

Application Fields and Innovative Technologies

Wearable-Sensors-Enabled Real-Time Decision Support in Geriatrics W. Haque, S. Freeman, H. Fournier, V. Gami, D. Pandya. *Gerontechnology* 25(s)

Purpose Historically, geriatric assessments typically provided only periodic snapshots of patients' condition. This limits the early detection of clinical changes in vital signs, such as brief spikes in blood pressure, irregular heart rates, or drops in oxygen saturation, which can lead to serious complications. The purpose of this work is to design and demonstrate a digital platform that enables continuous physiological monitoring to support real-time data-informed decision-making in geriatric care. The work specifically focuses on smartwatch-based monitoring, as these are the most accessible and widely adopted consumer wearable suitable for continuous data acquisition. Further, smartwatches provide a practical entry point into the broader wearable ecosystem, enabling real-time capture of metrics such as heart rate, SPO_2 (saturation of peripheral oxygen), sleep, and physical activity. The work represents a proof-of-concept system rather than a full clinical evaluation, establishing a foundation for future real-world validation studies. **Method** A cross-platform monitoring and decision support application has been developed to integrate consumer-level smartwatches with mobile health frameworks. Older adults wear a smartwatch as part of the monitoring protocol and are expected to keep the device on during daily activities to ensure consistent data capture. The smartwatch continuously records physiological and activity signals. The application queries the relevant health platforms (Apple Health on iOS and Health Connect on Android) for current sensor readings and uploads them securely to a cloud database. Sensing, Data storage and Data communication (SDD) model ensures consistency and secures end-to-end data flow [1]. The developed platform transforms continuous sensor streams into structured summaries and visualizations, to inform digital geriatric assessments and care workflows, thereby supporting proactive decision-making by clinicians and caregivers. **Results and Discussion** The platform successfully demonstrates continuous and reliable collection of physiological readings from smartwatches. Real-time data syncing to the cloud worked consistently with stable transmission and low latency. An interactive dashboard displays trends in heart rate, SPO_2 , sleep, and activity, allowing clinicians to spot issues such as sustained tachycardia, brief drops in oxygen saturation, or irregular sleep patterns. This aligns with the broader literature showing that wearable sensors can reliably capture indicators of frailty and other age-related risks [2]. Additionally, our design is consistent with evidence from hospitalized older-adult studies on the feasibility, acceptability, and validity of continuous wearable monitoring [3]. Importantly, integrating sensor data into digital assessment forms and care plans enhances the clinical utility of the platform. Vital-sign summaries and trend patterns can be automatically linked to specific sections of geriatric assessments, reducing manual data entry while providing more accurate, time-aligned clinical context. Furthermore, care plans can incorporate these biometric trends to support data-driven recommendations such as modifying monitoring intensity, scheduling earlier follow-up or hydration interventions and much more. This integration strengthens continuity across the care teams while supporting more personalized and timely decision-making.

References

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Affiliation: University of Northern British Columbia, Canada

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