EDITORIAL

Guest Editorial on the Special Issue on the Role of Fuzzy Systems on Biomedical Science in Healthcare

Davide Moroni[1] | Maria Trocan[2] | Behçet Ugur Töreyin[3]

[1]Institute of Information Science and Technologies, National Research Council of Italy, Pisa, Italy
[2]Institut Supérieur d'Électronique de Paris, Paris, France
[3]Istanbul Technical University (ITU), Istanbul, Turkey

Artificial neural networks (ANN) face challenges in the biomedical and health care sectors due to the elastic nature of biomedical data. This data requires a knowledge-centric approach rather than a purely data-centric one. Fuzzy systems efficiently handle the vagueness in medical big data, emulating human perception. These systems provide precise analysis for various medical situations, neutralizing uncertainties like varying disease patterns. They also support ranking populations based on health attributes, aiding in early prognosis and preventive medicine. This special issue is dedicated to focus on the recent advancements and applications of fuzzy systems within the area of healthcare data analysis. It has provided a platform for researchers to share innovative techniques andmethodologiesmore effectively. Through this issue,we aspire to stimulate discussions, foster collaborations and inspire further innovations in leveraging fuzzy systems for more nuanced, human-like interpretations of complex biomedical datasets. As technology evolves, healthcare and diagnostics keeps changing continously. Taking a look at the array of innovative methods, we observe a clear inclination towards deep learning and computational intelligence in diagnostics. For instance, the application of Computational intelligence for analysing CT images for lung cancer detection and the XlmNet, which uses an Extreme Learning Machine Algorithm for classifying lung cancer from histopathological images, both focus on early-stage detection of lung diseases. Their reliance on intricate computational techniques demonstrates a move towards more precise and early diagnostic procedures. On the other hand, we have algorithms like the Residual neural network-assisted one-class classification, specifically tailored for melanoma recognition in imbalanced datasets. It's evident that there's a conscious effort to tackle class imbalance issues, which have long been a hurdle in medical image analysis. Mental health and wellbeing are not left behind either. The "Smart Analysis of Anxiety People and Their Activities" and the "Classification Analysis of Burnout People's Brain Images" both emphasize the growing role of technology in understanding and diagnosing psychological health issues. Similarly, kidney diseases, retinal issues, skin lesions, and other specific conditions are being targeted with specialized models like the Explainable Deep Learning Model for early-stage Chronic Kidney Disease prediction and the modified CNN for retina disease prediction, incorporating the strengths of SVM classifiers. Finally, the integration of ontology-based speculative sense models and hybrid methods like the SVM-ABC for gene expression data classification illustrates a blend of traditional computational methods with modern deep learning, enhancing accuracy and efficiency. We extend our heartfelt appreciation to the Editor-in-Chief of the journal for granting us the opportunity to organise this special issue. We would also like to express our gratitude to the authors

Received: Added at production | Revised: Added at production | Accepted: Added at production

DOI: 10.1111/coin.12623

and reviewers for their punctual and valuable contributions.We believe that this special issue will provide an additional valuable contribution to the research community.