

ABSTRACT

The growing elderly population in Indonesia highlights the need for an efficient and integrated health monitoring system. Conventional systems have proven inadequate in addressing the challenges of continuous elderly health monitoring, mainly due to limited medical personnel and access to technology. To address these issues, this study proposes the development of a web-based elderly health monitoring system that integrates Internet of Things (IoT) technology with a flexible and scalable REST API architecture. This research adopts the Agile methodology using the Extreme Programming (XP) approach to support iterative development and responsiveness to changing requirements. The system is built on a client-server architecture using Next.js for the frontend and Golang for the backend, with PostgreSQL as the database. The system utilizes sensors to measure heart rate, body temperature, and oxygen saturation, with data transmitted via APIs to the cloud system. The collected information is displayed on a responsive and informative web interface as stored data, rather than live readings. The implemented web application presents historical health data and includes features such as user authentication using JSON Web Tokens (JWT). To evaluate the system's performance, functionality, load, and security tests were conducted using a scenario involving 100 virtual users. The results showed that the system successfully handled over 27,000 requests with a success rate of 99.68% and an average response time of 772 milliseconds. The system also demonstrated stability, security, and ease of use, even for elderly users. These results suggest that the system can serve as a foundation for developing inclusive and sustainable digital healthcare services, contributing to the improved well-being of elderly individuals through smarter and more efficient health monitoring.

Keywords: health monitoring, elderly, Internet of Things, REST API, XP, system performance.