

AI-Enabled Wearable Technologies for Real-Time Disease Diagnosis and Patient Monitoring

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ABSTRACT

Diagnosis involves the systematic evaluation of clinical signs, symptoms, medical history, and investigative findings to determine the nature and cause of disease. Over the past two decades, rapid digitalization has transformed conventional diagnostic practices, improving speed, accuracy, and accessibility of healthcare services. The integration of Artificial Intelligence (AI) with wearable and portable diagnostic devices represents a major advancement in modern medical technology. AI-enabled wearables facilitate continuous, real-time monitoring of physiological parameters, enabling early detection, risk prediction, and personalized disease management. These smart systems incorporate biosensors, data analytics algorithms, and wireless connectivity to track parameters such as blood glucose levels, oxygen saturation, heart rate, respiratory patterns, and sleep cycles. Devices including continuous glucose monitors, portable glucometers, pulse oximeters, wearable chest patches, and smart biosensor-based systems have significantly enhanced monitoring of chronic conditions such as diabetes, cardiovascular disorders, respiratory diseases, and sleep-related abnormalities. By leveraging machine learning algorithms, these technologies enable automated data interpretation, anomaly detection, and predictive diagnostics, thereby reducing clinical workload and enhancing patient-centred care. Despite challenges related to data privacy, validation, and regulatory compliance, AI-integrated wearable diagnostics hold immense potential for advancing precision medicine and preventive healthcare. Overall, AI-driven wearable technologies are redefining disease diagnosis by promoting proactive monitoring, improved therapeutic outcomes, and accessible digital healthcare solutions.

Keywords: Artificial Intelligence, Wearable Devices, Biosensors, Real-Time Monitoring, Digital Healthcare

