Brief Report
Volume 13:03, 2024

Journal of Electrical & Electronic Systems

ISSN: 2332-0796 Open Access

Enhancing Resource Efficiency in IoT-based Intelligent Electronic Health Systems for Heart Disease Prediction Using Artificial Neural Networks

Nexico Mania*

Department of Electrical and Electronic Engineering, Ariel University, Ariel 40700, Israel

Introduction

In recent years, advancements in Internet of Things (IoT) technology have revolutionized the healthcare industry, particularly in the realm of predictive diagnostics and personalized medicine. The integration of IoT with intelligent electronic health systems holds immense promise for enhancing healthcare delivery by leveraging real-time data collection, analysis, and predictive modeling. One of the critical areas where IoT and artificial intelligence converge is in the prediction of heart diseases, a leading cause of mortality worldwide. Heart diseases encompass a range of conditions that affect the heart and blood vessels, including coronary artery disease, heart attacks, and arrhythmias. Early detection and timely intervention are crucial in managing these conditions effectively and improving patient outcomes. Traditional diagnostic methods often rely on periodic check-ups and diagnostic tests, which may not capture the dynamic nature of cardiovascular health. IoT-enabled health systems, however, offer continuous monitoring capabilities, allowing for the collection of comprehensive data on vital signs, activity levels, and other physiological parameters in real-time [1].

Description

IoT-based intelligent electronic health systems operate on a foundation of interconnected devices and sensors that collect and transmit health-related data in real-time. These systems encompass wearable devices, medical sensors, mobile applications, and cloud-based platforms that facilitate seamless data exchange between patients, healthcare providers, and medical institutions. The integration of IoT enables remote monitoring of patients' vital signs, adherence to treatment protocols, and early detection of deviations from baseline health metrics. In the context of heart disease prediction, IoT-enabled devices continuously monitor physiological parameters such as heart rate variability, blood pressure, Electrocardiogram (ECG) signals, and physical activity levels. These data streams are aggregated and transmitted to centralized healthcare databases or cloud platforms for storage and analysis. Artificial Neural Networks, as a cornerstone of machine learning algorithms, process this influx of data to identify subtle patterns that may indicate the onset or progression of cardiovascular conditions [2,3].

The process begins with data preprocessing, where raw sensor data undergoes filtering, normalization, and feature extraction to enhance the quality and relevance of input data for ANNs. Supervised learning techniques train the ANNs using labeled datasets that include historical patient data, diagnostic outcomes, and health records. During the training phase, ANNs iteratively adjust their internal parameters to optimize predictive accuracy based on observed patterns in the data. Once trained, the ANN models can predict the likelihood of heart disease in individual patients based on their current and historical health data. These predictions provide valuable insights into disease risk stratification, allowing healthcare providers to prioritize interventions for high-risk patients or adjust treatment plans based on evolving health trends detected by IoT devices. The implementation of IoT-based intelligent electronic health systems for heart disease prediction not only enhances diagnostic precision but also optimizes healthcare resource allocation. By facilitating early detection and proactive management of cardiovascular health, these systems help reduce the burden on healthcare facilities and improve patient outcomes through timely interventions and personalized care strategies [4,5].

Conclusion

In conclusion, the integration of IoT with artificial neural networks in intelligent electronic health systems represents a transformative approach to predicting heart diseases. By leveraging IoT-enabled devices for continuous data monitoring and employing ANNs for advanced predictive analytics, healthcare providers can harness real-time insights to improve diagnostic accuracy and patient management. The optimization of resource efficiency within these systems is paramount to their successful implementation and scalability. IoT technology enables remote patient monitoring, reducing the need for frequent in-person visits and enabling early detection of health anomalies. This proactive approach not only enhances patient care but also alleviates strain on healthcare resources by preventing complications and hospital admissions. Furthermore, the predictive capabilities of ANNs empower healthcare providers to adopt a preemptive rather than reactive approach to managing heart disease. By identifying subtle changes in health metrics indicative of disease progression, ANNs enable timely interventions that can potentially mitigate adverse outcomes and improve quality of life for patients.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Deperlioglu, Omer, Utku Kose, Deepak Gupta and Ashish Khanna, et al. "Diagnosis of heart diseases by a secure internet of health things system based on autoencoder deep neural network." *Compr Commun* 162 (2020): 31-50.
2. Zhou, Sicheng, Anne Blaes, Chetan Shenoy and Ju Sun, et al. "Risk prediction of heart diseases in breast cancer patients: A deep learning approach with longitudinal electronic health records data." *iSciecne* (2024): 110329.
3. Pitchal, Padmakumari, Shanthi Ponnusamy and Vidivelli Soundararajan. "Heart disease prediction: Improved quantum convolutional neural network and enhanced features." *Exp Sys with Appl 249* (2024): 123534.

***Address for Correspondence:** Nexico Mania, Department of Electrical and Electronic Engineering, Ariel University, Ariel 40700, Israel; E-mail: mania@nex.il*

Received: 18 May, 2024, Manuscript No. jees-24-142040; **Editor Assigned:** 20 May, 2024, PreQC No. P-142040; **Reviewed:** 03 June, 2024, 2024, QC No. Q-142040; **Revised:** 08 June, 2024, Manuscript No. R-142040; **Published:** 15 June, 2024, DOI: 10.37421/2332-0796.2024.13.116

4. Susanto, Heru. "Electronic health system: sensors emerging and intelligent technology approach." *In Smart Sensors Networks*. Academic Press, (2017).

5. Wei, Xiao, Hao Li, Wenjing Yue and Song Gao, et al. "A high-accuracy, real-time, intelligent material perception system with a machine-learning-motivated pressure-sensitive electronic skin." *Matter 5* (2022): 1481-1501.

How to cite this article: Mania, Nexico. "Enhancing Resource Efficiency in IoT-based Intelligent Electronic Health Systems for Heart Disease Prediction Using Artificial Neural Networks." *J Electr Electron Syst* 13 (2024): 116.