B Smart Technologies in Engineering Applications of Cyber Physical System in Healthcare: Sensing, Imaging, Computing and Networking

The integrity of the Cyber Physical System’s applications to the computer communication networks makes the human being more social and dependable on the remote services such as healthcare, E-healthcare, etc. This can be the cause of the awareness by using the services of social networks and media, but the major factor is due to the high-performance computing and innovation in the biomedical sciences.

However, a big amount of real-time data is constantly updated, therefore other innovative technologies such as big data, cloud computing, and artificial intelligence also play a key role to handle this huge data. The most challenging task is to keep the patient health data confidential when we consider healthcare or biomedical data of patient. Therefore, certain security and privacy schemes are needed to be invoked. In this thematic special issue, we concentrate on all these aspects and other future research directions related to this specific area in biomedical sciences. Thematic Special Issue entitled “Applications of Cyber Physical System in Healthcare: Sensing, Imaging, Computing and Networking” of the “Recent Advances in Computer Science and Communications” incorporates ten (10) articles identified with the theme of special issue. A short review summary corresponding to the commitments for this Thematic Special Issue is as underneath:

- **Modwel et al.** contribute an article entitled “A robust real time object detection and recognition algorithm for multiple”. In this article authors have proposed hybrid method combines three important algorithms i.e. Recursive Density Estimation (RDE) algorithm, (YOLO) algorithm and Speed-up Robust Feature (SURF) algorithm to reduce scanning task for every frame. The hybrid algorithm is able to detect with a minimum accuracy of 97% for all the conducted experiments and time lag experienced is also negligible, which makes it considerably efficient for real time application [1].

- **Jain et al.** contribute an article entitled “Automation of data flow class testing using hybrid evolutionary algorithms”. Authors of the article proposed a heterogeneous approach using evolutionary meta-heuristics genetic algorithm and its variants for automatic data flow testing of classes. Proposed algorithm applies data flow testing. The proposed algorithm is used to experiment with test case generation of few test classes and result analysis is presented to study the effectiveness of proposed [2].

- **Yadav et al.** contribute an article entitled “Test case prioritization based on early fault detection technique”. In this paper, authors have presented fault based prioritization using fuzzy logic approach for object oriented software using fuzzy expert system. The proposed work focuses on the concept of fault detection rate, execution time and requirement coverage to select the test cases for prioritization purpose. The proposed novel approach for prioritization of test cases using fuzzy logic technique during regression testing has shown the promising results as compared to other existed approaches [3].

- **Jain et al.** contribute an article entitled “A fast parallel classification model for the diagnosis of cancer”. In this paper, authors have proposed an approach which comprises of two stages – the first stage presents a hybrid approach to reduce the dimensionality of cancer datasets, and the second stage presents an efficient classification method to optimize the SVM parameters and improve its accuracy. The proposed method with the combination of dimensionality reduction and parallel classification using optimized SVM classifier is found to give excellent results based on ‘Classification Accuracy’, ‘Selected Features’ and ‘Execution Time’ [4].

- **Rajeshwari et al.** contribute a review article entitled “A review of feature extraction from ECG signals and classification/detection for ventricular Arrhythmias”. The authors has presented a detailed literature review for feature extraction from ECG signals and classification/detection for ventricular arrhythmias which explored a next level horizon for future healthcare methodologies. This review paper offers the methods to deal with various technique and methods based on ECG signal derivative by research in order to detect and predict SCD [5].

- **Kumar et al.** contribute an article entitled “Energy efficient clustering and routing algorithm for WSN”. In this paper, authors have proposed an algorithm which takes into consideration of energy conservation at the nodes through its inherent architecture and load balancing technique. The sole purpose of this clustering-based algorithm is that it minimizes energy dissipation in wireless sensor networks. Rigorous simulations show that EECRA is better than PBCA and other algorithms in terms of energy consumption per round and network lifetime [6].

- **Holla et al.** contribute an article entitled “A sentiment score and a rating based numeric analysis recommendations system using web and data mining approach: A review”. In this paper, authors have exploited the work done under rating based numerical analysis methods which considers the transactions done by the end user. The main objective of this review is to understand and analyze different methods used to improve the efficiency of the current recommendation systems, thereby enhancing the credibility of product recommendations [7].
Patel et al. contribute an article entitled “A novel approach to discover ontology alignment”. In this paper, authors have proposed a novel approach to discover ontology alignment by exploiting the comprehensive knowledge structure, where every entity is represented and stored as a knowledge unit. The proposed approach always detects correct alignments and achieves optimal or near to optimal performance (in term of precision) in case of equivalence relationship [8].

Singh et al. contribute an article entitled “CBIR-CNN: Content-Based Image Retrieval on celebrity data using deep convolution Neural Network”. In this paper, an advanced deep learning model is applied to the CBIR on facial image data for Content-Based Image Retrieval (CBIR). In CBIR, there are two important things 1) classification and 2) retrieval of image based on similarity. The proposed model is completely unsupervised, and it is fast and accurate in comparison to other deep learning models applied for CBIR over the facial dataset. It outperforms other CNN-based models and other unsupervised techniques used for CBIR. Also, it has been compared with pre-trained models in terms of accuracy, storage space and inference time [9].

Sucharitha et al. contribute an article entitled “Predicting election results from twitter using machine learning algorithms”. In this paper, authors have utilized machine learning-based sentimental analysis to discover user emotions in tweets, anticipate sentiment score, and then convert this sentiment score to parties' seat score. The proposed model can precisely forecast the election results with accuracy (94.2 %) over the given baselines. The experimental outcomes are very closer to actual election results and contrasted with conventional strategies utilized by various survey agencies for exit polls and approval of results demonstrated that social media data can foresee with better exactness [10].

We hope that the quality research work published in this special issue will be able to serve the concerned humanity, science and technology.

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