

ABSTRACT

Landslides are one of the natural disasters that frequently occur in Indonesia, particularly in highland areas and steep slopes. One of the landslide-prone areas is Plarakan Village, Moga Subdistrict, Pemalang Regency, which experienced landslides in July 2022 and again in March 2024. Geographically, this village has a sloped terrain and high rainfall, making it highly susceptible to landslides. However, there is currently no early warning system available to minimize the losses caused by such disasters. Therefore, this study aims to design an early landslide detection system based on the Internet of Things (IoT), integrated with various sensors. The developed system utilizes the YL-69 soil moisture sensor to detect soil humidity, the MPU6050 sensor to measure ground tilt, and the ESP32 module to enable data transmission via Wi-Fi and serves as the main microcontroller, with a buzzer functioning as a local warning system. The analysis includes the accuracy of the MPU6050 sensor in measuring inclination, the reliability of the YL-69 sensor in detecting soil moisture levels, and the effectiveness of data transmission to an Android application via Telegram. This research also evaluates the Quality of Service (QoS), particularly the delay in data transmission through the ESP32 module. The results of this study include error values 3,01% from the sensor readings, transmission delays, and classification of disaster status into four categories: "Safe", "Alert I", "Alert II", and "Danger".

Keywords: *Landslide, MPU6050 Sensor, YL-69 Soil Moisture Sensor, ESP32, Internet of Things.*