

## Editorial

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# Special Issue on “Data Intelligence”

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In the computing and informatics environment, the evolution of data intelligence can play a significant role in developing a sustainable future. Since data act as an atomic source in this whole process of digital transformation, it is necessary to make judicial use of them as, otherwise, their misuse can result in some of the worst consequences. This special issue aims at bringing together the latest advances and developments related to the role of intelligent decision technologies in fostering of data with smart sensors and software systems. Researchers and scholars from both industry and academia have been encouraged to present their research findings and achievements in this domain. Thirteen papers have been selected for inclusion in this special issue, which are presented in the following.

The first paper, **by Usharani Bhimavarapu and M. Sreedevi, is on “An Enhanced Loss Function in Deep Learning Model to Predict PM2.5 in India.”** The PM 2.5 Problem is important in India and LSTM-based methods are used to analyze it. The ELF in the LSTM model returns more accurate results than the standard forecast models and other state-of-the-art deep learning techniques.

The second paper, **by S. Phani Praveen, T. Bala Murali Krishna, Shakeel Ahmed, and Parvathaneni Naga Srinivasu, is on “Software-driven Secure Framework for Mobile Healthcare Applications in IoMT.”** An IoMT-based mobile healthcare application is developed. The proposed framework collects the patients’ data using wearable devices-sensors. The collected data are shared with various entities using a secure mechanism. The proposed framework uses Elliptic Curve Cryptography (ECC). Digital sign is created and validated through the Elliptic Curve Digital Signature Algorithm (ECDSA). Security properties of the proposed framework are analyzed through the standard model checking tool “Automated Validation of Internet Security Protocols (AVISPA)”.

The third paper, **by Tina, Sanjay Kumar Dubey, and Ashutosh Kumar Bhatt, is on “Ensembled EfficientNetB3 Architecture for Multi-class Classification of Tumours in MRI Images.”** A novel neural network framework is used to exploit the optimization of an ensembled architecture of EfficientNetB3 with U-Net for MRI images which applies a semantic segmentation model for pre-trained backbone networks. The proposed neural model operates on a substantial network which adapts the robustness by capturing the extraction of features in the U-Net encoder. The decoder enables pixel-level localization at the definite precision level by an average ensemble of segmentation models. The ensembled pre-trained models provides better training and prediction of abnormal structures in MRI images and thresholds for multi-classification of medical image visualization.

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The fourth paper, by **Agam Madan, Jolly Parikh, Rachna Jain, Aryan Gupta, Ankit Chaudhary, Dhruv Chadha, and Shubham**, is on "*Enhanced Deep Learning Network for Emotion Recognition from GIF*." Emotions are recognized from GIF using Deep Learning Network and a method is described for detecting seven different emotion classes (Happy, Anger, Sad, Surprise, Disgust, Fear, and Neutral) in GIFs by combining an activity recognition network with face emotional expression.

The fifth paper, by **Anuradha Yenikara and C. Narendra Babua**, is on "*AirBERT: A Fine-tuned Language Representation Model for Airlines Tweet Sentiment Analysis*." A custom dataset is scraped from Twitter by including online reviews of five Indian airlines. Multiclass sentiment analysis is implemented using three classifiers, namely support vector machine,  $K$ -nearest neighbor and random forest with word2vec and TF-IDF word embeddings. AirBERT is proposed as a fine-tuned deep learning attention model based on bidirectional encoder representation from transformers.

The sixth paper, by **Deena P. Francis, Kumudha Raimond, and G. Jasper W. Kathrine**, is on "*Dimensionality Reduction of Large Datasets with Explicit Feature Maps*." The authors propose two new scalable dimensionality reduction algorithms called ECM-SKPCA and Euler-SKPCA. The efficacy of the proposed algorithms is demonstrated via the task of classification of many publicly available datasets. The results indicate that the proposed algorithms produce more effective features than the previous algorithms for the classification task. Furthermore, ECM-SKPCA is also demonstrated to be much faster than all other algorithms.

The seventh paper, by **Vaneet Garg, and Balkrishan Jindal**, is on "*Resource Optimization Using Predictive Virtual Machine Consolidation Approach in IaaS Cloud Environment*." Predictive Virtual Machine Consolidation (PVMC) architecture is proposed for resource optimization while maintaining high performance. After initial VM allocation, the proposed algorithm works in three phases: first predicted workload is estimated for each VM and upper threshold is assigned to prevent server overloading. In the second phase, Intercorrelation VM selection (IVMS) algorithm is proposed for selecting VM with minimum requirement in high fluctuation. In the third phase, a performance-aware VM mapping algorithm (ViMA) is proposed. Due to the distinct nature of workload on each VM, an exponential smoothing moving average method with varying window size is used to predict the workload for potential VM migration.

The eighth paper, by **Bidyut Bikash Borah, Satyabrata Malla Bujar Baruah, Uddipan Hazarika, Soumik Roy, and Ayangla Jamir**, is on "*A BCI Framework for Smart Home Automation Using EEG Signal*." A smart home automation model has been designed and implemented using a TGAM EEG sensor module integrated with a Bluetooth module serving as the core for control applications.

The ninth paper, by **Astha Gupta, Rakesh Kumar, and Yogesh Kumar**, is on "*An Automatic Speech Recognition System in Indian and Foreign Languages: A State-of-the-Art Review Analysis*." The paper presents a systematic review of Indian and foreign languages with automatic speech recognition system.

The tenth paper, by **Gaurav Sandhu, and Amandeep Singh**, is on "*Modified Euclidean-Canberra Blend Distance Metric for  $k$ -NN Classifier*." The performance of  $k$ -NN based on Canberra distance metric is measured on different datasets, further the proposed Canberra distance metric, namely, Modified Euclidean-Canberra Blend Distance (MECBD) metric has been applied to the  $k$ -NN algorithm which led to improvement of class prediction efficiency on the same datasets.

The eleventh paper, by **Deepika Bansal, Kavita Khanna, Rita Chhikara, Rakesh Kumar Dua, and Rajeev Malhotra**, is on "*BoF-SVM-based Data Intelligence Model for Detecting Dementia*." The paper addresses the prediction of the presence of dementia using magnetic resonance imaging data, which is significant for the diagnosis of normal control and dementia patients. Prediction of the presence of dementia using magnetic resonance imaging data is significant for the diagnosis of normal control and patients with dementia.

The twelfth paper, by **Samar Bouazizi, Emna benmohamed, and Hela Ltifi**, is on "*Decision-making based on an Improved Visual Analytics Approach for Emotion Prediction*." EEG (electroencephalogram)

data are used to demonstrate the efficiency for predicting emotional reactions to films. Utility and usability tests were performed to evaluate the developed prototype.

Finally, the thirteenth paper, by **M. Vinodhini and Sujatha Rajkumar**, is on "***Performance Analysis of Vehicle-to-Everything Communication Using Internet of LoRa Computing for Intelligent Transportation System.***" A system is proposed towards the design of Internet of LoRa-enabled vehicular communication with high reliability. The proposed system is based on an Enhanced Artificial Bee Colony (EABC) algorithm for the localization scheme.

We thank the authors for their high-quality contributions and the reviewers, IDT Journal editors, and IOSPress staff for supporting this special issue. We hope the journal readers enjoy and get inspired by the research results published in the special issue and new research is speered in the areas of Data Intelligence.