

ABSTRACT

Intelligent System for Monitoring Sitting Posture Balance Using Gyro Sensors to Support Spine Health

Back health issues, particularly lower back pain, are often caused by improper sitting posture. This problem is especially prevalent among office workers who spend long hours sitting. According to data from the Indonesian Ministry of Health in 2018, the prevalence of lower back pain in Indonesia reached 18%. This study aims to minimize and prevent diseases caused by improper sitting posture by developing an intelligent system that can monitor and alert users to maintain correct sitting posture. The system uses an MPU6050 sensor to detect the back angle, an ESP32 microcontroller to process the data, and IoT technology to transmit the data in real-time to a dashboard. Additionally, a vibrator is used as feedback if the sitting posture is incorrect. The testing was conducted using the black box method to ensure the functionality and performance of the system. The results showed that this system is effective in detecting improper sitting positions and providing feedback to help users correct their posture. IoT technology enables real-time monitoring and correction of posture. Prototype testing indicated that the MPU6050 sensor and ESP32 microcontroller function well and provide accurate data. The test results show that the developed system can detect improper sitting positions and provide feedback in the form of vibrations. This system enhances users' awareness of the importance of maintaining correct sitting posture, thereby preventing spinal health issues such as back pain and pinched nerves.

Keywords: Smart system, posture balance, spinal health.