# Editor's Note

In today's world, we have witnessed an onset of multimedia content being uploaded/downloaded and shared through a multitude of platforms both online and offline. In support of this trend, multimedia processing and analyzing has become very popular in all kinds of information extraction and attracts research interest from both academia and industry. This is to be expected as the multimedia digital world is worth trillions of dollars worldwide. However, multimedia information is hard to encode, interpret and recognize because it is combined with many complex components. Recently, there are many research areas related to the overall notion of intelligent multimedia processing. Therefore, the collected papers in this special issue provide a systematic overview and state-of-the-art research in the field of intelligent multimedia processing and analyzing system and outline new developments in fundamental, theorems, approaches, methodologies, software systems, recommendations, and real-world applications in this area. The collected research works in this special issue are described as follows.

In the first paper, titled "A Novel Fog Computing Approach for Minimization of Latency in Healthcare using Machine Learning", the authors presented a novel Intelligent Multimedia Data Segregation (IMDS) scheme using Machine learning (k-fold random forest) in the fog computing environment. The designed model segregates the multimedia data and calculates total latency in terms of transmission, computation, and network. With the simulated results, the developed model achieved 92% classification accuracy, and an approximately 95% reduction in latency compared with the pre-existing model and improved the quality of services in e-healthcare.

In the second paper, titled "An enhanced texture-based feature extraction approach for classification of biomedical images of CT-Scan of Lungs", the authors considered a feature vector by concatenation of features extracted from the local mesh peak valley edge pattern (LMePVEP) technique. A dynamic threshold-based local mesh ternary pattern technique and texture of the image in five different directions are then considered in the developed model. The concatenated feature vector is then used to classify images of two datasets. The proposed framework has improved the accuracy by 12.56%, 9.71% and 7.01% on average for dataset 1 and 9.37%, 8.99% and 7.63% on average for dataset 2 over three popular algorithms.

In the next paper "Alzheimer Disease Detection Techniques and Methods: A Review", the authors presented a systematic review of Alzheimer's disease based on Neuroimaging and cognitive impairment classification, which is mainly focused on computer-aided diagnosis. This study revealed that the classification criterion based on the features shows promising results to diagnose the disease and helps in clinical progression. The most widely used machine learning classifiers for AD diagnosis including Support Vector Machine, Bayesian Classifiers, Linear Discriminant Analysis, and K-Nearest Neighbor along with Deep learning are then studied and investigated. The possible challenges along with future directions are also discussed in the paper.

The work "Imputation of Rainfall Data Using the Sine Cosine Function Fitting Neural Network" proposes a novel pre-processing mechanism for non-precipitation data by using principal component analysis (PCA). The PCA in the developed model is used to extract the most relevant features from the meteorological data. The output of the PCA is combined with the rainfall data from the nearest neighbour gauging stations and then used as the input to the neural network for missing data imputation. In addition, a sine cosine algorithm is presented to optimize the neural network for infilling the missing rainfall data. The proposed SC-FITNET model outperformed LSTM, SC-FFNN and FFNN imputation in terms of mean absolute error (MAE), root mean square error (RMSE) and correlation coefficient (R), with an average accuracy of 90.9%.

In the paper titled "Design and Development of an Energy Efficient Multimedia Cloud Data Center with Minimal SLA violation", the authors highlight a novel virtual machine (VM) selection policy based on identifying the Maximum value among the differences of the Sum of Squares Utilization Rate (MdSSUR) parameter to reduce the energy consumption (EC) of multimedia cloud data centers with minimal service level agreement violation (SLAV). The proposed MdSSURVM selection policy has been evaluated using real workload traces in CloudSim. The simulation results demonstrate that the designed MdSSUR VM selection policy achieves the rate of improvements of the EC, the number of VM migrations, and the SLAV by 28.37%, 89.47%, and 79.14%, respectively.

In the paper titled "A Generalized Wine Quality Prediction Framework by Evolutionary Algorithms", the authors propose the generalized wine quality prediction framework to provide a mechanism for finding a useful hybrid model for wine quality prediction. Based on the developed framework, the generalized wine quality prediction algorithm using the genetic algorithms is proposed. It first encodes the classifiers as well as their hyperparameters into a chromosome. The fitness of a chromosome is then evaluated by the average accuracy of the employed classifiers. The genetic operations are performed to generate new offspring. The evolution process is continuing until reaching the stop criteria. As a result, experiments on the wine datasets were made to show the merits and effectiveness of the proposed approach.

The authors of the paper titled "Optimal QoE Scheduling in MPEG-DASH Video Streaming" designed a series of click density experiments to verify whether different resolutions have different quality of experience (QoE) effects in different video scenes. To evaluate true user's experience, the authors convert viewing QoE into a satisfaction quality score, called Q-score, for different resolutions of each video segment. Additionally, the authors developed an optimal segment assignment (OSA) algorithm for the Q-score optimization in a constraint network bandwidth. The experimental results showed that the playback schedule by applying the OSA algorithm significantly improved users' viewing satisfaction.

In the next paper, "Pulmonary nodule classification in lung cancer from 3D thoracic CT scans using fastai and MONAI", the authors construct a convolutional neural network to classify pulmonary nodules as malignant or benign in the context of lung cancer. To construct and train the model, the fastai deep learning framework is extended and investigated to 3D medical imaging tasks, combined with the MONAI deep learning library. The authors train and evaluate the model using a large, openly available data set of annotated thoracic CT scans. The designed model then achieves a nodule classification accuracy of 92.4% and a ROC AUC of 97% when compared to a "ground truth" based on multiple human raters' subjective assessment of malignancy. Also, the developed model achieves a test set accuracy of 75% for predicting patient-level diagnoses of cancer.

In the paper titled "Modeling of Performance Creative Evaluation Driven by Multimodal Affective Data", the authors proposed a Performance Creative-Multimodal Affective (PC-MulAff) model based on the multimodal effective features for performance creative

DOI: 10.9781/ijimai.2021.08.014

evaluation. The multimedia data acquisition equipment is used to collect the physiological data of the audience, including the multimodal affective data such as the facial expression, heart rate and eye movement. The designed model thus calculates effective features of multimodal data combined with director annotation and defines Performance Creative-Affective Acceptance (PC-Acc) based on multimodal affective features to evaluate the quality of performance creative. Results showed that the accuracy of the mPC-MulAff model is 7.44% and 13.95% higher than that of the single textual and single video evaluation.

In the next work, "Modified YOLOv4-DenseNet Algorithm for Detection of Ventricular Septal Defects in Ultrasound Images", the authors first solve the object detection problem of the ventricular septal defect (VSD) by using a modified YOLOv4–DenseNet framework regarding the echocardiographic images that are used for diagnosing congenital heart diseases (CHDs). The results revealed that the YOLOv4–DenseNet outperformed YOLOv4, YOLOv3, YOLOv3–SPP, and YOLOv3–DenseNet in terms of metric mAP-50. The F1-score of YOLOv4-DenseNet and YOLOv3-DenseNet were better than those of others. Thus, the modified model establishes the feasibility of using deep learning for echocardiographic image detection of VSD investigation.

In the last paper, titled "Integration of Genetic Programming and TABU Search Mechanism for Automatic Detection of Magnetic Resonance Imaging in Cervical Spondylosis", the authors adopted a heuristic programming, genetic programming (GP), to build the core of the refereeing engine by combining the TABU search (TS) with the evolutionary GP. To validate the accuracy of the proposed model, the authors implemented experiments and compared the prediction results with the radiologist's diagnosis to the same magnetic resonance image (MRI). The experiment found that using clinical indicators to optimize the TABU list in GP+TABU got better fitness than the other two methods and the accuracy rate of the proposed model can achieve 88% on average. Thus, the proposed model can help radiologists reduce the interpretation effort and improve the relationship between doctors and patients.

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