Guest Editorial Preface

Deep Learning Assisted Intelligent Human Computer Interaction for Next Generation Internet Applications

Human-computer interaction (HCI) is a field that focuses on how people use technology, focusing on creating user-friendly, interactive systems tailored to their needs. One of the main challenges in HCI is creating intuitive and natural user interfaces, especially for non-technical users. As technology becomes more widespread, there is a growing need to create interfaces that are usable by individuals with various skills and disabilities. Designing interfaces that enable multitasking and multiple interaction modalities is another challenge. HCI also needs to address security and privacy concerns. Deep learning can be used to enhance interface usability by creating intelligent interfaces that can understand and respond to users in a natural and intuitive way. One of the main advantages of intelligent HCI with deep learning assistance is the development of new interaction modalities, such as voice, touch, and gesture, which can be recognized and responded to by the interface. This makes the interface more versatile and easier to use. Another area of research in deep learning-assisted intelligent HCI is the development of new security and privacy methods. By encrypting and safeguarding user data, deep learning can be used to develop interfaces that can recognize and respond to potential security concerns, such as hacking attempts. After a careful review process, a total of five papers were accepted for publication, and their major contributions are highlighted below.

In the first article is entitled "Vulnerability Detection in Cyber-Physical system using machine learning," the author proposed the cyber-physical system is a specific type of IOT communication environment that deals with communication through innovative healthcare devices. The intelligent Health care industry utilizes wireless medical sensors to gather patient health information and send it to a distant server for diagnosis or treatment. A method for intelligent threat recognition based on machine learning that enables run-time risk assessment for better situational awareness in CPS security monitoring. When used in industrial reference applications, the model creates a safe environment where the patient is only made aware of risks when categorization optimism exceeds a specific limit, minimizing security managers' pressure and efficiently assisting their choices.

In the second article is entitled "Cardiacnet: Cardiac Arrhythmia Detection and Classification Using Unsupervised Learning-Based Optimal Feature Selection with Custom CNN Model," the author describes the irregularity in the heartbeats caused cardiac arrhythmia, which resulted in serious health problems. This cardiac arrhythmia is monitored by electrocardiogram (ECG) signals. An accurate and timely analysis of ECG data can prevent serious health problems. CardiacNet, which is an AI tool for identifying and classifying cardiac arrhythmia from MIT-BIH based dataset. Unsupervised machine learning algorithm-based principal component analysis (UML-PCA) is used to extract the features of the pre-processed dataset.

In the third article is entitled "Parkinson Net: Convolutional Neural Network model for Parkinson Disease Detection from image and voice data," this article demonstrates the Parkinson's disease is a critical dopaminergic neuron problem that causes brain disorders. The early prediction of PD can save human lives. CAD with artificial intelligence models can predict PD in a quick time as compared to manual prediction. ParkinsonNet focused on the implementation of a deep learning mechanism for PD identification from both voice and image datasets. The simulation results show that the proposed ParkinsonNet achieved 99.67% accuracy on image data and 98.21% accuracy on voice data.

In the fourth article is entitled "DRG-Net: Diabetic Retinopathy Grading Network using Graph Learning with Extreme Gradient Boosting classifier," the author proposed the Diabetic retinopathy is a leading cause of blindness that occurs in different age groups. The early detection of DR can save millions of people from blindness issues. The manual analysis of DR requires more processing time and experienced doctors. CAD based artificial intelligence models have been developed for an early DR prediction. We have implemented the DR grading network using graph learning properties, the synthesis minority over-sampling technique (SMOTE) is applied to the EyePACS and Messidor dataset to balance the instances of each DR class into uniform levels.

In the final article is entitled "ELM-Based imbalanced Data Classification-A Review," the author describes the imbalance issues occur in Machine Learning when there is high distortion in the class distributions. A great challenging task in ML is the imbalance of data classification. The most prominently adopted technique to deal with data having an imbalance class distribution is the Extreme Learning Machine (ELM). Unwanted class boundaries as of data with unbalanced classes may be learned by ELM similar to various other classification algorithms. An augmentation in the ELM framework is done for efficient imbalanced classification.

We would like to thank all the authors for their valuable contributions. A special thanks to the reviewers for their timely comments and suggestions on the research articles. We hope this special issue will add significant value to the research community.

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