

ABSTRAK

Penelitian ini bertujuan untuk melakukan Systematic Literature Review terhadap pemanfaatan sinyal Electroencephalogram dalam sistem Internet of Things untuk monitoring dan diagnosis dini penyakit jantung dengan fokus pada integrasi EEG dan biosinyal lain seperti Electrocardiogram dalam sistem wearable berbasis IoT. Data literatur dikumpulkan dari berbagai basis data akademik seperti IEEE Xplore, Scopus, Semantic Scholar, MDPI, dan ResearchGate dengan rentang publikasi tahun 2024–2026 melalui tahapan identifikasi, seleksi, ekstraksi, dan analisis studi. Hasil kajian menunjukkan bahwa integrasi EEG dengan biosinyal lain dalam sistem IoT mampu meningkatkan akurasi monitoring kardiovaskular secara real-time, didukung oleh perangkat wearable yang memungkinkan pengambilan data kontinu serta penerapan kecerdasan buatan dan machine learning untuk meningkatkan deteksi dini penyakit jantung. Selain itu, pendekatan multimodal biosignal memberikan informasi yang lebih komprehensif terkait kondisi neurologis dan kardiovaskular pasien, meskipun masih terdapat tantangan seperti kompleksitas integrasi perangkat, keterbatasan kualitas sinyal EEG, konsumsi energi, serta isu keamanan dan privasi data. Oleh karena itu, pemanfaatan EEG dalam sistem IoT memiliki potensi signifikan dalam mendukung monitoring dan diagnosis dini penyakit jantung serta dapat menjadi dasar pengembangan sistem kesehatan cerdas yang lebih akurat, efisien, dan aplikatif di masa depan.

Kata kunci: EEG, IoT, penyakit jantung, wearable biosignal, ECG, monitoring kesehatan, systematic literature review.

ABSTRACT

This study aims to conduct a Systematic Literature Review on the utilization of Electroencephalogram signals in Internet of Things-based systems for early monitoring and diagnosis of heart disease, with a focus on integrating EEG and other biosignals such as Electrocardiogram in wearable IoT-based healthcare systems. The literature was collected from academic databases including IEEE Xplore, Scopus, Semantic Scholar, MDPI, and ResearchGate covering publications from 2024 to 2026 through identification, selection, extraction, and analysis stages. The results indicate that integrating EEG with other biosignals in IoT systems improves the accuracy of real-time cardiovascular monitoring, supported by wearable devices that enable continuous data acquisition and the application of artificial intelligence and machine learning to enhance early detection of heart disease. Furthermore, multimodal biosignal approaches provide more comprehensive insights into neurological and cardiovascular conditions, although challenges remain such as device integration complexity, EEG signal limitations, energy consumption, and data security and privacy issues. Therefore, the utilization of EEG in IoT systems shows significant potential in supporting early monitoring and diagnosis of heart disease and can serve as a foundation for developing more accurate, efficient, and practical smart healthcare systems in the future.

Keywords: EEG, IoT, heart disease, wearable biosignal, ECG, healthcare monitoring, systematic literature review.