Guest Editorial Preface

Special Issue on Collaborative Computing Technologies for Future Generation Computer Systems

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Evolving from parallel computing, cluster computing, grid computing, cloud computing, the distributed computing paradigm has been shifting from parallelization, distribution, sharing, to be able to support full-scale collaboration between systems and people. This new computing paradigm can be called collaborative computing, composing of technologies and techniques to facilitate people, software, and hardware working together via computer-assisted means. Artificial Intelligence (AI) has been witnessed as one of the fastest growing technologies in our life to optimize the resources and make our daily life more convenient. However, there are still several challenges for implementing AI algorithms in collaborative computing. Several well-known technologies are contributing to the emergence of this new computing paradigm, including computer supported cooperative work and groupware, software agents and multi-agent systems, web services and semantic web, social networks, and ad-hoc networks, IoT, Artificial Intelligence and cloud computing, which further promotes the applications of collaborative computing. This collaborative computing paradigm and related technologies have seen wide applications in many areas and solve complex tasks at present and it will create more impact on future generation computer systems.

This special issue on "Collaborative Computing Technologies for Future Generation Computer Systems" of the *International Journal of e-Collaboration* (IJeC) contains 18 manuscripts which are an excellent work in collaborative filtering, Stock market prediction system, Artificial Intelligence, Web Services, Internet of Things, Security systems and different collaborative technologies. The accepted manuscripts presented a different perspective of solving real-world problems and provide directions for various approaches, principles, applications and the implementation of Emerging Technologies and Systems for collaboration. Each published manuscript has undergone full double-blind peer review, prior to being selected for this special issue. All submitted articles are thoroughly evaluated for novelty and quality.

The first article, "Stock Market Prediction Based on Big Data Using Deep Reinforcement Long Short-Term Memory Model", explores challenges of stock market and technical indicators. Big data is another technical aspect of the stock market to import large amounts of stocks. Deep Reinforcement Long Short-Term Memory (DRLSTM) model is proposed for achieving better prediction rate for stock market trends based on the technical indicators. Three most popular banking organizations data is obtained in real-time live stocks from the NIFTY-50 market data. The experimental results are performed based on the mean squared error (MSE) for the proposed model which obtained a low

error rate. The proposed model is evaluated, and results are compared with other existing techniques which the RLSTM outperforms by obtaining a high accuracy rate.

Authors of the second article, "Construction of Online Education Platform Based on SOA Architecture and Multimedia Technology", applied to establishment of regional basic teaching platform, to integrate educational resources, unified teaching platform, centralized management of teaching information, education information development is an urgent matter. In view of the characteristics of wide distribution and many applications of multimedia teaching platform in primary and secondary schools, the current mainstream architecture is adopted to realize the efficient application, flexible expansion, and convenient maintenance of the system through centralized management and distributed deployment.

The third article, "OMIEEPB: An Efficient Cluster-Based Technique for Optimized Mobile Sink Node in Wireless Sensor Network", it is tried to design optimized routing protocols to shrink the consumption of nodes energy and expand the nodes lifetime. Among many routing protocols, PEGASIS provides efficient performance. In existing model, the sink needs to visit every chain leader's location to get the data consumes more energy and time. To overcome this issue, OMIEEPB protocol is proposed to identify centroid of nearest possible chains through K-means clustering algorithm.

Fourth paper is titled "Green Landscape Design Based on Niche Genetic Algorithm for E-Business Solutions". The purpose of this article is to present an optimization design scheme using genetic algorithm that can optimize the size of landscape and cost reduction and providing facilities by processing the information. In conclusion it has been analysed that the scientific planning and design of urban architectural landscape is of great significance to improve the urban appearance. It has been further concluded that the proposed approach enhances the quality of urban environment, development of urban economy and open to the outside world.

In the fifth article, "Minimization of Energy Holes With Lively Bonding and the Division of Coverage", the author's present research on effective data collection on Wireless Sensor Nodes (WSN). Consumption of energy varies from one node to another node since the data present in the network goes through one or many sensor nodes. As a result of this, the node containing excess load might lose its battery power supply and will cease to function. The proposed method increases the lifetime as compared to the existing protocols.

In the sixth paper titled as "Fault Based Test Case Prioritization of Regression Testing Using Genetic Algorithm", the authors proposed Prioritization of test case technique system to increase the efficiency and effectiveness of the system. The test case executed in an order which enhances the probability of finding the fault and it finds the severe fault at the early stage. The prioritization of test case is proved to be useful for the regression testing. In this paper, test case prioritization technique based on fault of regression technique is proposed from the requirement specification, to improve the software quality and to increase the fault detection rate.

The seventh article, "A Method for the Reconstruction of Myocardial Fibre Structure in Diffusivity Adaptive Imaging Based on Particle Filter", explores the cause of characteristic change and pathological variation of myocardial fibre structure. To solve the problems of low computational efficiency and slow convergence of traditional particle filter, an adaptive particle filter myocardial fibre reconstruction algorithm based on diffusion anisotropy is proposed. This algorithm dynamically adjusts the number of particles and the disturbance intensity at the prediction stage according to the diffusion anisotropy values at different body elements.

Authors of the eighth article, "Prognostic of Soil Nutrients and Soil Fertility Index Using Machine Learning Classifier Techniques", propose a unique tool for soil testing. It helps to select the suitable crops concerning available pH and soil nutrients level to increase crop production. In this current approach, the soil test prediction is used to differentiate several soil features like soil fertility indices of available pH, organic carbon, electrical conductivity, macro nutrients, and micronutrients. The Classification and prediction of the soil parameters lead to reduce the artificial fertilizer inputs, increasing crop yield, improves soil health and crop growth and increase profitability.

The ninth article, "Classification the Senescence-Accelerated Mouse (SAM) Strains With Its Behaviour Using Deep Learning", explores the idea of feature selection to reduce the size of high dimensional data. In this study, gene selection methods have been implemented, including Analysis of Variance (ANOVA). The results are showed that CNN model achieve more accuracy based on a subset of genes from ANOVA method.

Tenth paper titled, "Missing Data Filling Algorithm for Big Data Based Map-Reduce Technology", propose the idea of predicting the large number of missing values to compute the correct decision in big data. To solve the missing values in the real database, this approach prepopulated the missing data, and filled in the classification attributes based on the probabilistic reasoning. The reasoning process is completed in Bayesian network to realize the parallelization of big data processing.

Authors of the eleventh article, "Automated Math Symbol Classification Using SVM", introduced the novel approach for Handwritten character/symbol recognition in digital world. The main motivation for this work is both recognizing of the handwritten mathematical symbol, digits and characters which will be used for mathematical expression recognition. The system first identifies the contour in handwritten document segmentation and features extracted are given into SVM classifier for classification.

The twelfth article, "Application Analysis of RFID in Library Automation Management", explores the idea of the location information of books to the user's using RFID. In this paper, based on the overall architecture of RFID library intelligent bookshelf system, through the indoor positioning algorithm, from the actual needs of the intelligent bookshelf system for book positioning, the RFID indoor positioning algorithm is selected.

The thirteenth article, "A Hybrid PSO-ACO Algorithm to Facilitate Software Project Scheduling", explores the challenges for the developers on how to make a trade-off between cost and quality as well as between quality and time. A hybrid PSO-ACO algorithm is proposed for scheduling purposes and the results are recorded. It is observed that the readings are passible and are bench marked through relevant measures of quality.

The fifteenth article, "Research on Interactive Question Answering System of Artificial Intelligence Customer Service Based on Word2Vec", aimed to reduce the labour cost pressure of telecom operators' and improve the service quality. This paper proposes to obtain word vectors based on Word2vec model. By comparing the word vectors under different training model parameters, the results show that the low-frequency word threshold plays a better role in controlling the number of the final trained word vectors.

In the sixteenth article, "Feature Selection Using Elephant Herd Principal Component Optimization Technique in Big Data Streams using Internet of Things", the authors conducted innovative research on Collaborative writing tools and Natural language processing in learning networks. The collaborative writing tools and natural language processing applications are used for verb tense prediction, and it encodes the temporal order of activities in a sentence.

In the seventeenth article, "An Implementation of Outdoor Vehicle Localization and Tracking Using Automatic License Plate Recognition (ALPR)", the authors conducted the research on controlling the traffic in the metropolitan cities and the identification of the owner of a particular vehicle. In this paper the outdoor localization for crime investigation ALPR with Pressure-based localization is proposed to find out the vehicles. Camera in place will capture the image of the Number plate automatically using the Raspberry-Pi. The Pressure-based localization is implemented along with the Automatic license Plate Recognition to improve the accuracy and tracing the vehicles.

In the last article, "Collaborative Computing-Based K-Nearest Neighbour Algorithm and Mutual Information to Classify Gene Expressions for Type 2 Diabetes", the authors conducted research on dynamic gene expression data for two classes, namely, control and exposed to insulin. The data reduction results are divided into training and testing, and further supplemented to the KNN classifier for diabetes classification. The results clearly exhibit the importance of finding the most informative

genes in the database by using the statistical gene selection technique to achieve a reduction in time and cost and increase the efficiency of the classifier.

We would like to extend our thanks to all the authors who have contributed their research results that will definitely a great help or a resource for other researchers working in this area. Special thanks to Dr. Jingyuan Zhao, the Chief Editor of the journal for providing all necessary support required from manuscript submission to its final acceptance. At last, but not the least, thanks to Ms. Alexis Miller, assistant development editor, IGI Global, as the work would not have reached to its present form without her invaluable help.

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