

Editorial Preface

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In today's world Blockchain and Machine Learning (ML) technologies are gaining strong momentum and thrust around the world. Blockchain, a disruptive technology, made its mark with the trading and inventions of cryptocurrencies. On the other hand, considering the predictive and descriptive algorithms, ML has contributed in harnessing existing data to identify patterns and gain insights. Integrating both the technologies can result in making them super disruptive! Both have the potential to hasten data exploration and analysis as well as intensify security of transactions. Additionally, distributed blockchains can be a great and proven input for ML, which requires big data sets to make quality predictions.

Digital revolution is characterized by the convergence of technologies, rapidly advancing fourth industrial revolution thereby blurring the lines between physical, digital and biological objects. The speed of the fourth revolution which is evolving at an exponential rate cannot by any means be compared with any previous technologies. AI and IoT employ the interactions and operations in various fields such as home appliances, autonomous vehicles, nanotechnology, robotics, cognitive systems, self-driving cars and wearable devices. The potential of blockchain technology has been realized in many sectors nowadays as security plays a crucial role everywhere. There is a tremendous increase in the usage of AI and IoT technologies in various firms. AI has big potential to identify the patterns and anomalies in the data generated by IoT sensors.

The accuracy of operational predictions using AI technologies is greater when compared to threshold-based monitoring systems. IoT and connected systems drive AI as intelligent automation which makes sense of data generated from sensor devices in decision making process. Blockchain plays a significant role in providing security during data handling operations and defines how trusted transactions can be carried out addressing the solution for internet facing vulnerability issues. Blockchain overcomes the security fault line among AI and IoT where most of the IoT devices are connected to each other through public networks. Linear and permanent indexed records are maintained in blockchain to face the vulnerability issues. Many applications and concepts, common to these technologies, are already in practice with promising results. Gaining control of the device and records is hard in the blockchain system and consequently the blocks are maintained and guarded. IoT devices are sharing information via public networks which increases the vulnerability of data and the risks increase even more if AI is also involved. Furthermore, the blockchain system has robust security implementations thus it is considered as a scalable, secure and verifiable platform. Peer-to-peer model is a competent solution for the effective communication in centralized client /server paradigm.

The main focus of this special issue was to provide the latest advancements in the problem domain of machine learning, Block chain, IoT and Artificial Intelligence. So, we encourage researchers to submit original works which will enlighten other researchers and provide the world with new and

improved methodologies using some of the topics as mentioned in the following section. The aim of the special issue is providing a quality publication with innovative ideas and implementation methodology to upcoming buddy researchers and users in the modern-day era.

The unique characteristics of the special issue are:

- 1) The proposed work of eminent researchers related to Data-Centric and Service-Centric IoT and Blockchain Architectures, Digital world and business transformation, the analytics of IoT: Machine Learning perspective, IoT and Blockchain's potential to drive business value, Big data analytics for IoT systems: opportunities and challenges, IoT Privacy and Security Concerns, Blockchain Privacy and Scalability concerns, IoT's best practices and new business models, Industrial IoT and Factory of Things, Machine Learning and Data Analytics Techniques in IoT for Industry, IoT Application and Services: Creation and Management Aspects, Future directions for businesses in IoT context, Blockchain role in Trust and Privacy, Supply Chain digitalization are current topics of research will be the part of proposed publication.
- 2) The proposed publication will be very well targeted towards providing quality, latest and best research by eminent researchers considering the impact of their research and significant influence on common people in their everyday life.
- 3) The area which will be part of published work will be having a significant influence on the business users, common people and has a great impact on the society.

This special issue is a collection of the five papers which are written by eminent professors, researchers and Industry people from different countries. The papers were initially peer reviewed by the Editorial board members, reviewers and industry people who themselves span over many countries.

In "Emotion Recognition Using Facial Expressions," the authors should the importance of Emotion Recognition in human interaction and this ability of humans to interpret emotions based on facial expressions is a basic element for effective communication. Machine learning can help automate this complicated task with the help of feature engineering. This work proposes some pipelines trained on the JAFFE dataset using feature extraction methods namely, Principal Component Analysis (PCA) and Local Binary Pattern (LBP) combined with Fisher Discriminant Ratio (FDR) as a feature selection method. In order to build a classification scheme capable of successfully identifying face images related to the six universal emotions and neutral expression, all possible combinations have been empirically analysed. In the final model, authors used PCA combined with FDR have been used on the Support Vector Machine classifier with a linear kernel. The results obtained are encouraging and this work may also prove important for disciplines other than computer science such as for management purposes.

In "Distributed Database Management With Integration of Blockchain and Long Short-Term Memory," authors discovered that Supply chain management is the broad range of activities required to plan, control & execute the flow of a product. As a less corruptible and more automated alternative to traditional databases, blockchains are well suited to the complicated record-keeping necessary in modern. However Distributed database management system is a centralized software system, the blockchain technology can overcome the problem of synchronization between multiple databases, it also ensures that integrity problems are solved. In the proposed model, Ethereum blockchain is used to solve a few major supply chain problems to manage a distributed database. The model has incorporated techniques to predict the rise and fall of the demand for the medicine in the market by using machine learning algorithms such as linear regression and LSTM, also the trend predicted by both the models has been compared. The result shown by authors states that while using linear regression the predicted trend is not very accurate and cannot trace the actual trend closely. whereas BLSTM has performed well in predicting the trends of time series data.

In "Energy-Efficient Virtualized Scheduling and Load Balancing Algorithm in Cloud Data Centers," authors brought about with better load balancing algorithm improves the excel in the resource assignment task. So as to scale back the energy consumption, this paper proposed three algorithms,

the first one is identifying the load balancing factors and redistribute the load, the second one is find out the most suitable server to assigning the task to the server, achieved by Most Efficient First Fit Algorithm (MEFFA) and the third algorithm is processing the task in the server in an efficient way by Energy efficient Virtual Round Robin (EEVRR) Scheduling Algorithm with FAT Tree topology architecture. The authors showed that this EEVRR algorithm improves the Quality of Service via; steps send the task scheduling performance and cut the delay in Cloud data centers. Increase the energy efficiency by achieving the Quality of Service (QOS).

In “Optimal Composition of Services for Intelligent Systems Using TOPSIS,” authors discussed that SOA: Service Oriented Architecture is a widely accepted service used for supporting consolidation and integration functions under an enterprise system which are complex in nature but with an intelligent framework which helps in integrating the services in an optimistic and dynamic manner for getting the task done. For any Service Oriented Architecture based applications, its services are the main components, as it requires service compositions for answering various requests. There exist many possible service compositions for completing a task. To find an optimum composition from these dynamically present serviced during run time is another crucial aspect for the success of this architecture. The present research by authors elaborated a novel idea for optimal composition of services in SOA or any other service-based system. In this paper, authors covered a case study along with the outcomes of the experiment which indicates the efficiency and validity of the proposed technique.

In “Artificial Intelligence and NLP-Based Chatbot for Islamic Banking and Finance,” authors presented and argued that the role of Artificial intelligence (AI) is becoming increasingly important in the field of banking and finance. It has come a long way and the trend is likely to continue for some time in future as well. This research study reviews the role of artificial intelligence and use of technology in finance and banking industry and how AI has changed the way the banks and financial institutions used to do their business. Customer engagement is one of the most critical aspect of finance and banking industry. The authors in this work proposed an artificial intelligence and Natural Language Processing (NLP) based Chatbot model for advising the customers of the Islamic banking and finance. Presently, the proposed chatbot is the first chatbot as best of our research that will help the Islamic finance and banking customers to interact in real time and get Islamic financial advice based on the principles of Sharia related to individual’s financial needs.

Overall the collection of article indicates the widespread application in various domains of the IoT, Block chain and Artificial Intelligence. Simultaneously the Optimization and Convergence of Machine Learning Algorithms for Leveraging IoT, Block chain and Artificial Intelligence has significantly grown over the year which helps the society develop in every aspect of life.

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