

## Mobile and wearable sensors for data-driven health monitoring system: State-of-the-art and future prospect

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### Abstract

Mobile and wearable devices embedded with multiple sensors for health monitoring and disease diagnosis are growing fields with the potential to provide efficient means for remote health management. A sensor-based health monitoring system offers an essential mechanism for real-time diagnosis and management to detect/ predict, recommend treatment and prevent the onset of diseases. This paper aims to synthesize the research efforts on mobile and wearable sensors for health monitoring. It will investigate sensors, components of health monitoring systems, major application areas, challenges, and solutions faced during the implementation of health monitoring systems by researchers and practitioners. It was observed that sensors embedded in mobile and wearable devices for health monitoring are broadly categorized into homogeneous, dual, and heterogeneous sensors. In health monitoring, heterogeneous sensors based in

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extraction and development, data analysis, and evaluation of different algorithms for implementation of the health monitoring system. Supervised machine learning algorithms such as support vector machine, decision tree, k-nearest neighbors, and deep learning methods were the most implemented methods, while accuracy was the favored evaluation measure for health monitoring. Generally, we found that a health monitoring system is implemented to resolve health issues in the areas of human activity and posture monitoring, sleep disorder, sleep stage detection, fall monitoring in the elderly, depression, and mood swing detection. Other important areas include Parkinson's disease management, cardiac diseases monitoring,

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disease diagnosis, and well-being, and Corona virus detection and contact tracing to minimize infection rate. Furthermore, the review succinctly highlights various challenges impeding the development of sensor-based health monitoring systems with significant solutions that were recommended in the literature to ameliorate these challenges discussed. From the review, it can be acknowledged that various research efforts have been conducted to develop effective health monitoring systems, and many new systems have been implemented. However, there is still much work to be done which we have also discussed under future prospects.

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