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Development of a Wearable Health Monitoring System using Signal Processing

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Abstract: *The proposed research focuses on developing a real-time, adaptive wearable health monitoring system utilizing advanced signal processing techniques and wearable sensor technology. The primary objective is to provide a personalized, continuous, and cost-effective healthcare solution that overcomes the limitations of traditional health monitoring systems, which often lack flexibility, multi-metric capabilities, and real-time insights. The methodology involves integrating non-invasive wearable sensors to collect physiological signals such as electrocardiogram (ECG), photoplethysmography (PPG), and respiratory data. Advanced noise filtering, feature extraction, and machine learning algorithms are employed for signal processing and anomaly detection. The system is designed to adapt dynamically to individual health profiles by leveraging historical and real-time data to improve accuracy and relevance. Data visualization and alerting functionalities ensure timely feedback for both users and healthcare providers. The expected outcome is a modular, scalable, and user-friendly health monitoring system that offers real-time health insights, reduces false alarms, and enhances proactive healthcare. This innovation aims to transform healthcare delivery by enabling early detection of anomalies, personalized monitoring, and improved patient engagement, ultimately contributing to better health outcomes and reduced medical costs.[1].*

Keywords: Real-time health monitoring, Wearable sensors, Signal processing, Machine learning, Anomaly-detection, Personalized healthcare, Adaptive algorithms, Physiological signals, ECG monitoring