Editorial

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Biographical notes: Chinmay Chakraborty, SMIEEE, MACM is an Electronics and Communication Engineering Assistant Professor at Birla Institute of Technology, Mesra, India. He completed a post-Doctoral fellowship at the Federal University of Piauí, Brazil. His main research interests include the Internet of Medical Things (IoMT), AI/ML, communication and computing, telemedicine, m-Health/e-health, and medical imaging. He has published 200+ articles in reputable international journals, conferences, book chapters, 25+ books, 4+ patents, and 20+ special issues.

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The opportunities and challenges in broadening the applications of electronic devices in practical healthcare have increased in recent years. The everlasting pursuit of preferable human life propels the ceaseless advances of intelligent communities. In particular, the burgeoning concept of the Internet of Things (IoT) is revolutionising how we live through active interaction with the smart network. The electrical, chemical, and mechanical activities that occur in the human body during any biological event, such as the beating of the heart and contraction of muscles, produce different biomedical signals. Sensors that can sense bio-signals or biopotentials can be categorised as physical, electrical, or chemical depending on their specific applications. Recent progress in the design and fabrication of soft sensors with more advanced capabilities and enhanced reliability suggests an impending translation of these devices from the research lab to clinical environments. One of the major challenges with these kinds of wearable devices is the device handling power.

The historically distinct markets of regulated medical devices and consumer health wearables are blending, driven by the advance of wearable technologies. This special issue collects the state-of-the-art advances in design, construction, functionality, and application of such systems that have not been presented before.

In this special issue, 48 manuscripts are published. The papers directly or indirectly are related to advanced learning and computing for bio-signal acquisition systems with intelligent computing. As follows, we briefly reviewed the main contribution of each manuscript.

Note that the special issue is published in two bindings, cited as IJNT 2023 V20 N1–4 and IJNT 2023 V20 N5–8, respectively.

- Saleh et al. present the deep learning-based feature extraction coupled with a support vector machine for efficient detection of COVID-19. Seven pre-trained models were employed as feature extractors and the extracted features were classified by multi-class SVM classifier to classify COVID-19, common pneumonia, and healthy individuals' CT scan images, to improve the performance of the models.

- Rahebi et al. present an automated segmentation method that is used to increase the speed of diagnosis and reduce the segmentation error of CT scans of the lung using the Fishier mantis optimiser algorithm.

- Suganya et al. aim to discover cumin powder's effect on physical and biological parameters using smart approaches among adults with obesity in urban areas.

- Rao et al. develop and validate a bioanalytical method for a novel antiseizure agent Cenobamate. This paper successfully confirms using Cenobamate-D4 as the internal norm and tert-butyl methyl ether in several positive ionic reactions.

- Umer et al. improve the online learning systems by analysing and mining this information to extract representative features about students' behaviour and academic skills. Various classifiers are investigated to study the prediction of students' academic performance based on the attributes of the Kalboard360 learning management system.

- Singh et al. present a multi-to-binary class size-based imbalance handling technique in wireless sensor networks to solve the class imbalance problem in multi-class classification.

- Sun et al. present a dynamic programming method for content-based retrieval of medical images. The approach represents an image with three different histograms containing both crucial intensity and textural features.

- Vijayaraj et al. discuss the most common disease for a smoker is lung cancer. The deadly type of lung cancer is small-cell lung cancer, and only in the final stage can this form of lung cancer can be detected.

- Mahajan et al. analyse the choice of the proper method for the determination of features significantly for a specific artificial intelligence task through high-dimensional information.

- Suneetha et al. improve generalised fuzzy peer groups with a modified trilateral filter to remove mixed impulse and adaptive white Gaussian noise from colour images.

- Madhavan et al. present optimisation methods for pharmacokinetics via ADMET, bioactivity of Zr substituted samarium-doped ceria nanomaterials.

- Gophi et al. evaluate the impact of dialytic stretching on muscle problems and the personal satisfaction of hemodialysis patients. A semi-exploratory scan pattern was chosen.

- Peddi et al. present a novel and intelligent decision-making system for real-time healthcare tracking using commercial wearable data.

- Huo et al. propose a predictive protein module based on a protein-protein interaction network and double-clustering algorithm, which considers the characteristics of the protein-protein interaction network and nodes as two-dimensional data points.

- Senthilkumar et al. explore statistical machine learning models with a multimedia healthcare approach using artificial intelligence to predict risk factors of heart diseases associated with type 2 diabetes mellitus.

- Yan et al. present a power minimisation approach with a QC-based approach called improved sequential parametric convex approximation trained by a deep learning algorithm called graph convolutional neural network.

- Wang et al. present the gathered data from the preprocessed wearable devices to remove the noise. The relevant features for better recognition are selected using the proposed LBPNet with PSO. Then a sequential minimal optimisation-based SVM classifier recognises the abnormalities of heart disease from normal patients for diagnosis.

- Reddy et al. present the boost converter performance and examine it using non-idealities of semiconductor devices. The impact of such non-idealities on the different parameters is investigated.

- Wang et al. discuss how the wavelet transform is used as a feature extraction method, and the support vector machine is used as the classifier to study the recognition of the four imaginary movements of left and right and tongue and leg.

- Salunkhe et al. design an architecture for integrating the IoT with crop production, and various measurements and techniques for crop monitoring using cloud computing have been employed.

- Narayanan et al. present IoT cameras' visible property enhancement methods using machine learning.

- Agarwal et al. present smart wireless automation with an IoT system that interfaces with users' mobiles for real-time crop field monitoring and control through the internet anytime anywhere in the world.

- Li et al. propose an image feature extraction algorithm based on MMN linear activation function adaptive initialisation of convolutional neural network parameters.

- Huang et al. present the detection rate maximisation and false rate minimisation that are major problems owing to their inability to discover a particular attack.

- Sharma et al. present a hybrid model of an unsupervised classifier investigated. The proposed approach is tested at different noise signal levels and overlaps window sizes. A comparison with the existing artificial neural network and support vector machine is presented to validate the proposed approach.

- Akella et al. present a novel hybrid model for automatic diabetic retinopathy grading and multi-lesion recognition.

- Yu et al. present 16 patients with depression who underwent 5 minutes and 12 seconds of brain functional MRI scan. The Hamilton depression scale was used to evaluate the severity of the condition.

- Bonagiri et al. present how modified histogram estimation architecture is proposed to verify the histogram count in the FPGA platform, and the Basic HE architecture is also implemented for comparative purposes.

- Mishra et al. present an Arduino IDE and ESP32 microcontroller-based IoMT edge device architecture to minimise the computing base in terms of the least number and size of resources for lightweight and secure architecture.

- Siddique et al. analyse the concentration of polycyclic aromatic hydrocarbon standards in black and brown quail meat; they checked the effect of different recipes, and also compared the recipe-wise polycyclic aromatic hydrocarbon concentrations.

- Dhopte et al. present health risk assessment data that clearly show the regions' non-carcinogenic risk associated with arsenic and cadmium.

- Huang et al. review the adoption of hyperbranched polymers in the textile industry.

- Dhiman et al. present the study of improved fuzzy optimisation techniques by analysing the upgraded facility location centre for COVID-19 vaccination using fuzzy clustering algorithms.

- Narayandas et al. present a comparative study between WiFi, Zigbee, and LoRa, based on cup carbon simulation, using varying attributes distance, nodes, packet loss, etc.

- Jain et al. present a method that combines and uses recovery approaches via collaborative sparsity and sparse group representation.

- Balaji et al. present the low area FIR filters designed by proposing the optimal array multiplier, and full adder to minimise the resources used.

- You et al. present a smart health management system based on WEBGIS. The dynamic health data acquisition hardware module is designed.

- Sharma et al. detect voice activity with an improved signal-to-noise ratio in a noisy environment. This paper uses feature extraction to classify voiced and unvoiced signals with a higher signal-to-noise ratio. Furthermore, by combining two classifiers in a hybrid model, the model is less affected by noise for speech features, and identification performance improves.

- Hang et al. present the AI-IoT-based health planning scheme. The paper explains the definition, characteristics, and concept pedigree of landscape architecture AI reconfiguration design, analyses the main digital design methods and application software platform in the concept pedigree, and summarises the flow chart of landscape architecture AI reconfiguration design.

- Siddique et al. present the formation of polycyclic aromatic hydrocarbons (PAHs) in cooked European rabbit meat. PAHs are powerful noxious compounds that are produced in well-done processed meat products.

- Nayak et al. detect and classify brain abnormalities by a novel hybrid Efficinentnet-Deep Autoencoder CNN model from MRI brain images in smart health diagnosis.

- Sharma et al. design and analyse a power-efficient hybrid full adder using static CMOS and transmission gates to improve the energy efficiency and high performance.

- Peng et al. present medical data management using overlay methods based on wireless communication technology and feature fusion. The algorithm considers sensors and remote sensing equipment to collect patient data and transmit them by wireless communication.

- Kang et al. present a health service platform based on a multimedia imagery training method. The application of multimedia imagery training teaching methods in hospital health service technology teaching not only conforms to the characteristics of modern health and mind learning but also increases the stability and accuracy of patients' health.

- Li et al. present a teaching resource database construction method based on a neural network, which combines electronic engineering education with physical education.

- Yao et al. design an evaluation method of public space indoor landscape colour matching based on artificial intelligence.

- Tang et al. present stereoscopic display of architectural design images based on virtual reality technology. The images are drawn using DIBR technology and the depth images are processed using Gaussian filtering.

- Senthilkumar et al. present COVID-19 detection and tracking using smart applications with artificial intelligence. This work describes MLP techniques integrating the ANN model for extracting COVID-19. The model is equipped with a normalisation process deploying Gaussian process regression and radial-based function for detecting the noise level.

All 48 papers tackle different but highly relevant domain vectors of bio-signal acquisition. We believe this special issue will raise awareness in the scientific community, by presenting and highlighting the advances and latest novel and emergent technologies, implementations, and applications concerning the sensing biosignal parameters and patient monitoring. In closing, we thank all the authors who submitted their research work to this special issue. We would also like to acknowledge the contribution of many experts who have participated in the review process and provided helpful suggestions to the authors to improve the contents and presentations of the articles. We would particularly like to thank the Editor-in-Chief, and the publishing team for their support, helpful suggestions, and comments during the delicate stages of concluding the special issue.