Editorial Preface

Optimization and Convergence of Machine Learning Algorithms for Leveraging IoT, Blockchain, and Artificial Intelligence

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Blockchain and Machine Learning (ML) technologies are gaining strong momentum and thrust all 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 encouraged 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 was 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 was:

- 1. The proposed work of eminent researchers related toData-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 four 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 paper, "Life Insurance-Based Recommendation System for Effective Information Computing," authors argued that due to the rapid advancements in information and communication technologies, the digital data is exponentially growing on Internet. They stressed that insurance industry with tough competition has emerged as information rich domain based on health, assets and life insurance for public. Customers expect to receive personalized services that match their needs, preferences, and lifestyles. But, a large portion of population is still unfriendly to the insurance selection. Major reasons could be the time and complexities involved in selection of suitable policies. In this this paper authors presented the state of the art of the research done in insurance recommendation systems at national and international level. They also showed Multi criteria decision making methods which are compared with collaborative filtering and data mining techniques. Their suitability to the field of life insurance recommendation is analysed by them. In this paper, they also identified the lack of public dataset of customers and life insurance policies and highlights the need for a personalized, neutral and unified model for effective information computing for life insurance recommendations.

In paper, "Analysis of SMOTE-Modified for Diverse Imbalanced Datasets Under the IoT Environment," authors proposed that the tremendous amount of data generated through IoT can be imbalanced causing Class Imbalance Problem (CIP). CIP is one of the major issues in machine learning where most of the samples belong to one of the classes, thus producing biased classifiers. The authors in this paper are working on 4 imbalanced datasets belonging to diverse domains. The objective of this study as narrated by authors is to deal with CIP using Oversampling techniques. One of the commonly used Oversampling approaches is Synthetic Minority Oversampling technique (SMOTE). In this paper, the authors have suggested modifications in SMOTE and proposed their own algorithm, SMOTE-modified (SMOTE-M). To provide a fair evaluation, it is compared with

3 oversampling approaches, SMOTE, Adaptive Synthetic oversampling (ADASYN) and SMOTE-Adaboost. To evaluate the performances of sampling approaches, models are constructed using 4 classifiers (K-Nearest Neighbour, Decision Tree, Naive Bayes, and Logistic Regression) on balanced and imbalanced datasets. The study shows that the results of SMOTE-M are comparable to that of ADASYN and SMOTE-Adaboost.

In paper, "Predicting Diabetes Mellitus With Machine Learning Techniques Using Multi-Criteria Decision Making," authors discussed that diabetes has become one of the common health issues in people of all age groups. The disease is responsible for many difficulties in lifestyle and is represented by imbalance in hyperglycaemia. If kept untreated, diabetes can raise the chance of heart attack, diabetic nephropathy and other disorders. Early diagnosis of diabetes helps to maintain a healthy lifestyle. Machine learning is a capability of machine to learn from past pattern and occurrences and converge with experience to optimise and give decision. In the current research work, the authors have employed machine learning techniques and used multi-criteria decision making approach in Pima Indian diabetes dataset. To classify the patients they examined several different supervised and unsupervised predictive models. After detailed analysis it has been observed that the supervised learning algorithms outweigh the unsupervised algorithms due to the output class being a nominal classified domain.

In paper, "Portable Smart Healthcare Approach for Earlier Stage Eye Tests for Diabetic Retinopathy Detection," authors discovered that high-quality, wide field retinal imaging is an effective method of retinal disease screening that is preventable and endangers vision. Retinal smartphone-based cameras promise to increase retinal imagery access, but variable image quality and restricted field of view can restrict their usefulness. In this article, the authors discussed how to build a fundus camera based on your own smartphone that is capable of photographing the central retina and the peripheral retina up to the plana pars. It is a cost effective alternative to the fundus camera.

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.