risk (HOR). The HOR method can identify risk agents that trigger risk events, provide priority suggestions and generate critical strategies to reduce risk in distribution processing. Ten risk agents start trouble in the distribution flow. Recommendations for mitigation strategies based on the highest Difficulty Effectiveness (ETD) value, namely minimizing temporary production, then increasing the following production capacity with an ETDk value of 1920.

9:40 ***A safety function deployment model for improvement in safety related decision making: A case of transportation system...371***

Gourab Kumar Bagchi, Souvik Das and Ashish Garg (IIT Kharagpur, India); Jhareswar Maiti (Indian Institute of Technology, Kharagpur, India)

Despite of being a considerable amount of investigations going on in road transportation safety, there still the preventive measures are a concerning issue. Various methods are developed for the safe transportation system and for risk mitigation, but there are still gaps remaining for the proper hazard identification and prioritization of safety measures purposes. This study describes a hazard identification technique from a system breakdown approach to its analysis for risk management in a transportation system. A safety function deployment (SFD) approach is introduced which is basically the integration of quality function deployment (QFD) and risk management to identify potential hazards and find crucial safety measures. This method can be used as a technique to identify safety requirements and implement proper safety barriers in order to reduce the risk in the transportation system.

10:00 ***A system thinking approach for evacuation during fire incidents considering systems***

dynamics...376

Piyush Kumar, Swarnakamal Pradhan, Souvik Das and Ashish Garg (IIT Kharagpur, India); Jhareswar Maiti (Indian Institute of Technology, Kharagpur, India)

The ability to safely evacuate a burning structure is the most important factor in building safety. An essential prerequisite is that the building's fire safety features permit independent and adequate fire reaction actions from its inhabitants. The laws as they are now don't always seem to give the assistance that those trapped in burning buildings need. As evacuation process involves several stages, it is a complex system. A scientific and effective emergency evacuation strategy is critical to increasing incident response capability i.e. better risk analysis of the system. System Dynamics emphasize on strategic decision making and feedback to the complex system. This paper focuses on construction of System Dynamics for evacuation of building during a fire. As system dynamics helps in understanding the parameter of a complex system for superior risk analysis.

SESSION D2

9:00 ***Supply Chain Management in Green Construction: A Systematic Review...381***

Muhammad Ali Musarat (Universiti Teknologi PETRONAS, Malaysia); Muhammad Altaf (Persiaran UTP, Seri Iskandar, Perak & Universiti Teknology Petronas, Malaysia); Muhammad Irfan (The University of Lahore, Islamabad Campus, Pakistan); Wesam Salah Alaloul (Bandar Seri Iskandar & Universiti Teknologi PETRONAS, Malaysia); Khalid Mhmoud Alzubi (Universiti Teknologi PETRONAS, Malaysia & Albalqa Applied University, Jordan); Aawag Mohsen Alawag (Universiti Teknologi PETRONAS, Malaysia)

The construction sector is accountable for considerable ecological impacts because of the outcomes of its activities. Consistently increasing environmental and societal developments pertinent to the construction activities are pushing the construction stakeholders to adopt green practices. Green supply chain management (GSCM) presents the capability of a foundational way to deal with the evolution of the construction industry. However, studies conducted regarding GSCM and its part in construction have been increasing currently, but till now, have not been effective enough to systematically bring it all together. Therefore, for highlighting the importance of GSCM in green construction, a systematic review is conducted. Database of Scopus was chosen to extract and finalize the research articles written in the English language from the year 2011 to 2021 with specific keywords of "Supply Chain Management", "Green", "Sustainable" and "Construction" in the area of engineering. A total of 94 research papers were extracted followed by carefully reviewing the titles of the papers and their abstracts, only 22 papers were finalized for subsequent evaluation. It was highlighted that green supply chain management can minimize ecological pollution and manufacturing costs, and it also can prompt economic growth. Therefore, it is recommended to focus on the environmental factors as they have a key part in the attainment of green construction through effective supply chain management (SCM) practices.

9:20 ***Discriminant method approach for harvesting forest operations...387***

Cristian L Oyarzo Paez and Daniel Rossit (Universidad Nacional del Sur, Argentina); Víctor Viana-Céspedes (Universidad de la República, Uruguay); Alejandro Olivera (Universidad de La República, Uruguay)

Forest harvesting operations are complex resolution problems where different factors of different nature intervene. These operations are affected by the nature of the trees to be harvested, the environment where they are planted, the operator who performs the operation and the shift in which it is performed, among other aspects. These factors affect the productivity of the harvest, which, in turn, being the first link in the forestry supply chain, affects the rest of the links. Poor management of harvest operations can lead to critical setbacks and delays in the forestry supply chain. In this work, it is proposed to develop productivity prediction models that allow adequately estimating productivity considering the simultaneous impact of all the factors or variables that intervene. For this, the data collected automatically by the harvesters are analyzed using the linear discriminant method. The results allow us to infer that the approach is adequate to generate these models, particularly when the target set to be predicted is partitioned.

9:40 ***Frameworks for Integrating Blockchain and Supply chain: A Survey...392***

Bidah Alkhaldi and Alauddin Yousif Al-Omary (University of Bahrain, Bahrain)

Current Supply Chain Management (SCM) practices focus too much on administrative processes among agencies of different countries, which leads to confusion and increased delivery time because of human error, bottlenecks in processing documents, and necessity to comply with changing rules across different borders. With little to no changes possible in the administrative side of global distribution, the focus has strongly shifted towards blockchain technology that can meet the demand of security, reliability, and accessibility while being able to satisfy each requirement to conduct cross-border trade. In this paper, different blockchain frameworks were analyzed to assess common factors that could improve blockchain integration across different existing Supply Chain (SC) platforms traceability, intuitiveness, and security were found to be among the key aspects that positively influence adoption of blockchain frameworks. While deploying security systems for multiple blockchains at different layers helps create a trusted environment, using a multi-chain approach improves traceability that is critical for cross-border permits in SC.

10:00 ***Z-number Based Improved Sustainability Index for the Selection of Suitable Suppliers...397***

Ashish Garg, Souvik Das and Shubham Dubey (IIT Kharagpur, India); Jhareswar Maiti (Indian Institute of Technology, Kharagpur, India)

Information reliability is an important trait of decision making. In recent years, supplier selection in a sustainable environment has gained much popularity. The supplier's performance is evaluated by the organizations under economic, social, and environmental criteria. Generally, expert opinions based on the above criteria are collected to select suitable suppliers. Unfortunately, these expert opinions are subjected to uncertainty and ambiguity. Z-number, Z = (A, B), is developed to handle the uncertainty and reliability of expert opinions. The existing literature on sustainable supplier selection does not utilize the information contained in the Z-number to the full extent. In this work, a Z-number-based improved sustainability index has been proposed to select suitable suppliers with improved utilization of available information. Further, a case study and comparative analysis are provided to support the proposal.

SESSION D3

9:00 ***Digital Marketing Competencies as a Factor in the Success of E-Commerce Small Businesses in International Markets...402***

Waleed A. Aziz (University of Bahrain, Bahrain)

The growth of international e-commerce is a significant worldwide trend that is being propelled by a tailwind created by the strengthening of economic policies, changing habits of customers, as well as improvements in logistics and technology. This research looks at the several reasons why international e-commerce small and medium-sized businesses have different levels of success. Building on the capacity's perspective and market orientation literature, a research model is developed and tested using linear regression and mediation analysis on an effective sample of 42 SMEs in various zones in the MENA (the Middle East and North Africa) region that use e-commerce as an international sales channel. According to the findings of this research, companies in this industry crucially need to have digital marketing skills, but that alone is not enough to boost performance and create true competitive advantages. The findings of the study indicate that marketing ambidexterity, which is characterized by tactics that are both market-driven and market-driving, is essential in order to maximize the impact of digital marketing capacities.

9:20 ***Assessing the Adequacy of the Legal Framework in Facilitating E-Commerce in Nigeria...412***

Udosen Jacob Idem and Elisabeta Smaranda Olarinde (Afe Babalola University, Nigeria)

The concept of E-commerce transaction accompanied by the digital revolution has changed the way people work, learn, communicate and transact business. This has fostered economic growth and social development across the countries of the world. As such, Nigeria though not a frontrunner is also not left behind in the pack. However, there is presently no explicit law governing e-commerce in Nigeria, although, there is some extant legislation on the subject. This has led to several legal issues as to whether the existing laws effectively addressed electronic transactions in Nigeria. This study succeeded in identifying some of the shortcomings in our laws which affect the smooth operation of e-commerce. Despite these shortcomings in our legal

frameworks, the study has demonstrated that there are opportunities for the expansion and growth of electronic transactions in Nigeria; particularly if the National Assembly pass the Electronic Transaction Bill 2015 into law because doing so would provide a welcoming environment for effective growth of Nigerian e-commerce. This research comes to the conclusion that reforming the current regulatory frameworks will undoubtedly increase consumer and investor trust in Nigeria's electronic transaction market.

9:40 ***Predicting E-commerce Consumers' Loyalty Through the Lens of Protection Motivation Theory...418***

Prasetyo Rahman (Universiti Teknologi MARA, Malaysia); Siti Norida Wahab (Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Alam, Malaysia)

The issue of data breaches in the e-commerce industry has gotten a mountain of attention among online consumers. Despite the issue, this study investigates factors influencing e-commerce consumers' loyalty. The protection motivation theory served as the underpinning theory. A total of 384 experienced online consumers in West Nusa Tenggara, Indonesia participated in this quantitative survey. Findings revealed that perceived severity, self-efficacy, and safety habit behaviour significantly influence online consumers' loyalty in an e-commerce environment when a data breach occurs. Meanwhile, perceived cost and perceived vulnerability have no significant influence. Based on the findings, e-commerce providers' efforts to fix data breaches will enable to increase in consumers' loyalty toward online shopping and the likelihood of consumers' repeat purchases. This study provides useful insights for e-commerce providers to improve their current and future e-commerce services and strategically allocate their resources to overcome the issue of data breaches toward resilient online shopping.

10:00 ***Analyzing the Application of Artificial Intelligence for E-Commerce Customer Engagement...423***

Fatima Vapiwala (Symbiosis Institute of Business Management, Pune & Symbiosis International(Deemed University), Pune, India); Deepika Pandita (Symbiosis Institute of Business Management Pune, Symbiosis International (Deemed) University, Pune, India)

Consumption patterns for retail have drastically changed due to the widespread use of digital and mobile technologies, especially after the Covid-19 pandemic. The popularity of e-commerce is expected to considerably grow due to consumers' growing desire for comfort and safety. The new era of enterprise business disruption has been significantly influenced by the technological revolution driven by the expanding use of artificial intelligence. Through this study, the authors attempt to identify the various factors of artificial intelligence that affect customer engagement in the Indian e-commerce sector. The authors also propose a CAPE model (Captivating Consumers by Using Chatbots for Interaction, Augmented AI Advertising, Personalized Content and Offerings, Engaging Consumers based on AI Data Insights) indicating the strategies that Indian e-commerce businesses and marketers may adopt for enhancing the levels of customer engagement in a post- pandemic scenario.

SESSION D4

9:00 ***CNN -LSTM Based Approach for Recognition of Devanagari Manuscripts...428***

Aditi Moudgil (Chitkara University, India)

Devanagari manuscripts provide a good source of information for the retrieval of information of medieval times. Manuscripts provide a wealth of knowledge for the coming generations so the scripts need to be digitized to make the information available to the public. Pattern recognition emerges its one of the applications as OCR. For the character recognition from manuscripts, the authors have used CNN which gives higher character recognition accuracy. This paper implements CNN+ LSTM for Devanagari character recognition. The total of 250 manuscript pages were considered and the dataset of multiple characters were divided into 33 classes of basic characters. The proposed model was run using 15: 85 and 25: 75 as test: train ratio of characters. Also, the number of epochs were varied for better recognition accuracy. The authors observed the best recognition accuracy of 93.63

9:20 ***Wheat Crop Yield Prediction Using Machine Learning...433***

Deepak Kumar, Yash Kumar and Akhilesh Gulati (Chitkara University, India); Vinay Kukreja (Chitkara University, Punjab, India)

With the substantial increment in population, wheat production is the major consent to fulfill human requirements. In this study,

the wheat production yield has been predicted using the SVR, Decision Tree, Random Forest, and Gradient Boosted regressor techniques. SVR is built based on the concept of a Support Vector Machine (SVM). A Decision Tree is a supervised learning technique that can be used for both classification and Regression problems and it follows a tree-structured classifier, where internal nodes represent the features of a dataset, branches represent the decision rules, and also each leaf node represents the conclusion. Also, Random Forest Regression uses an ensemble learning method for regression. Gradient boosting Regression calculates the difference between the current prediction and the known correct target value. With the help of regressor techniques, the effectiveness of yield parameters on wheat such as average rainfall, pesticides, and the average temperature on the yearly basis was calculated. The experimental results show that the random forest regressor has high Mean Absolute error minimum of 2351.86 than SVM and SVR for yield prediction. Also, three different types of error analyzing mechanisms were used to calculate the best accuracy for our prediction algorithm. Our study provides a gateway for the betterment of farming practices and showcases potential growth in decision-making by providing data-driven analysis for prediction.

9:40 ***CNN Implementation for Severity Levels of Potato Blight Disease...438***

Varun Jindal (Chitkara University, Punjab, India); Yukta Nagpal (Chitkara University Institute of Engineering and technology, India); Vinay Kukreja (Chitkara University, Punjab, India)

In the past, numerous studies have been done on potatoes and different authors have performed research on different diseases of potatoes. The present study has targeted only one potato disease, named potato blight and further 5 different severity levels of the disease have been taken into consideration. The severity levels in percentage are 1-20, 21-40, 41-60, 61-80, and 81-100. The CNN implementation has been performed on the 6 classes, out of these 5 classes are disease severity levels and one class belongs to healthy potatoes. The total number of images is 9600 and the accuracy achieved is 96.29% and the macro average is 86.625%. In the nearer future, more improvements can be done in the accuracy by using hybrid algorithms as well as by increasing the dataset size.

10:00 ***A comparative analysis of deep learning algorithms in eye gaze estimation...444***

Nandini Modi (Chitkara University, India)

The process of monitoring where one is gazing (point of gaze) is known as eye tracking. Different algorithms and techniques have been developed by researchers to automatically track the gaze position and direction, which can be useful in a variety of applications. Eye tracking is becoming more popular as a result of its potential to simplify a variety of tasks, particularly for the elderly or users with special requirements. This research intends to investigate and review eye tracking methodologies by focusing on modern approaches such as machine learning and deep learning for gaze points estimation. This paper provides a quick overview of gaze tracking based upon appearance of eye images and model based approaches. Different mapping functions are mostly used for calculating gaze points. The findings of this study indicates that when compared with machine learning algorithms for estimating gaze points, deep learning techniques produce more accurate results in gaze detection from images captured using camera. Finally, some potential directions for using eye tracking are discussed.

SESSION D5

9:00 ***An IoT model for Fish breeding analysis with water quality data of pond using Modified Multilayer Perceptron model...448***

Arepalli Peda Gopi and K J Naik (National Institute of Technology Raipur, India)

The fishing and aquaculture industries are significant food production areas, providing nutritional security, livelihood assistance, and meaningful employment to more than 14 million people. They also contribute to agricultural export by generating income. Aquatic creatures have a defined tolerance range for various environmental conditions in their habitat. When cultivating aquatic organisms, the quality of the water is essential. One of the critical characteristics of aquaculture is breeding. Aquaculture farmers will get better breeding results if they maintain good water quality. In water, dissolved oxygen (DO) and temperature play a critical role in fish breeding. Properly maintaining DO and temperature levels in water is a crucial task. Previously, a laboratory manually collected and tested DO and temperature levels. But these modes are not effective and not scalable. In this paper, we use IoT based data collection process and analyze these data using a deep learning-based modified Multi-layer Perceptron (MMLP) model to maintain proper DO and Temperature levels in the pond for better breeding conditions. The proposed model predicts

different water metrics better than existing models. The proposed model gives 95% accuracy and a minimum error value of 0.01.

9:20 ***Classification of Water Potability Using Machine Learning Algorithms...454***

Husain Yusuf Hani and Salman Yusuf Hammad (University of Bahrain, Bahrain); Salman Bader Alhaddad, NA (University of Bahrain & Liverpool John Moores University, Bahrain)

Water is the most important resource for sustaining life. Everyone has the right to have access to pollution-free water. The achievement of safe drinking water leads to tangible benefits to health. According to the World Health Organization (WHO), the number of global deaths due to water diseases is about two and a half million deaths per year. Therefore, it is important to study new applications for analyzing and classifying safe water quality. In this research, the classification algorithms of K Nearest Neighbors (KNN), Decision Tree (DT), Random Forest (RF), Artificial Neural Network (ANN), Logistic Regression (LR), and Support Vector Machine (SVM) are used to classify the potability of the drinking water. RF and DT achieved the highest performance with an accuracy of 83.78% and 74.98% respectively. The lowest classifier accuracy is LR with 48.74%. In addition, the most important features of the RF model are pH, followed by Hardness, followed by Sulfate. On other hand, the least important feature is Turbidity.

9:40 ***Conceptual Paper on Action Research in a Chinese Lithium Electric Materials Company: Brain Drain, Talent-Position Mismatch and Talent Outflow...459***

Poh-Chuin Teo (Universiti Teknologi Malaysia, Malaysia); Fu Jianghua (Azman Hashim International Business School, Malaysia); Theresa C.F. Ho (Universiti Teknologi Malaysia, Malaysia); Ling Suan Choo (University of Bahrain, Bahrain); Tan Jun-Wei (University of Manchester, Malaysia)

With the globalization of economy and trade as well as the rapid development in information and communication technologies (ICT), the competition for human resources has become extremely fierce. Recruitment, as the first link in corporate human resource management, is not only an important channel for the company to replenish fresh power and obtain outstanding talents, but also determines whether the company can establish a scientific and effective human resource management system, so as to win and maintain for the company. This conceptual paper first provides a brief introduction to WOYIDI company and its organizational structure, and then analyzes the various composition ratios and recruitment characteristics of WOYIDI company's existing staff team, focusing on describing the current situation of the recruitment policy of the company. The proposed research methodology and data analysis tools were also discussed.

10:00 ***A Conceptual Paper on Action Research in Job Satisfaction and Turnover Intention for a Chinese Property Company...463***

Poh-Chuin Teo, Fu Xue and Theresa C.F. Ho (Universiti Teknologi Malaysia, Malaysia); Ling Suan Choo (University of Bahrain, Bahrain); Tan Jun-Wei (University of Manchester, Malaysia)

This is a conceptual paper on an action research project, which focuses on online business performance of a Chinese property company. Specific attention was given on job satisfaction and turnover intention of employees in a company named Chongqing Beleyn Property Management Corporation. This study first assessed the company's specific situation in the Chinese property industry; and subsequently identify its potential job satisfaction dimensions that affecting employee turnover intention, based on preliminary investigations and literature reviews. This study proposed a conceptual framework, whereby the impact of job satisfaction on employee turnover intention will be examined from five sub-dimensions, namely work itself, pay, promotion, superior and co-worker. With this regard, a total of six propositions were developed. Besides, preliminary intervention and impact plans were also developed accordingly. Last but not least, research design, research methods and conclusion were discussed. This study potentially shed lights to practitioners in the property industry in keeping their talents by improving its employees' job satisfaction.

SESSION D6

9:00 ***Classification of sEMG Biomedical Signals for Upper-Limb and Hand Rehabilitation Using a Hybrid CNN-SVM Architecture...467***

Sami Briouza (RISC Lab, Tunisia); Hassène Gritli (National Engineering School of Tunis & Higher Institute of Information and Communication Technologies, Tunisia); Nahla Khraief (Ecole National d'Ingénieurs de Tunis, Tunisia); Safya Belghith (Ecole Nationale d'Ingénieurs de Tunis, Tunisia); Dilbag Singh (Gwangju Institute of Science and Technology, Korea (South))

Electromyography (EMG) classification has been an important step for the rehabilitation process of lower/upper limbs and hands using robotic devices. To perform this step effectively, many researchers have adopted machine learning and deep learning algorithms. In this study, a hybrid CNN-SVM architecture was developed for the classification of surface EMG (sEMG) signals. The CNN part of the proposed architecture is used to extract relevant features from the data and the SVM part would use the extracted features for the classification task. This can be helpful as it will reduce the human input and make results more consistent. For this work, we use the Ninapro DB2's dataset, which contains 3 different Exercises B, C and D. Thus, we obtained the following accuracy results: 78.56% for Exercise B, 72.84% for Exercise C, and 88.24% for Exercise D.

9:20 ***Centralized Web portal for organ, tissue and blood donation in GCC...472***

Ehab Juma Adwan (University of Bahrain, Bahrain); Joud Adnan Alnfaiai (UOB, Bahrain); Marwa Alkhayat (University of Bahrain, Bahrain); Muneera Yusuf AlSada and Jana Adwan (UOB, Bahrain)

Organ, tissue, and blood donation has become one of the most effective lifesaving and enhancing medical innovation for patients. However, besides factors of availability, medical, religious, legal, etc., limited regulatory web portal platforms is considered a major obstacle against demand and supply in the GCC countries. This research project aims at achieving two objectives, 1) explore the organ, tissue, blood donation phenomena and 2) develop and evaluate a GCC centralized web portal "ODB" that manages the donation process. Methodologically, an SDLC based methodology, entailing two phases: 1) Exploratory phase and 2) Web portal app development phase, represents the base of the current research design. The exploration was performed following SLR and CA literature surveying methods and 1st questionnaire to collect user requirements, while the second phase employed 2nd and 3rd questionnaires to collect and analyze system requirements and to evaluate the developed ODB based on Nielsen heuristics. The development process employed DFD, ERD, and other modeling techniques, while the coding employed JAVASCRIPT, PHP, HTML, CSS, jQuery and SQL as development and DB packages. Empirically, research findings revealed a better understanding of the shortcomings of the organ, tissue and blood apps, informed the requirements of the development of ODB, and obtained an 83.9% acceptance rate in terms of usability. 96.2% in terms of visibility, 83.3% in terms of model accuracy, 76.8% in terms of user control, 87.7% in terms of consistency, 73.9% in terms of Aesthetic and minimalist design, 82.6% in terms of error recognition and error prevention, and 87.0% in terms of privacy.

9:40 ***Comparing the Performance of Individual and Hybrid Classifiers for Medical Datasets...479***

Isa Yaser AlHeddi, Aysha Alkhayyat and Elham Abdulla Musaaed (University of Bahrain, Bahrain); Nabil Hewahi (UOB, Bahrain)

An accurate prediction of a certain medical condition is a crucial matter that is of great benefit to patients and healthcare systems. Machine Learning can be of a great help to the medical professionals in assisting them to precisely predict the occurrence of medical condition. This research paper aims to enhance the prediction ability of machine learning models, so it become more adopted. This has been done by exploring the capabilities of the ensemble hybrid model and comparing it to the capabilities of the individual models. These were tested using five medical datasets pertaining to five different diseases. The Random Forest model was the best performing individual model. In terms of accuracy, the ensemble hybrid model performance was close to the individual models in all datasets, except for the Liver Disease dataset. However, for the recall, precision and F1-score measures, the ensemble hybrid model outperformed in two datasets, while it matched the best individual model in the Breast Cancer and Kidney Disease datasets. The only occasion where the ensemble hybrid model underperformed (by 3%) was in the Heart Disease dataset. This research could be extended to experiment the integrated hybrid models along with the optimization techniques.

10:00 ***Literature Review of Blockchain-based Cloud Computing: Data Security Issues and Challenges...484***

Noora Saad Alromaihi (University of Bahrain, Bahrain); Yasser Ismail (Southern University, USA)

Cloud computing has been widely accepted in a variety of areas of the information technology industry as a critical solution for handling infrastructure and data service demands at low cost, with minimal effort, and with a high degree of scalability. Even though the number of cloud computing users has increased significantly, security issues have not been adequately addressed. Cloud computing technologies can be considered the forerunners of blockchain technology. Because blockchain networks may be established under cloud security settings, they can play an essential role in blockchain deployments. Blockchain technology is frequently referred to as an incorruptible technology due to its rapid acceptance across a variety of industries. It is expected that blockchain technology might be able to solve the security issues associated with cloud applications. The majority of cloud computing's benefits involve operational efficiency. Security must play a greater role in achieving blockchain's benefits. While blockchain technology ensures data privacy and transactional traceability, it may increase the performance costs of cloud computing platforms. Before exploring how Blockchain could be used to safeguard Cloud Computing, this essay will investigate the numerous security considerations of Blockchain and Cloud Computing. Through a literature review, this study will examine cloud data security and how academics use blockchain technology to improve cloud data security.

Wednesday, October 26 10:30 - 11:50 (Asia/Qatar)

SESSION E1

10:30 ***ATM Interface Using Culture Empowered Low Literate Users...493***

Muhammad Naveed Shahzad (Superior Univeristy, France); Muhammad Waseem Iqbal (The Superior College, Lahore, Pakistan); Muhammad Raza Naqvi (INP-ENIT, University of Toulouse, France); Muhammad Aqeel, Muhammad Ameer Hamza and Farukh Muneem (Superior University, Pakistan)

The utilization of banking robotized teller machine (ATM) mechanical advancements have huge significance and advantages in Pakistan; however unskilled and semiliterate Pakistanis, addressing about 40.33%, don't see them as valuable or simple to utilize. The motivation behind this contextual analysis was to distinguish procedures utilized by programming engineers of banking ATM frameworks in Pakistan to make simple-to-utilize banking ATM framework interfaces in Pakistan. The innovation acknowledgement model was embraced as the calculated system. One association in Pakistan was utilized for this current investigation's populace. Information was gathered through semi-organized, inside and out vis-à-vis interviews with nine financial ATM framework interface engineers and the investigation of 11 archives. Discoveries from the members were approved through part-checking and hierarchical records. Through methodological triangulation one significant topic arose: the significance of client-focused plan procedures, that incorporate five significant parts: (a) client-focused plan measures, (b) significance and comprehension of the social foundations and education levels of clients, (c) plan dependent on information and comprehension of clients' requirements, (d) significance of understanding the objective clients, and (f) straightforward, easy to use, and simple to utilize the plan. The discoveries in this investigation give guidance for the future advancement of procedures to make simple-to-utilize ATM framework interfaces for individuals with shifting capacities and proficiency levels and other data innovation frameworks that are UI innovation subordinate.

10:56 ***Designing a Data Warehouse Framework for Business Intelligence...498***

Quang Tran Minh and Thai Thanh Do (Hochiminh City University of Technology, Vietnam); Duc Tien Bui (Ho Chi Minh City University of Technology, Vietnam); Phat Huu Nguyen (Hanoi University of Science and Technology, Vietnam)

In order to make use of the gathered data, Data warehouse (DW) and Business Intelligence (BI) is a solution that provides the tool for companies to exploit their data reaching the goal of making better, more efficient decisions. However, from the perspective of business users, they may have difficulties and confusions in the first approach to the analytic technology. This paper presents the design and implementation of a platform for constructing Data Warehouse frameworks including Business Intelligence tools for data analytics, and designing an ETL process for populating the Data Warehouse from Data Sources. The Fact models

provided in the proposed framework include Sales, Procurement, Product Inventory, and Customer Relationship Management processes. By applying Dimensional modeling approach, the goal is to provide a platform for new business users to get use of data exploitation by helping them building fast and customizable DW. In addition, we evaluate that using a cloud-based solution would bring back more values rather than investing initial infrastructures.

11:23 ***A PowerBi solution for sales...N/A***

Ticiana Capris, Yuka Takagi and Pedro Melo (Polytechnic Institute of Viseu, Portugal); Nuno M. Garcia (Universidade da Beira Interior & Instituto de Telecomunicações, Universidade Lusófona de Humanidades e Tecnologias, Portugal); Ivan Miguel Pires (Instituto de Telecomunicações, Portugal); Norberto Jorge Gonçalves (Universidade de Trás-os-Montes e Alto Douro, Portugal)

The Internet stores a wealth of information about its users, including what products they buy, when and where they buy them, and what kind of products they buy. Suppose they want their company or business to succeed. In this case, people who want to start their own company or industry need to know much of this sales-related information. Applications built on a web page are seeing a rapid increase in production thanks to the efforts of end-user application developers. One of these essential operations in the information technology domain is data warehousing. The notion of data warehousing enables the filling of data through online transaction processing, also known as OLTP. This is possible in a variety of different methods. The web revolution has not eliminated the demand for a data warehouse. Business Intelligence (BI) is a process of taking an abundance of data to be analyzed and presented as a set of reports; this includes synthesizing the key concepts implicit in all the data and translating these concepts into a conclusion applicable in decision-making processes to improve business performance. This paper demonstrates the cloud-based dashboard adoption process using Power BI at the strategic management level.

SESSION E2

10:30 ***An Explainable Machine Learning Model For Lumpy Skin Disease Occurence Detection...503***

Anuj Kumar Jain (Chitkara University Punjab, India); Raj Gaurang Tiwari, Neha Ujjwal and Anshbir Singh (Chitkara University, India)

Animals are very important to the human being. Humans are dependent on most things like milk, curd, honey, etc. which are produced by the animal. So taking care of them is the utmost responsibility of human beings. Nowadays, a disease named lumpy skin disease (LSD) is spreading very rapidly amongst cattle and water buffalo. It's an infectious, eruptive, sometimes lethal condition marked by skin nodules. In this paper, we intend to predict whether the cattle of a specific geographic location can have this disease or not in the present or maybe in the future so that preventive measures can be taken accordingly. We have applied various machine learning algorithms to the lumpy skin disease dataset and compared their accuracy in predicting the disease. The dataset consists of 18603 instances and 16 features with target columns having 2 values, 0 for occurrence and 1 for the non-occurrence of lumpy disease. Among all applied algorithms, we have found that the RandomForest algorithm outperforms others with the highest accuracy 97.7%.

10:50 ***Implementation of a Priority Queue to Optimize Resources during Manual Verification of Fake News...509***

Piran Karkaria (Indian Institute of Technology Kharagpur, India); Rahul Golder (IIT Kharagpur, India); Sobhan Sarkar (Indian Institute of Management Ranchi, India)

Combating fake news on social media is a critical challenge in today's digital age, especially when misinformation is spread regarding vital matters such as the Covid-19 pandemic. Manual verification of all content is infeasible; hence, Artificial Intelligence is used to classify fake news. Our ensemble model uses multiple Natural Language Processing techniques to analyze the truthfulness of the text in tweets. We create custom parameters that analyze the consistency and truthfulness of domains contained in hyperlinked URLs. We then combine these parameters with the results of our deep learning models to achieve classification with greater than 99% accuracy. We have proposed a novel method to calculate a custom coefficient, the Combined Metric of Prediction Uncertainty (CMPU), which is a measure of how uncertain the model is of its classification of a given tweet. Using CMPU, we have proposed the creation of a priority queue following which the tweets classified with the lowest certainty

can be manually verified. By manually verifying 3.93% of tweets, we were able to improve the accuracy from 99.02% to 99.77%.

11:10 ***Machine learning for satellite image classification: A comprehensive review...514***

Hafsa Ouchra (Laboratory of Information Technology and Modeling LTIM, Hassan II University, Morocco); Abdessamad Belangour (University Hassan II, Morocco); Allae Erraissi (Chouaib Doukkali University, El Jadida, Morocco)

Classification of satellite images is the most important technique used in remote sensing for the extraction and analysis of satellite information, which consists of grouping the values of the pixels of the image into significant categories. Nowadays, large quantities of medium to high-resolution satellite images are acquired daily. However, the classification of satellite images is mandatory for many fields such as urban planning, military, agriculture, and environmental monitoring. Many researchers are discussing this area, but the sufficient degree is optimal has not yet been reached. The classification of satellite images requires the selection of an appropriate classification method according to the requirements. Existing satellite image classification methods are classified into three main categories according to the features they use: manual feature-based methods, unsupervised feature learning methods, and supervised feature learning methods. Each of these three methods has its own advantages and disadvantages. The objective of this paper is to present an evaluation of publicly available satellite datasets and on the study of different methods used for satellite image classification as well as a brief overview of previous studies proposed in this field.

11:30 ***Blockchain Technology: Opportunities & Challenges...519***

Khushnood Bilal (Aligarh Muslim University, India); Mohammad Sajid (Aligarh Muslim University, Aligarh, India); Jagendra Singh (Bennett University, Greater Noida, India)

As an emerging technology, Blockchain technology can efficiently be used for various tasks in various domains. It has become disruptive technology due to its secure, immutable, decentralized, persistent, anonymous, and auditable nature. Blockchain technology has a lot of opportunities to offer in various fields like cryptocurrency, risk management, supply-chain management, financial services, identity management, healthcare, cloud computing, and the Internet of things (IoT). Blockchain technology is relatively young and growing rapidly; thus, several challenges must be addressed to realize its full potential. These challenges are even more significant and require critical attention because of the financial aspect of blockchain-based solutions. This work attempts to present a holistic picture of Blockchain Technology by discussing an overview, style, reality, and actuality of Blockchain. It discusses various Blockchain components, including mining and consensus mechanisms. It also presents Blockchain layers, multiple applications, advantages, and disadvantages. This study also discusses various issues and challenges which are helpful for researchers to explore and advance multiple aspects of Blockchain Technology.

SESSION E3

10:30 ***Graphene, Copper and Nickel based composites in EMI applications: A brief review...525***

Saba Ayub (Universiti Teknologi PETRONAS, Malaysia); Beh Hoe Guan (Universiti Teknologi Petronas, Malaysia); Zaib Un Nisa (Universiti Teknologi PETRONAS, Malaysia); Faiz Ahmad (UTP, Malaysia); Hassan Soleimani (University Technology Petronas, Malaysia)

Electromagnetic inference (EMI) is one of the most troubling back issues on which research is ongoing with various new combinations. There are many composites that have been utilized to provide shielding against the EMI. Therefore, this review focused on the graphene, copper and nickel-based composites which are been utilized. As a study limitation, iron was not considered in the review as the focus was to explore the other metals which can come up as an emerging metal for EMI applications. It was revealed by the review that copper and nickel when combined with graphene gives better shielding effectiveness. The effectiveness was not only achieved in X-band but also in the higher frequency range which shows it is of utmost importance in EMI applications. Therefore, more attention is utilized to these metals to further enhance their effectiveness.

10:50 ***Accelerating the Deployment of observant Energy Efficient Lighting System for Smart Cities...528***

Vinay Mishra and Mayank Singh (Teerthanker Mahaveer University, India); Raj Gaurang Tiwari and

Ajay Kumar (Chitkara University, India)

It is no secret that street lighting costs a city a lot of money in terms of energy. An intelligent street lighting system can reduce municipal street lighting expenses by 50 percent to 70 percent. As the name implies, intelligent street lighting systems automatically modify their light output based on usage and occupancy, such as pedestrians, cyclists, cars and trucks being the primary users of the road. In order to reduce energy consumption, an intelligent street light management recommends installing a wireless-based system that can remotely track and control the real energy usage of the street lights. Using an IR transmitter and IR receiver combination, we present a technique for energy conservation. When the sensor detects movement, it sends the data to the microcontroller, which then turns the Light ON/OFF as needed. To reduce energy wasting and to save lives from accidents, this research's major goal is to prevent energy wastage.

11:10 ***Performance assessment of solar radiation based on satellite data in a Moroccan city...533***

Halima Yakoubi (ENSAM, Moulay Ismail University, Meknes. Morocco, Morocco)

Solar radiation data at a relevant location is crucial for various solar energy applications. In the present study, four models are assessed to predict the global solar radiation on the horizontal surface for a specified location in northern Morocco. The satellite-derived radiation data for the period of 2005 to 2020 are analyzed. The comparisons of predicted and measured values have been carried out with various statistical indicators, including the Relative Mean Bias Error (rMBE), the Relative Root Mean Square Error (rMSE), t-statistic (TS) and the determination coefficient R^2. The obtained results were in good agreement using these indicators. The solar radiation intensities predicted in this study can be used in the future design and estimation of solar energy systems suitable in all Moroccan cities and in other locations of similar climate conditions where there are no solar radiation measurements.

11:30 ***Evaluation of Academic Procrastination Tendencies in Sophomore Medical Students...538***

Zeashan Hameed Khan (National University of Sciences and Technology, Pakistan); Afifa Siddique (Riphah International University, Pakistan)

This paper describes the effectiveness of learning analytics on various academic endeavors. Two scenarios are discussed. The first one considers the academic performance while the second one considers diversity-related issues on the studies in order to ensure the evaluation of online classes during COVID-19 pandemic. The present work details the key academic and non-academic factors and suggests some strategies to minimize the impact of academic procrastination and hence improve the retention rate of sophomore medical students.

SESSION E4

10:30 ***Early Recognition of Wheat Powdery Mildew Disease Based on Mask RCNN...542***

Deepak Kumar (Chitkara University, India); Vinay Kukreja (Chitkara University, Punjab, India)

Agricultural production and growth are seriously undermined by wheat powdery mildew disease. A total of 6.75% of wheat quality has been reduced every year due to wheat powdery mildew disease. Thus, the identification of wheat powdery mildew disease is important for farmers. In this paper, a real-time system for powdery mildew disease is proposed. The real-time system uses the Mask RCNN algorithm to use real-time captured images to determine the exact location of powdery mildew disease on each wheat plant image. An entire of 6200 images has been collected from different regions of Punjab. Among all captured images the images have been preprocessed using image resizing and noise removal techniques and a total of 1500 images have been discarded due to low background and foreground. All the preprocessed images have been used for training and testing in the Mask RCNN algorithm for finding the exact location of powdery mildew wheat disease. The performance of Mask RCNN is measured through ground truth and predicted label images. The ground truth images were labeled using a VOTT and these images were considered ground truth images. Several epochs were used to train the Mask RCNN model. After training of the Mask RCNN model, the maximum loss is found with a minimum number of epochs. Thus, the mask rcnn achieves 0.44 MIoU for wheat powdery disease recognition in wheat plant images. There is the total of 1263 patches have been extracted by Mask RCNN. As the Mask RCNN achieves 96.3% classification accuracy for wheat powdery mildew disease recognition with various training losses. After the classification of powdery mildew disease, the severity has been estimated. Thus, the severity of wheat powdery mildew disease in each wheat plant with POI (39.3%) has been estimated.

10:50 ***Application of PSPNET and Fuzzy Logic for Wheat Leaf Rust Disease and its Severity...547***

Deepak Kumar (Chitkara University, India); Vinay Kukreja (Chitkara University, Punjab, India)

Correct identification of wheat crop diseases in an accurate manner is helpful for small and large-scale farmers. Once, the wheat diseases are spreading, the whole wheat plant is damaged. In this study, leaf rust disease in the wheat plant along with their severity level system is determined. The main purpose of this paper is to use the Pyramid scene parsing network (PSPNET) and Fuzzy rule models to develop an innovative multilevel model (PSGIC) for estimating wheat leaf rust with their infection level. The study takes 1266 wheat plant images from secondary sources and these images have been preprocessed using image processing techniques. After preprocessing, a total of 315 bad condition images have been removed from the whole dataset. A prediction mask of wheat leaf rust is mapped using PSPNET and severity is estimated with five fuzzy rules. The evaluation of PSPNET is measured between output and predicted mask in terms of Mean square error. By using the proposed PSGIC wheat leaf rust prediction model, an effective decision can be made about wheat rust disease identification.

11:10 ***Driver Drowsiness Detection Using Fixed and Dynamic Thresholding...552***

Ebenezer Essel (Southern University and AM College, USA); Fred Lacy (Southern University, USA); Wael M El-Medany and Fatema Albalooshi (University of Bahrain, Bahrain); Yasser Ismail (Southern University, USA)

Drowsiness is identified as a major cause of road accidents. Although extensive work has been performed in this field, this research is proposed to improve the accuracy of drowsiness detection by using the Dlib algorithm for facial feature detection. Dlib shape predictors extract the facial features that aid in calculating essential parameters: Eye Aspect Ratio (EAR) and Mouth Opening Ratio (MOR). These values are the primary indicators of driver drowsiness. The parameters are evaluated to assess the level of drowsiness of the driver. Two methods are proposed: the method of fixed thresholding, and the method of adaptive thresholding. The fixed threshold approach involves alerting the driver of drowsiness once the EAR or/and MOR value meets the criterion. The threshold for EAR was set at 0.15 while that for MOR was 0.4. A driver is notified as drowsy when: (1) EAR is less than 0.15 (closed eyes) and (2) MOR is greater than 0.4 (yawning). The accuracy and sensitivity in detecting drowsiness using fixed thresholding were 89.4 and 96.5 respectively for 1000 images used. The method of adaptive thresholding involves a counter to track a set number of consecutive frames that meet the criterion before sending a warning. Further, the consecutive number of frames is adjusted as the time elapses to increase the accuracy of detection and for quick communication of a drowsy state. Four (4) videos each of 30 minutes were passed through the algorithm to evaluate its response. The accuracy and sensitivity in detecting drowsiness were (93.4) and (89) respectively for 686 samples.

11:30 ***Satellite data analysis and geographic information system for urban planning: A systematic review...558***

Hafsa Ouchra (Laboratory of Information Technology and Modeling LTIM, Hassan II University, Morocco); Abdessamad Belangour (University Hassan II, Morocco); Allae Erraissi (Chouaib Doukkali University, El Jadida, Morocco)

Today, accelerated growth has led to unprecedented growth in urban areas. Indeed, the demographic explosion has become a problem for urban planners because it makes it necessary to frequently update land use and occupancy maps. To overcome the difficulties of urban planning, it is necessary to implement a geographic information system (GIS) as the main tool in planning operations and satellite data. GIS and satellite imagery can support the urban planning process by enabling the storage, manipulation, and analysis of data valid for planning, and decision making. The objective of our paper is to present an overview of the different approaches and advanced methods of spatial analysis and machine learning applied in the field of urban planning. Then, we cited the different sources of satellite data, and we have demonstrated the usefulness of integrating remote sensing with GIS and the different multispectral indices that allow the extraction of urban characteristics and are designed to improve satellite imagery to introduce new urban classification schemes. The researchers' results showed that the implementation of GIS in urban planning can improve the result based on the quality of the urban planning process, save time, and the data can be obtained faster.

SESSION E5

10:30 ***An Intelligent Food Serving Robot Prototype with Android Application for Canteens...565***

Bibin Vincent (Providence College of Engineering, India); Pramod Mathew Jacob (Providence College of Engineering Chengannur & Chengannur, India); Sandeep Pradeep, Fathima Najeeb, Aswin Renjith and Merlin Monachen (Providence College of Engineering, India)

As the world is facing COVID-19 pandemic social distancing is one of the important regulations that we need to follow. There are places where social distancing can't be followed properly, restaurants are one such place. The proposed system provides an automatic food serving robot for restaurants and college canteen, which helps us to maintain the social distancing. Standing in long queues and the delay in serving food are some of the issues faced by people at restaurants. while talking about college canteens, students only have a limited time for refreshment which will results in the rush at canteen. Our automatic food serving robot will serve the food to the customers without any fail, all they had to do is to use the mobile application to order food and be ready to eat their favorite food. The system uses a mobile application for ordering the food and a robot to serve it effectively. The help button in the mobile application will allow the users to call the robot which in turn results in waste management of the canteen. We use various sensors and RFID technology for routing and finding right path to the table. Apart from making the customers happy, our solution will also favor the admin. The cost of making a robot will be more beneficial than a human waiter. The system not only provides a payment interface of rechargeable wallet but also have net banking, card payment, and UPI payment options.

10:50 ***Issues, Challenges, and Opportunities in Food Recommender Systems...570***

Maheen Ashraf and Shahab Saquib Sohail (Jamia Hamdard, India); Beenish Moalla Chaudhry (University of Louisiana at Lafayette, USA)

Recommendation systems are commonly used to provide consumers with customized services. They are primarily designed to provide recommendations or ideas that address the problems of consumers and can be applied to a variety of industries. Food recommendation systems are used to propose meals to users based on their purpose, assisting users in acquiring the meals that are most suited to them. We explain the four primary sectors of the meal recommendation system, as well as the methods and models utilized to implement them, for the first time in this work. This paper also provides a full overview of several FRS studies, breaking them down as simply as possible. Finally, we explore the current issues in FRS as well as the field's future potential. This paper will pose a reference to those seeking a detailed breakdown of FRS in the most coherent way possible.

11:10 ***Weed Plant Identification and Removal Using Machine Vision and Robotics...575***

Santhosh Simon (Providence College of Engineering Chengannur, India); Pramod Mathew Jacob (Providence College of Engineering Chengannur & Chengannur, India)

Weeds are undesired plants that grow around crops or plants of desire. Farmers and gardeners have always been fighting against weeds because weed removal is a tiring and laborious process. That is where precision farming becomes the need of the hour. To implement precision farming for weed removal, we need a system that detects weeds from crops and also a robotic system that will execute the weed removal process using a robotic arm, mimicking the human action of removing weeds. The proposed system uses the YOLOv4 algorithm to detect weeds and crops in real time and removes the detected weeds using a weeding robot. The system proves to be a good solution of removing weeds from land.

11:30 ***Drone for Agriculture: A way forward...580***

Syed Yusuf Ahmad and Syed Maasir Azeem Husain (Jamia Hamdard, India); Asfia Aziz (JAMIA HAMDARD, India); Shahab Saquib Sohail (Jamia Hamdard, India)

Drones, also known as unmanned aerial vehicles (UAVs), are most commonly associated with military, industrial, and other specialised operations. However, with recent developments in the areas of sensors and information technology in the last two decades, the scope of drones has been widened to include other areas such as agriculture. As the world's population grows, it is expected to reach 9 billion people by 2055, resulting in increased agricultural consumption. It is critical to meet everyone's eating needs. Agriculture is the most promising sector, but it is currently beset by a slew of issues, one of which is a labour shortage in the farming industry. Extreme weather events, insufficient fertilizer, poor fertilizer application, infection, diseases, allergies,

and other health problems caused by chemical application (fungicide, pesticide, insecticide, etc.) or insect/animal bites are some of the additional challenges or difficulties. The application of sophisticated technologies in agriculture, such as drones, has the potential to confront a number of large and minor challenges. Irrigation, crop monitoring, soil and field analysis, and bird control are the most common uses of drones in agriculture. Drones are growing smarter as they incorporate open source technology, sophisticated sensors, greater integration, longer flight times, and the ability to hunt down criminals as well as to detect forests and other disaster regions. The purpose of this study paper is to highlight the importance of drones in agriculture and to go over the best drones on the market for agricultural monitoring and observation in order to improve crop quality and prevent damage to fields.

Keywords - DRONES, AGRICULTURE, UAVs, IRRIGATION, CROP MONITORING, SOIL AND FIELD ANALYSIS, SENSORS.

SESSION E6

10:30 ***Proposing Algorithm to Localize and Extract Facial Information Using FaceNet and MTCNN...587***

Phat Huu Nguyen, Anh Pham Thi, Quy Mai and Tran Manh Hoang (Hanoi University of Science and Technology, Vietnam); Quang Tran Minh (Hochiminh City University of Technology, Vietnam)

Facial recognition systems from photos or videos are widely applied in daily life such as surveillance systems, access management, and security investigations. It can be compared with other forms of biometrics such as fingerprint or iris recognition systems. Among the facial recognition systems developed so far, Facenet introduced by Google brings a high accuracy rate. Therefore, in this paper, we will build a face recognition system using MTCNN to detect faces and extract features using Facenet and SVM to classify and recognize faces. The proposed algorithm consists of 5 steps, namely, preparing data for training; face detection from data with MTCNN; extracting the features of each face with the FaceNet Keras model; classifying feature vectors by SVM, and performing face recognition. The algorithm results in an accuracy of up to 99.63% with data from only 5 to 15 images for a person. This proves that the algorithm is feasible when applied in practice.

10:50 ***An Approach Based on Quantum Reinforcement Learning for Navigation Problems...593***

Niyazi Furkan Bar, Hasan Yetis and Mehmet Karakose (Firat University, Turkey)

The power of classical computers is still insufficient for deep reinforcement learning (DRL) in state space large problems. Thanks of entanglement and superposition, quantum computers have a high computational power. The concept of using this high computing power to solve problems that would be difficult for classical computers is fairly common. In this study, a hybrid approach is proposed to take advantage of the benefits of quantum computers. Deep Q-Network (DQN) algorithm for DRL, optimization operations, and storage operations are performed on the classical computer side of this hybrid approach. In the quantum side, a variational quantum circuit (VQC) is proposed. The proposed method is applied to a navigation problem. The proposed approach is evaluated in terms of target success rate, collision (going out) rate. The proposed approach is compared to the literature's DRL solutions for the navigation problem with classical computers. According to the number of parameters used, the proposed approach appears to be successful. As a result, the performance of the proposed approach has been validated.

11:10 ***An Improved DeepFake Detection Approach with NASNetLarge CNN...598***

Ismail Ilhan (Adıyaman University, TBMYO & Adıyaman University, Turkey); Ekrem Balı and Mehmet Karakose (Firat University, Turkey)

Deep fake images are a new technology that has emerged with the development of computer vision and deep learning technologies in recent years. The development of these deep fake technologies has led to the production of many fake or manipulated products. Thus, the problem of detecting the deep fake has emerged and many methods have been developed to solve this problem. In this study, feature extraction and classification method on the dataset with NASNetLarge CNN deep learning model is proposed and a successful result is produced. In the proposed method, training and test datasets were created by removing facial regions from the video frames in the Celeb-DFv2 dataset. The architecture of the NASNetLarge model is explained and the success of the model is tested. According to the test results, an ACC value of 96.7% was obtained and compared with other methods. As a result, the study offers an easier model training with a smaller dataset than other methods

and produces a competitive and successful result.

11:30 ***Detection of Customer Opinions with Deep Learning Method for Metaverse Collaborating Brands...603***

Irfan Aygun (Celal Bayar University, Turkey); Buket Kaya and Mehmet Kaya (Firat University, Turkey)

In recent years, metaverse projects have been developed that both increase the number of users and bring a new concept to the use of the internet. With this development, collaborations are frequently established within the business world with metaverse projects that attract the attention of companies. In the study, the gains of the companies operating in the metaverse after these activities were examined. Thanks to the tweets collected before and after the companies participated in the metaverse, it was analyzed how potential users interpreted their participation in the metaverse. In this context, sentiment analysis experiments were conducted for five different clothing, sportswear, and retail companies (Adidas, Balenciaga, H&M, Nike, and Zara) serving in similar fields of activity. The BERT architecture, which is a language representation model, was used in the experiments, and it was seen that the positive shares on Twitter for companies increased greatly. After the companies transitioned to Metaverse, the biggest change in positive Twitter posts was seen in Nike, with 47%, and in second place, positive Twitter posts about Balenciaga increased by 42%. Experiments show that firms' assets in the metaverse create a positive perception within one month.

Wednesday, October 26 12:30 - 14:10 (Asia/Qatar)

SESSION F1

12:30 ***The Impact of Service Quality on Corporate Social Responsibility and Customer Citizenship Behavior in Telecommunication Companies...608***

Ala Fathi and Laith Tashtoush (Near East University, Turkey)

Telecommunications companies should strive to portray themselves as socially responsible in a competitive global market. The organization will reap additional benefits from effective participation in society. The goal of this study is to look at a conceptual model of the connections between corporate social responsibility and customer citizenship behavior in Gambia's telecommunications companies. The goal of this study is to add to the literature by demonstrating how service quality (reliability, responsiveness, and empathy) can mediate the relationship between corporate social responsibility and customer citizenship activity. 400 questionnaires were delivered and analyzed using SPSS v 25 software to achieve this purpose. According to the findings, corporate social responsibility has a favorable and considerable impact on customer citizenship behavior. Furthermore, the findings revealed that service quality (reliability, responsiveness, and empathy) derived from corporate social responsibility is a critical and fundamental variable that telecommunications corporations in Gambia can use to facilitate positive customer behavior and enhance customer citizenship behavior towards their corporations, which will have a positive impact on customer citizenship behavior. There are also managerial and practical implications for Gambia's telecommunications companies.

12:50 ***Understanding Business Analytics Maturity Drivers for Indian Companies...617***

Hari Saravanabhavan (SP Jain School of Global Management, India); Sadia Riaz (S P Jain School of Global Management & Dubai International Academic City, United Arab Emirates); Suchismita Das (SP Jain School of Global Management, India)

Data and its analysis play a pivotal role in gaining a competitive business advantage in any industry or sector. Firms across the globe are utilizing computing technologies to gain meaningful insights into data and leverage it their decision-making. To maximize the benefits of business Intelligence Analytics, organizations look for measures that facilitate the effective assessment of the analytic maturity. In this regard, the aim of the paper is to test the maturity model for Indian firms. The proposed model constitutes five drivers, namely leadership, Information Technology, Human Capital, Organization, and Indian Analytics Maturity Catalyst. The model is tested using a quantitative study using a 5-point Likert scale survey. A total of 52 respondents answered the survey questionnaire. The key findings include that all the drivers are essential in ascertaining the business analysis maturity of the Indian firms. It is also found that implementing the model will lead to strategic, financial, operational, marketing, and

customer benefits for the organization. It is finally suggested to test the model for a larger sample size to generalize the results.

13:10 ***Unsupervised and Categorical Sentiment Segmentation of Customer Product Reviews...624***

Aditya Kumar Singh (National Institute of Technology Durgapur, India); Rahul Golder (IIT Kharagpur, India); Sobhan Sarkar (Indian Institute of Management Ranchi, India)

In Consumer Review Analysis (CRA), identification of the context of reviews holds paramount importance. In this purview, it is the responsibility of all businesses to suffice their underlying sectors with a structured and classified list of consumer feedback, available on various online platforms. However, generally, reviews and feedbacks are available in a very unorganized manner and need to be tagged and distributed properly to appropriate sectors. To address the problem, we propose a comprehensive model, employing sequential Clustering, Sentiment prediction and subsequent ranking of reviews. To validate the proposed model, data from a Samsung smartphone manufacturing firm was used. The robustness and stability of our model have been examined through different performance indices- Silhouette Index (SI), Davies-Bouldin Index (DBI) and Calinski Harabasz Score (CHS) Score. Our analysis shows a distinct categorization of reviews based on their contexts with minimal noise in the classification measures. Our custom declared coefficient, Relevant Voting Score (RVS) has been found to rank the reviews in an accurate priority list thereby helping the sectors to contemplate only the most important customer feedback.

13:30 ***Modeling and Simulation of Platform Screen Door (PSD) System using MATLAB-SIMULINK...629***

İsa Koç (Eskişehir Osmangazi University, Turkey); Ömer Mermer and Necim Kırımca (Albayrak Makine Elektronik A.Ş., Turkey); Fatih Hayati Çakır (Eskişehir Osmangazi University, Turkey); Mehmet Karakose (Firat University, Turkey)

In this paper, electromechanical modeling of an industrial platform screen doors (PSD) system have been developed. The system incorporates several sub-units such as PMSM, motor controller, inverter, and mechanical unit. Moreover, a newly designed motor control system based on real operation conditions is introduced. In addition, modeling procedures are described, and simulation results are presented. Furthermore, numerical simulation in according to specific velocity and position references are provided for verifying the effectiveness of the proposed modeling. Furthermore, the results show that the developed electromechanical model of PSD system is effective in managing the parameters that affect the actual operating state of the PSD sliding door system. These modelling and simulation will play an important role in increasing the PSD design capability for real applications.

13:50 ***Excelling Customer Experience Through Data Driven Behavioral Intelligence: A conceptual framework...634***

Abu Bashar (IMS Unison University, India); Mustafa Raza Rabbani (University of Bahrain, Bahrain); Mohammad Selim (UOB, Bahrain); Mohammad Atif (Jamia MIllia Islamia, India); Zehra Zulfikar (Delhi Skills and Entrepreneurship University, India); Yusra Naseem (Shri Ram College of Commerce, India)

Only a bad customer experience is enough to annoy even the most loyal customer of an organization. In today's world of Omni-channel customer encounters, the retailers need to ascertain excellent customer experience across-channels. Intelligent segmentation mechanism is required to smartly identify, contact (reach) and transact with prospective customers. This article explores the importance of behavioral intelligence of the customers through strategic data management and analytics, which in turn results in favorable customer experience. A conceptual model based on S-O-R theory is proposed for achieving the behavioral intelligence and using it for better ROI with three main components a) Customer data hub b) behavioral intelligence and c) Recommendations. The article deliberates on the importance and challenges of each component from its application perspective. Moreover, this article identifies the benefits of deep insights of consumer behaviour that can led to the loyalty and advocacy of the brand/products to larger number of customers in each segment, which allows businesses to improve their marketability through proven credibility. The probable areas of expansion along with limitations are also enumerated at the end of the article.

SESSION F2

12:30 ***Predicting the Impact of University Majors on the Length of Post-Graduation Unemployment***

Periods in Bahrain...639

Isa Yaser AlHeddi, Aysha Alkhayyat and Elham Abdulla Musaaed (University of Bahrain, Bahrain); Ahmed M. Zeki (University of Bahrain & College of IT, Bahrain)

Unemployment rate is among the most important measures that reflects the country's development. International investors and creditors will closely monitor the unemployment rate prior to making any decision to invest in any country. In addition, this measure is being monitored by the governments to set plans to keep it within the norm should it exceed the acceptable limits. By understanding the importance of this measure and in pursuance of guiding high school graduates to enroll in majors of high demand and hence reduce the waiting time, this research studied the ability of three classifiers, namely Support Vector Machine (SVM), KNearest Neighbors (KNN), and Naïve Bayes (NB) to accurately predict the length of post-graduation unemployment periods based on the university major of University of Bahrain (UOB) graduates. SVM classifier was found to provide the best predictions, though not significantly outperforming the KNN and NB classifiers. Moreover, other factors such as the Grade Point Average (GPA) and gender can be tested for their impact on unemployment period individually or grouped with the major. Additionally, this paper can be used to set the basis for deploying real life applications that will predict the unemployment period based on multiple factors.

12:50 ***Predicting Performance of Primary School Students and Determining The Dominant Factors Using Data Mining with Feature Selection Methods...645***

Yasmeen Mubarak Aldossary (University of Bahrain & Liverpool John Moores University, Saudi Arabia); Majeed Mohamed Ebrahim, NA (University of Bahrain & NA, Bahrain); Salman Bader Alhaddad, NA (University of Bahrain & Liverpool John Moores University, Bahrain); Ahmed M. Zeki (University of Bahrain & College of IT, Bahrain)

Educational organizations consistently attempt to investigate students' behaviors in learning and give early predictions for intervening and improving their learning performance, especially in primary education, which is the core stone of education. Educational data mining offers different practical prediction algorithms to predict student performance and various feature selection methods to determine the dominant factors which affect student performance. This study applied three data mining algorithms, K-Nearest Neighbor, Naïve Bayes, and Decision Tree, to predict the performance of students based on their socio-demographic characteristics. The feature selection methods Information Gain Attribute Evaluation, Wrapper Subset Evaluation, and Classifier Subset Evaluation were used to identify the dominant factors. The research was done by adopting the CRISP methodology using a data set obtained from one of Bahrain's public primary boys' schools. The results showed that the model of the k-Nearest Neighbors algorithm with Wrapper Subset Evaluation as a feature selection method had achieved the highest accuracy rate of 67.6%. For the dominant factors, Student Age and Student Level have the most impact on student performance, followed by Parent education level.

13:10 ***Identifying spammer groups in consumer reviews using meta-data via bipartite graph approach...650***

Varun Balakrishna (IIT Kharagpur, India); Subhajit Bag (Indian Institute of Technology Kharagpur, India); Sobhan Sarkar (Indian Institute of Management Ranchi, India)

Nowadays, online product reviews are more common on e-commerce platforms. Before making a purchase, people frequently consult product reviews to assess the quality of the item. However, the review system has been seriously harmed by a huge number of review spammers, who frequently cooperate to promote or denigrate specific products. Earlier research uses machine learning techniques to identify singleton suspicious reviews and reviewers without considering the meta-data. In this study, we utilise the meta-data of the consumer's reviews to identify review spammer organisations using the state-of-the-art community detection techniques. Due to the diversity of behavioural indicators, group spammers are challenging to identify. In this study, we propose that clustering the singleton spammers using the meta-data (location and time) of the reviews is the key to identifying group spammers (and their fraudulent reviews). We propose filling out the review-product matrix using the product and review information and text. We then use this to deduce the hidden reviewer-product connections to address the issue of the absence of explicit behavioural signals for singleton reviewers. Subsequently, we build a bipartite graph using the review-product matrix. Using the meta-data of the reviews, which are frequently overlooked by existing algorithms, experiments on a real-world Yelp dataset demonstrated the effectiveness of our methodology in detecting group spammers.

13:30 ***Spatial Data Mining technology for GIS: a review...655***

Hafsa Ouchra (Laboratory of Information Technology and Modeling LTIM, Hassan II University, Morocco); Abdessamad Belangour (University Hassan II, Morocco); Allae Erraissi (Chouaib Doukkali University, El Jadida, Morocco)

Today, spatial data mining (SDM) techniques are used collectively with GIS and satellite imagery to deduce associations between spatial attributes, cluster and classify information related to spatial attributes in various fields such as fire accident analysis, forest extent change analysis, agricultural land classification, agriculture and forestry, soil quality monitoring, urban area classification, and meteorology, etc. GIS has become indispensable and contains heterogeneous data from multidisciplinary sources in different formats. Today, thanks to the increasing power of remote sensors and the improvement of GIS technologies themselves, the amount of terrestrial data generated is very massive. The rapid growth of geographic databases and satellite imagery is generating a huge volume of data related to natural resources such as vegetation, water, temperature, forest cover, urbanism, etc. The objective of this paper is to study the different spatial data mining (SDM) techniques for the analysis of data related to spatial relationships. This article presents a description of SDM tasks and gives the idea to understand GIS data models. It also presents the different GIS data sources, and data formats and describes the challenges related to the GIS dataset.

13:50 ***Extracting large-scale POI data for a defined land area through APIs...660***

Durage Dineth Dhananjaya, Thillaiampalam Sivakumar and Dimuth Indeewara (University of Moratuwa, Sri Lanka)

Locations that act as prominent attractors for humans can be defined as the Point of Interests (POIs). Restaurants, schools, and transit terminals are some excellent examples of it. Historically, these have been added to the maps utilizing symbols and labels by cartographers, and the increasing digitization assisted the institution of digital maps and the POIs. Contemporarily, POI data are provided by several Location Based Services (LBSs), comprising comparative advantages and disadvantages. However, all these sources provide the data for the users through the different requests attached to their Application Programming Interfaces (APIs). In this context, APIs limit the data extraction to balance the distribution of its resources and its pricing strategies which halt the users from achieving their highest potential in different applications accompanied by POI data. To this end, this study proposes a methodology to collect the POI data for a defined land area in large and store it locally for further analytical utilizations. This approach performs the iteration of API calls that can be used for a defined land area efficiently and cost-effectively. It was tested for an area of 49km2 in a country in the South Asian region and could extract 50,207 POIs with an average API calling time of 3 seconds. Both researchers and application users of POI data are beneficial through this approach in conducting their tasks without bounding to the typical limitations.

SESSION F3

12:30 ***Exploring Factors Influencing The Acceptance of Community Service Web Application...665***

Yuniarty Yuniarty (Binus Online Learning, Binus University, Indonesia); Teguh Sriwidadi and Ngatindriatun Ngatindriatun (Binus University, Indonesia); Dendhy Indra Wijaya and GG Faniru Pakuning Desak (BINUS Online Learning, Bina Nusantara University, Indonesia); Arief Agus Sukmandhani (Binus Online Learning, Indonesia & Universitas Bina Nusantara, Indonesia); Nuraini Sari and Frihardina Marsintauli (Bina Nusantara University, Indonesia)

A learning management system (LMS) is commonly used in universities and higher education institutions to monitor and manage electronic learning and teaching. There are no known characteristics that influence community service web apps. By presenting an integrated technology acceptance model (TAM), the current work contributes to this research path. This research is then carried out to study the success of this web application development. The proposed model is tested using statistical data from 400 web application users from Indonesia and verified using structured equation modeling (SEM) partial least squares (PLS). The findings of this study reveal that the presentation and navigation of the application encourage ease of use and ultimately encourage users to use the web application. The study also found that content quality affects the usability of web applications, and eventually, users use web applications.

12:50 ***The Role of E-WoM and Trust in Beauty Platforms to Increase Cosmetic Purchases...670***

Hanasti RifaNingtyas and Malida Alviva Nugrahaning Gusti (Universitas Bina Nusantara, Indonesia); Hartiwi Prabowo (Bina Nusantara University & BINUS Online Learning, Indonesia)

Electronic word of mouth becomes a force for consumers to consider purchasing decisions, especially when using new platforms. This study aims to analyze the role of electronic word of mouth, satisfaction, and trust in the platform in increasing the purchase intention of cosmetic products. The data collection technique used a questionnaire distributed to 130 females aged 19 to 24 using the Female Daily Platform. Questionnaire data were analyzed using variance-based structural equation modeling (PLS-SEM). The study's results prove that e-WOM positively and significantly affects platform trust and purchase intention. Satisfaction with platforms positively and significantly affects trust and purchase intention. Finally, trust in platforms has a positive and significant effect on the purchase intention of cosmetic products at Female Daily. As a new platform that explicitly provides information on beauty products, companies can use customer databases to encourage them to give positive feedback and share experiences while using the beauty products.

13:10 ***Decision Making for Optimal Marketing Strategy: A Case Study in E-Commerce...675***

Nazaruddin Nazaruddin, Muhammad Luthfi Hamzah and Muhammad Rizki (Universitas Islam Negeri Sultan Syarif Kasim Riau, Indonesia); Arini Anestesia Purba (Institut Teknologi Kalimantan, Indonesia)

This Case Study was conducted on an e-commerce site, Nordhenbasic. This business is one of the names of business startups engaged in custom specialists and sales of finished products such as t-shirts, hats, hoodies, and others who actively sell on social media or e-commerce such as Instagram, Shopee, and Tokopedia. This study aims to determine the important weight of the criteria and sub-criteria that affect sales and determine the marketing strategy of the designed alternatives. This study uses two-method approaches. The first method used is the Analytic Network Process (ANP). ANP is used to identify the factors that influence each other in sales. The second method is Technique for Others Preference by Similarity to Ideal Solution (TOPSIS). Topsis is used as a decision-making method in evaluating various alternative strategies. The findings of the weight with the highest value are financial conditions. The main priority alternative is to open more online stores in various marketplaces with a V value of 0.709 and a percentage of 20.532% of the seven alternatives.

13:30 ***Factors Affecting Online Repurchase Intention on E-Commerce Website...680***

Satya Nand (Symbiosis International Deemed University, India); Vimal Kamleshkumar Bhatt (Symbiosis Institute of Business Management, Pune & Symbiosis International Deemed University, Pune, India)

Day-by-day online shopping is a widespread phenomenon. The instant incremental growth of start-ups and the exploring avenues of online shopping by established companies have opened a huge potential for e-commerce. E-commerce shopping has several advantages as we all know and not only the younger generation but also the elder generation are hooked on it such is the attraction & popularity of e-commerce. The rising trend to surf products online and increasing opportunity has drawn the attention of researchers to pay attention on this part. This existing research tries to establish the similarity between online repurchase intention and different variables such as perceived usefulness, ease of use, security, online trust, & intention of repurchase. Purchasing of products through e-commerce is changing the whole economic system of India in a better way. The sharp increase in internet penetration, decreasing data cost, smartphone availability, optical fiber infrastructure, and indeed upcoming 5G technology will completely change online shopping and other businesses in the world.

13:50 ***A mobile checkout application for groceries...684***

Ehab Juma Adwan (University of Bahrain, Bahrain); Lulwa F. Albuarki, Hema A. Abdin, Ameena A. Almehri and Jana Adwan (UOB, Bahrain)

Consumers may now acquire whatever they want online through several websites and mobile applications and have it delivered to their door. However, many customers who still believe that grocery shopping is a personal and sensory experience prefer to shop in stores. One of the most serious issues is with the checkout process, which is an important aspect of consumer satisfaction. Online grocery shopping is still viewed as a supplement to in-store shopping rather than a replacement. This implies that consumers do not rely on the internet to accomplish their grocery shopping and still go to physical stores to do it. Checkout is regarded as one of the biggest issues in the traditional grocery shopping process. This project aims to develop an application

"Grab and Go" that will help in solving the problems arising in the checkout process of the traditional checkout method and will overcome the insufficiencies in the current applications available in the market and introduce the mobile checkout. The application also provides other features such as E-wallet, Click and collect, organized shopping list and other features which will engage in making the shopping experience more satisfactory and efficient. A systematic literature review (SLR) and web content analysis (CA) methodologies are used to build the theoretical framework. A system development life cycle (SDLC) based methodology was utilized for exploration of the e-checkout practice and mobile application development, with 3 data collection questionnaires, one for collecting user requirements, system requirements, and the third for evaluating the mobile application. The research outcomes recognized the shortcomings of the currently used grocery checkout applications, informed the requirements of the "Grab and Go" mobile application which revealed 98.9% of acceptance in terms of the application's usability.

SESSION F4

12:30 ***Dissected Urdu Dots Recognition Using Image Compression and KNN Classifier...691***

Shivani Wadhwa and Deepak Kumar (Chitkara University, India); Vinay Kukreja (Chitkara University, Punjab, India); Shivani Bansal (Chitkara University, India)

Character recognition for the Urdu language is always a tedious task because of its complexity as Urdu words are composed of ligatures that further consist of primary and secondary components. The Secondary components further consist of Urdu diacritical marks which play an important role in recognition of the Urdu language. This paper presents the technique for recognizing these secondary components to improve the recognition accuracy of the Urdu language. For this, three types of features of secondary components are extracted i.e. invariant moments, DCT, and DFT. The trained data set consists of a total of 228 features out of which 28 are invariant moment features, 100 are DCT features and 100 are DFT features. These extracted features are classified using the KNN classifier for recognition. The proposed methodology achieves 97.57% accuracy for Urdu dot recognition.

12:50 ***Real-Time Sign Language Detection Using CNN...697***

Md. Nafis Saiful, Abdullah Al Isam, Hamim Ahmed Moon, Rifa Tammana Jaman Chetona, Mitul Das and Md. Raisul Alam (BUBT, Bangladesh); Ashifur Rahman (Independent University of Bangladesh (IUB), Bangladesh & Bangladesh University of Business and Technology (BUBT), Bangladesh)

Sign language is a system of communication using visual gestures and signs. Hearing impaired people and the deaf and dumb community use sign language as their only means of communication. Understanding sign language is so difficult for a normal person. Therefore, the minority group has always faced many difficulties in communicating with the general population. In this research paper, we proposed a new deep learning-based approach to detect sign language, which can remove the barrier of communication between normal and deaf people. To detect real-time sign language first we prepared a dataset that contains 11 sign words. We used these sign words to train our customized CNN model. We did some preprocessing in the dataset before the training of the CNN model. In our findings, we see that the customized CNN model can achieve the highest 98.6% accuracy, 99% precision, 99% recall and 99% f1-score on the test dataset.

13:10 ***A New Mobile Segmentation Network Approach for Defect Detection of Rail Surface...702***

Ilhan Aydin (Firat University, Turkey & Firat, Turkey); Selcuk Sinan Kirat and Erhan Akin (Firat University, Turkey)

Railways have been carrying people and their loads for over 200 years. Rail controls must be carried out periodically for safe transportation on railways, which are increasingly important today. The control of the rails is carried out manually by the personnel of the railway enterprises. Making the rails automatically by a computerized system will reduce the time spent for control, minimize the errors that may arise from human perception, and reduce the cost. This study made predictions based on image segmentation by training a hybrid network using MobileNetV2 in the encoder part of U-Net using 607 rail surface images in a specially prepared dataset. According to the dice coefficient metric, the hybrid model achieved 0.8702 success. According to the results of the study, the hybrid MobileNetV2 network with more parameters, faster training, and prediction time can be preferred for segmentation tasks on devices with low hardware power.

13:30 ***MRISVM: A Object Detection and Feature Vector Machine Based Network for Brown Mite Variation in Wheat Plant...707***

Deepak Kumar (Chitkara University, India); Vinay Kukreja (Chitkara University, Punjab, India)

The wheat brown mite decreases the wheat yield quality. According to the national agricultural institute of research, a total of 30-40% of wheat quality has been reduced due to the transmission of wheat brown mite. The brown mite is transmitted in active and inactive variants. The active variants generate the same type of mites on the same day. As a result of active variants, the whole wheat plant has died and it affects the closing wheat plant. But the inactive variant does not produce the mites on the same day. Hence, the active variant is more dangerous than the inactive variant. So, the classification as well localization of brown mites in active and inactive variants is more important which is beneficial for land field farmers. In addition, the manual identification of mites is a very time-consuming and complex process. A deep learning technique provides an efficient automated way to solve the identification problem. In this paper, the MRISVM approach is proposed for brown mite classification and localization in the variant category. Firstly, the wheat plant has been segmented and localized in the object detection model. A total number of 20 images were randomly selected for training purposes in the Mask RCNN object detection model. After finding the location of the wheat brown patch, the active and inactive variant features have been extracted through the Independent component analysis (ICA) technique. The ICA extracts the 82 feature vectors which are beneficial for variant classification. The variant has been classified through Libsvm which can easily predict the brown mite variant in the active and inactive stages. The proposed method achieved a high recognition rate of 97.33% and could effectively recognize brown mites in a complex environment. The proposed method provided a new approach to the detection and recognition of insect pests in a real-time manner.

13:50 ***Developing A Parallel Program For Image Similarity Search Using Hashing Methods...712***

Yasmeen Mubarak Aldossary (University of Bahrain & Liverpool John Moores University, Saudi Arabia); Majeed Mohamed Ebrahim, NA (University of Bahrain & NA, Bahrain); Abdulla Alqaddoumi (University of Bahrain, Bahrain)

Nowadays, images play an essential role in people's lives as they document their memories and affairs. Therefore, a large number of images have been generated in different storage. As a result, there was a need to search for similar images in this colossal quantity. While enormous data processing requires speed in execution, it needs the parallel processing method. This study aims to develop a program to search for similar images using the image hashing methods, the Average Hashing, and the Difference Hashing, then to compare their performance. In addition, it aims to explore the effect of using parallelization on the speedup and efficiency of the program. The first part's results stated that the performance of the Average Hashing and the Difference Hashing methods was affected by the type of data used, despite their effectiveness in detecting identical images. As for the second part, the parallel program reduced the execution time by almost half using two workers, while the best speedup value was when using eight workers. In terms of efficiency, it achieved the highest results with a value greater than 0.9 when using two workers.

SESSION F5

12:30 ***An improved iterated local search for solving the total weighted earliness tardiness blocking flowshop scheduling problem...717***

Ahmed Missaoui (Faculty of Economics and Management of Sfax, Tunisia)

The idea of punctual delivery has appeared in many industrial companies as their customers need a fixed date in time to receive their orders. In this paper, the flowshop scheduling problem with blocking constraint is introduced aiming to minimize the total weighted earliness tardiness from the due date window. A few works in the literature have considered this problem and have proven that it is NP-hard. Therefore, we propose in this work an approach based on iterated local search in order to solve the problem. A benchmark of 110 instances is used to test the efficiency of our proposal which is compared with a set of five competing methods well selected from the scheduling literature. All procedures are re-implemented and calibrated in order to give maximum effectiveness. This result has allowed us to confirm the performance of our approaches.

12:50 ***A Review of Indoor Positioning System: Technologies and Applications...723***

Noopur Tyagi (Chitkara University Institute of Engineering and Technologies & CUIET, India)

In logistics and transportation, for the administration and real-time monitoring of the process chain. There are a variety of approaches for following persons and things inside a specific area. One of them is the Global Positioning System (GPS), which allows objects on the ground to be geolocated as long as there is a passable line of sight to four or more satellites. GPS cannot be used in interior conditions as a result of this constraint. A few Indoor Positioning Systems (IPS) based on various technologies have recently been developed. This paper aims to review and summarize the existing technologies such as Radio Frequency Identification (RFID), Wireless- Fidelity (Wi-Fi), and Bluetooth Low Energy (BLE) positioning systems for indoor navigation and discuss the challenges, benefits, and applications of an IPS. Fusing the technologies can improve performance and provide fast and accurate navigation for mobile robots.

13:10 ***LMI-based Optimization for the Position Feedback Control of Underactuated Robotic Systems via an Affine PD Controller: Case of the Pendubot...729***

Sahar Jenhani (Higher Institute of Information and Communication Technologies, Tunisia); Hassène Gritli (National Engineering School of Tunis & Higher Institute of Information and Communication Technologies, Tunisia); Giuseppe Carbone (University of Calabria, Italy)

In this paper, our main objective is to solve the position control problem of underactuated Lagrangian robotic systems via an affine PD-based control law and using the LMI-based optimization approach. In order to design the condition on the feedback gains for the stabilization, we consider the dynamic model defining the difference between the nonlinear dynamics and the approximated linear one, and where such difference is assumed to satisfy some Lipschitz condition. Moreover, via some properties of the different matrices of the nonlinear dynamics, such Lipschitz condition is also developed. Furthermore, using the LMI approach, we design the stability conditions of the underactuated robotic system. Finally, the pendubot manipulator is adopted to verify the effectiveness of the affine PD-based control law.

13:30 ***Data Science for Genomics (GSK- XGBoost) for Prediction Six Types of Gas Based on Intelligent Analytics...736***

Samaher Al-Janabi (Babylon University, Iraq)

Gas is one of the most important sources in world's economy and play a prominent role in controlling the country's development in various directions. Therefore, the question of forecasting its production rate for subsequent years is a very important point for drawing plans for a country according to rules and values that are closer to reality. Therefore, this work attempts to build an optimization model to predict the values of produced crude oil as well as the associated natural gas associated with those networks using Intelligent data analysis. In this study; we will build a system consisting of five steps: (a) Collect data from Gas network through IOT Platform in real-time, (b) Pre-processing that data based on split it into different intervals, and determining the main limitation and rules on it. (c) build predictive model called (GSK-XGboost). This predictor is based on Extreme Gradient Boosting (XGboost) typically using Decision Trees (DTs) to produce the predictor. But it will replace the DTs with Gaining-Sharing Knowledge-based algorithm (GSK) because it would potentially give more accurate and optimum results than DTs by themselves. (d) Finally, the results of GSK-XGboost would be evaluated based on five experimental measures generated by a confusion matrix, namely: Accuracy (AC), recall or true positive rate (TP), precision (P), F-measure (considers both precision and recall), and Fb. In addition, Cross-Validation will use to validate the accuracy of GSK-XGboost.

13:50 ***Digital Twin Design for Engineering-to-order...N/A***

Daniel Rossit, Guido Vinci-Carlavan and Adrian Toncovich (Universidad Nacional del Sur, Argentina)

Engineering-to-order systems are processes that seek to satisfy specific customer requirements. These systems usually require an arduous planning process because they deal with unique projects for each client, therefore, the management of information and planning is very demanding as there is very little standardization. This paper deals with a case study of an engineering-to-order company. In this type of company, not only is the management of operations and processes complex and variable, but also the handling of materials are really complex operations due to the size and weight of the materials and semi-finished products. These issues have an impact on the fact that the estimated times in the planning for the different operations and tasks differ considerably from the real times. To overcome these differences, readjustments and modifications in planning are required. Something that makes it even more difficult to manage information in these environments. That is why the design of a Digital Twin

is proposed to integrate information systems and achieve efficient and agile production management. For this, the architectures and infrastructures that should be developed and incorporated to achieve this objective are developed, as well as at the system level.

SESSION F6

12:30 ***Exploring the Effect of N-grams with BOW and TF-IDF Representations on Detecting Fake News...741***

Amal Esmail (Aligarh Muslim University & AMU, India); Mohammad Sajid (Aligarh Muslim University, Aligarh, India)

The Internet is used by millions of users daily, who publish news content on social media platforms like (Twitter, Facebook, etc.). These platforms are becoming the most significant source of spreading fake news, which plays a significant issue for the individual and society. Fake news is incorrect information written to mislead readers. Fake news' text available on these platforms is unstructured and needs to be preprocessed and converted to a numerical format to be used later. Some fake news has seemed natural, making it challenging even for humans to identify them. Therefore, automated fake news detection tools leveraging machine learning methods have become an essential requirement. This paper investigates and compares two feature extraction approaches, Bag of Words (BoW) and Term Frequency- Inverse Document Frequency (TF-IDF), with N-grams, and three conventional machine classifiers, Support Vector Machine (SVM), Naïve Bayes (NB), and Decision Tree (DT). In addition, the performance of these models is compared with the fine-tuned BERT transformer model with its feature representation. The experiment was conducted on fake and real news dataset. It is demonstrated that the traditional models are still good candidates and that the use of bigram combined with BOW and DT classifier performs the best among others, with an accuracy of 99.74% compared to existing results and reaching BERT f1-accuracy on this dataset.

12:50 ***Intelligent Agricultural Management System Based on IoT: Opportunities and Challenges...747***

Vimal Kamleshkumar Bhatt (Symbiosis Institute of Business Management, Pune & Symbiosis International Deemed University, Pune, India); Pankaj Pathak (Symbiosis International University & Symbiosis Institute of Digital and Telecom Management, India); Binod Sinha (Balaji Institute of Modern Management, Sri Balaji University, Pune, India); Gayathri Ramesh (Balaji Institute of Modern Management Sri Balaji University Pune, India)

Issues affecting the agricultural sector and farmers have constantly been impeding India's growth and development, as the agricultural sector contributes to the GDP by 15.11% (At 2011-12 prices) [1]. Looking at the percentage contribution of the agricultural sector, it becomes quite essential to understand how to improve the sector's productivity with the help of technology. Intelligent technology in agriculture has been primarily employed in every aspect of agriculture, and it has the capability to improve productivity and utilizes full agricultural resources optimally. In recent years, the use of technology in agriculture has increased, and technology has enabled farmers to monitor and control agricultural processes with greater efficiency. Still, technology penetration in India is by far called fair usage of technology, let alone Intelligent Technology. Most of the farmers are not relying on new-age intelligent technology for farming, mainly due to a lack of trust. In agriculture, multiple factors affect productivity, which needs continuous monitoring and evaluation like water availability, soil condition, weather condition, etc. None of the factors affecting the productivity of the farm are static in nature and have dynamic values, which makes it absolutely essential to monitor these values. Here, IoT, combined with Intelligent Technology, extends help in tracking such values by connecting through various sensors, thereby continuously monitoring and controlling the entire system. This is possible as IoT is inter-disciplinary in nature and can be used across various platforms to create an integrated system. In India, Intelligent Technology penetration is not more than 1% [2], even though cutting-edge technology is available. The research article aims to study the extant literature in order to understand, compile, and present a holistic view of the work.

13:10 ***An Augmented Similarity Approach for Improving Collaborative Filtering based Recommender System...751***

Mohammed Wasid (Aligarh Muslim University, India); Khalid Anwar (Aligarh Muslim University, Aligarh, India)

Collaborative Filtering (CF) is one of the earliest and extensively used techniques to provide recommendations to the users. The success of collaborative filtering can be attributed to its ability to find the similarity among users and identify a set of similar users known as neighborhood set. In this direction, many researchers have put their efforts to investigate and propose new and modified similarity measures. Some researchers have combined two measures or improved a traditional similarity measure with a method known as similarity modifier. In this paper, we analyze and evaluate various similarity measures and compare them with an augmented similarity measure approach. Our approach identifies the factor which improves the performance of a similarity measure. The experiments conducted on Yahoo! Movies dataset and the comparative results show that our proposed approach outperforms the state-of-the-art approaches in terms of Coverage, MAE and RMSE performance measures.

13:30 ***Towards Portfolio Selection in Stock Markets Using Grey Wolf Optimization Approach...756***

Gayas Ahmad and Mohammad Shahid (Aligarh Muslim University, India)

In stock selection problem, maximizing the returns at least possible risks were always the most significant target of investors in the security markets. In recent years, various solutions and recommendations have been proposed concerning the frequency of portfolio optimization problems. Portfolio optimization has been an important investing decision-making method over the years. In this work, the Grey Wolf Optimization (GWO) algorithm is proposed as one of the most efficient approaches to address the portfolio optimization problem by exploiting the haunting behavior of the group of wolves. A repair method was used to control the various constraints of the constructed portfolio. The effectiveness of the suggested method is evaluated with regard to the performance on well-known benchmark datasets employed in our study. The results are compared with those of alternative solution techniques found in the literature. The overall findings demonstrate that it performs better than other state-of- art meta-heuristics methods.

13:50 ***Modeling Yemeni Crude Oil Reservoir Fluid Properties Using Different Fuzzy Methods...761***

Salem Baarimah (Hadramout University, Yemen); Abdullah O. Baarimah (Universiti Teknologi PETRONAS, Malaysia & Hadhramout University, Yemen)

Calculations for petroleum production, simulation, and reservoir characterization primarily rely on reservoir fluid properties including the bubble point pressure (Pb), formation volume factor (βo), solution gas oil ratio (Rs), and viscosity. The aim of this paper is to predict the Yemeni crude oil reservoir fluid properties using different fuzzy approaches. The fuzzy model was optimized using eight different types of input membership functions, ten cluster radius values, linear and constant output membership function in order to obtain the best fuzzy logic (FL) parameters. The proposed models were built using field data, such as temperature and the specific gravity of gas and oil. The data used in this study was gathered from a variety of wells in well-known Yemeni reservoirs. Different evolution criteria were applied utilizing statistical error analysis, including an average absolute percent relative error (AAPRE), standard deviation (SD), and the correlation coefficient (R2), to assess the effectiveness and correctness of the suggested FL models. The statistical analysis showed that the gaussmf function was the best input membership function, while the linear function was the best output function. The ideal cluster radius for the radius was 0.04. Correlation coefficients of 0.993, 0.995, and 0.990 were obtained by the best fuzzy logic models for bubble point pressure (Pb), formation volume factor (βo), and solution gas oil ratio (Rs), respectively.

SESSION F7

12:30 ***Exploring Wi-Fi WPA2 KRACK Vulnerability: A Review Paper...766***

Mohamed Ali Alhamry (University of Bahrain, Bahrain)

Wi-Fi networks are preferred by many businesses and organizations since they save money on wiring and give staff more flexibility. Organizations and people are becoming more concerned about security as more Wi-Fi connected networks go online. Wireless networks are sometimes assumed to be inherently insecure, allowing unauthorized access to data being transferred. While many wireless network security solutions have been developed, protocol weaknesses have been uncovered throughout time. When the Key Reinstallation Attack (KRACK) issue was revealed (in 2016-2017 by Mathy Vanhoef of the University of Leuven), it demonstrated that WPA2 was not impregnable; KRACK is thought to attack any Wi-Fi-enabled device, including those with appropriate WPA2 implementations. This puts the security of a home or business Wi-Fi network in jeopardy. In this paper, the KRACK attack on the Wi-Fi WPA2 protocol will be investigated. The paper will attempt to define the WPA2 protocol, examine

the WPA2 4-way handshake process, and investigate the KRACK vulnirability in the 4-way handshake process. In addition to this, the paper will demonstrate several potential solutions that have been offered in other studies. Also, the paper will make an attempt to demonstrate that the KRACK vulnerability is still a significant problem in Wi-Fi communication, despite the fact that the majority of vendors have already published their patches to fix the vulnerability. Furthermore, the improvement that WPA3 has over WPA2 in terms of defense against KRACK assaults and the reasons why it is not yet the ultimate solution will be highlighted in this paper. Finally, recommendations for the most effective measures that may be taken to defend against KRACK assaults will be given.

12:55 ***A Review on Methods for Managing the Risk of Android Ransomware...773***

Masaad Naji Ahmad, Ill (University of Bahrain & University of Bahrain 1, Bahrain)

One of the most dangerous assaults now is ransomware. In general, ransomware is encrypting or locking files on a targeted computer and mobile device to de- mand payment to unlock it, it requires doing some solutions to this problem. Malicious data is not only enticing to users, but also to hackers who want to infiltrate and spread it on smartphones and tablets. It is estimated that An- droid Ransomware is responsible for the largest number of global attacks, there are many research papers that have created some tools and methods to prevent ransomware attack before it occurs or detect it when it occurs, but they are often hacked within a short period. This paper provides a state-of-the-art eval- uation of ransomware research, detect-ions, and prevention strategies. From the perspective of Management the risks, the paper will try to answer three ques- tions: When a ransomware assault occurs, how can a Android OS be prepared and protected? How can a user respond to a ransomware assault to halt it or minimize its damage? And How can a victim of ransomware get their life back on track? Answering these questions will lead to building a novel Methodology for Managing the Risks of Android Ransomware. As a result, fully implement- ing will make it, almost, impossible for a ransomware attack to succeed, and in the worst case, the organization will be able to recover its data via the backup copy.

13:20 ***Blockchain Vulnerabilities And Recent Security Challenges: A Review Paper...780***

Aysha Hasan AFaw (University of Bahrain & Ministry of Education, Bahrain); Saeed Sharif (UEL, United Kingdom (Great Britain))

Blockchain is a relatively young technology, which is a distributed database used for sharing between nodes of computer networks. Blockchain stores all information in electronic the digital format as a database. The innovation in blockchain is that it ensures the accuracy and security of the data record and generates trust without the need for a trusted third party. They determined the security risk of the blockchain systems, analyzed the vulnerabilities exploited on the blockchain, and identified recent security challenges that blockchain faces are the objectives of this paper. This paper presents some of the previous studies of the security threats that blockchain is facing and also review the security enhancement solutions for blockchain vulnerabilities. At present time, there are some studies on blockchain security issues, but there is no systematic examination of the issue. Despite the security threats that the blockchain systems. Especially used in this research process is an observational research Methodology to research several studies that highlight the blockchain threats. The Excepted outcomes of this research are the consideration of blockchain in terms of security, identifying vulnerabilities, and predicting the new vulnerabilities. Required Resources for this research will be the Resources that have access to the library of the University of Bahrain and Google scholar.

13:45 ***The Internet of Things Security Issues and Countermeasures in Network Layer: A Systematic Literature Review...787***

Bashayer Hussain Ahmed, Bh (CS & UOB, Bahrain); Saeed Sharif (UEL, United Kingdom (Great Britain))

The Internet of Things (IoT) is a known term in recently communications where a system of physical objects that connected to internet is capable of collect, create, and transfer data easily without human assistance or intervention. IoT contribute to facilitate the communication that can contain sensitive data therefore it become a desirable target for adversaries to establish various attacks. Therefore, IoT security should be maintained and enhanced in physical, Perception, Network, and Application layers. Many researches were conducted to investigate IoT security issues and formulate proper solutions and countermeasures that can address these issues in general. This study was conducted using Systematic Literature Review methodology to provides an overview of conducted research about of IoT security issues in network layer specifically and proposed proper countermeasures and solutions to address these issues as well as providing future direction for further investigation and research in IoT security.

Wednesday, October 26 14:20 - 15:00 (Asia/Qatar)

INFORMS-BAHRAIN