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GUEST EDITORIAL

Emerging trends, issues, and challenges in Internet of Medical Things and wireless networks

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The Internet of Medical Things (IoMT) is global infrastructure consisting of the collection of medical devices and applications that are interconnected through information and communication technologies [1–3]. IoMT is also known as healthcare IoT. The IoMT uses accelerometer sensor, visual sensor, temperature sensor, carbon dioxide sensor, ECG/EEG/EMG sensor, pressure sensor, gyroscope sensor, blood oxygen saturation sensor, humidity sensor, respiration sensor, and blood-pressure sensor to observe and monitor the patient's health in a continuous manner. The IoMT sense the patients' health status and then transfer the clinical data to doctors and care holders with the help of remote cloud data centers [4, 5]. This data is most often used for disease diagnosis and clinical care. The useful information mined from the clinical database is used for preventing and protecting the patient health during situations of emergency. However, the main challenge in IoMT is how to manage with critical applications, where a number of connected devices generate a large amount of medical data [6, 7]. This large volume of data often called big data that cannot be processed by traditional data processing algorithms and applications. By intelligently investigating and collecting large amounts of medical data (big data), IoMT can enhance the decision making and early disease diagnosis. Hence, there is a need for scalable machine learning and intelligent algorithms that lead to more interoperable solutions and that can make effective decisions in emerging IoMT.

Padmavathy et al. investigated the feasibility of using circular and rectangular slotted microstrip patch antenna as a strain sensor for structural health monitoring without these aforementioned problems. The qualitative results obtained show that developed design of microstrip patch antenna can successfully detect and characterize the structural and rail line cracks [8].

Weiping Zhang et al. have monitored the medical data in the Internet of things and studied focusing on data fusion and related routing technology. According to the particularity of the data in the medical Internet of things, a data fusion cluster—tree construction algorithm based on event-driven (DFCTA) is proposed. The fusion delay problem in the network is analyzed, and the minimum fusion delay method is proposed by calculation of the fusion waiting time of the nodes [9].

Guizhen He et al. have solved skeleton extraction problems in the tree point cloud model; branch geometric features and local properties of point cloud are utilized to optimize tree skeleton extraction. The experiment results show that, this method displays strong anti-interference and high precision characteristics at branch bifurcation and crossed ending parts of fine tree branches [10].

Murali Dhar M S et al. have proposed a new policy oriented secured service model for providing the security to the services in cloud. The proposed model is the combination of a trust aware policy scheduling algorithm and an effective and intelligent re-encryption scheme. This model assured the scalability, reliability, and the security for the stored e-commerce data and access services [11].

Ching-Hsue Cheng et al. have modeled a hybrid knowledge-based classification system to organize expert experiences, integrated linear and nonlinear attribute-selection methods, data discretization of smart expert method, rough

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set theory, the LEM2 algorithm, and rule-filtering technique to classify the CVD for the early warning purpose [12].

Maozhu Jin et al. have studied the optimization and implementation of human-machine dialog system based on cloud computing technology. The combination of coarse perceived hash and detail-aware hash is elaborated in an effective way to recognize the human voice [13].

I. Chandra et al. have proposed a handover management scheme for QoS enhancement in roaming users between WiMAX – WLAN by subscribers of networks belong to the 3GPP standards. The proposed algorithms Genetic Queuing, Proportionally Fair Queuing, and WiMAX Aware Load Balancing are analyzed in the scheduling process during handover [14].

V. Sivakumar et al. have addressed broadcast scheduling problem in UWASN for utilizing the limited available bandwidth by parallelizing the nodes transmission. The main objective of this paper is to maximize the utilization of the available underwater acoustic bandwidth and to achieve high throughput as well as to reduce the nodes turn around wait time by using an evolutionary genetic algorithm (GA) [15].

Tamil Nidhi. M et al. have studied on the vasculature extracted from illumination correction on the fundus image brings the presence of diabetic retinopathy, DR. The images where initially preprocessed using the illumination correction method. Thus, the obtained image of vasculature contained sharp edges. Then, the LBP is extracted on the further processed image. Based on the LBP feature value, the RBF is trained and given to the ESNN to classify. The proposed method was been implemented on the DIARETDB1 database [16].

Yuefeng Zheng et al. have proposed a hybrid filter–wrapper feature subset selection algorithm called the maximum Spearman minimum covariance cuckoo search (MSMCCS). The MSMCCS combines the efficiency of filters with the greater accuracy of wrappers. Furthermore, the proposed algorithm achieved preferable performance on the Wilcoxon signed-rank test and the sensitivity–specificity test [17].

Chunzhe Zhao et al. have designed the decentralized low-order active disturbance rejection control (ADRC) scheme for uncertain multi-input multi-output (MIMO) systems. His design method is capable of guaranteeing the integrity for the open-loop stable plant with diagonally dominant NZC matrix and also obtains better performances for the systems with/without time delay [18].

Fan Linwei et al. have proposed a novel method to detect the photographer moving trajectory in image set. Firstly, in Lab color space, combining directional information and perceived color information, the similar images are found by the color difference histogram and to match feature points area and its context, and judge the area whether they are corresponding. Then, it obtains the essential matrix for a pair of image, through SVD method to determine the photographer trajectories [19].

Chunling Wu has proposed a novel type of saliency region detection method based on the recurrent learning of context. Moreover, by the way of incorporating semantic information of image contents, an object oriented pooling strategy is proposed to further improve the performance [20].

Fan Aiwan et al. have proposed a method to expand the data samples, which greatly improves the number of high-quality training samples and meets the needs of model training. Then, the convolutional neural networks are trained by using the enlarged data samples to recognize the SPAM in real time [21].

Ting Gao et al. have studied investigated the use of ensemble machine learning models in the prediction of pathological response to NAC for breast cancer patients with actual clinical data. Based on actual clinical data, important clinicopathological variables are selected, and the imbalanced problem are well solved by the ensemble EKNN model. The model improved the robustness and generalization for predicting the pathological response with imbalanced clinical data [22].

Hang Qin et al. have introduced a new alternating-offer spectrum bargaining framework with asymmetrically bilaterial wireless resource, in terms of sequential bargaining equilibria for frequency bands for high efficiency or approximate efficiency [23].

Dong Wang et al. have analyzed the similarities between manufacturing and the service industry. Student Information Desk (SID) in the University of Exeter is used as the case study in this research to explore the application of manufacturing technology in service system. The manufacturing technology Just-In-Time (JIT) is applied in this research to improve the efficiency of SID [24].

Haibo Yi et al. have presented a physical analysis model of Rainbow by combining fault analysis and differential power analysis. The proposed model is implemented on cloud computing platform. The secret keys of Rainbow signature recovered successfully [25].

B. Kanisha et al. have developed a new speech recognition method based on improved feature extraction and improved support vector machine (ISVM). The new ISVM method helps to recognize both familiar and unfamiliar words spoken by native and nonnative speakers with a high rate of accuracy [26].

T.V. Padmavathy et al. have proposed a region specific multi attribute white mass estimation technique to overcome the problem of accuracy in mammographic image classification. The method uses the white mass value, density measure, and binding to identify the micro calcification [27].

Yumei Wu et al. have developed a graph-theoretic model for SOA system and propose metrics that quantify the resilience of such system under resource failures. This method performs better than the previous methods in improving resilience of SOA system [28].

Dingju Zhu has offered a ubiquitous parking guidance robot system used for assisting drivers in selection of parking lots near their destination locations and recommending the parking lot with optimum conditions based on the forecast results by deep learning the big data of parking lots obtained through IOT [29].

Mohamed Abdel-Basset et al. have proposed a new variant of whale optimization algorithm named Improved Lévy-based Whale Optimization Algorithm (ILWOA).The proposed ILWOA adapts it to search the combinatorial search space of BPP problems [30].

Ying Sheng et al. have proposed the numerical method for solving the Burgers' equation. This method gave a numerical solution to the two-dimensional Burgers' equation and the optimal error estimate in H1 norm based on the variational formulation of the corresponding finite volume method is obtained [31].

R. Priya et al. have proposed a method, namely, Paillier Homomorphic Cryptosystem with Poker Shuffling Transformation based watermarking method for ensuring security for the digital medical images [32].

Zaoli Yang et al. have proposed a method, which can guide decision-makers to make better decisions in dynamic random information environment. This paper studies a dynamic normal distribution stochastic decision-making method that is based on the time degree and vertical projection distance [33].

Periyanayagi et al. have proposed a defense technique using Swarm Based Trusted Node for Tampering and Cheating Attack (SBTN-TC) model to identify the physical layer attacks in a WSN. In order to maintain a secure communication of contextual information between node and trusted node, a Cryptographic Puzzle Hiding Scheme (CPHS) is used for submitting the session receipts to trusted node [34].

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