FLOOD EARLY WARNING SYSTEM WITH WATER SURFACE MEASUREMENT TECHNIQUES USING IOT-BASED ULTRASONIC SENSORS

Ragita Fidari
Computer Engineering Study Program, Faculty of Science and Technology,
University of Technology Yogyakarta
Jl. Ringroad Utara Jombor Sleman Yogyakarta
E-mail : ragitafidariii70@gmail.com

ABSTRACT

Flooding is a frequent natural disaster in Indonesia and has a serious impact on community activities and infrastructure. This research aims to design an Internet of Things (IoT)-based flood early warning system capable of monitoring water levels in real time and accessible remotely. The system uses an HC-SR04 ultrasonic sensor integrated with an ESP32 microcontroller to measure the distance to the water surface and then classifies the water level status into three conditions: Normal, Alert, and Danger. Measurement results are displayed on a 16x4 LCD and equipped with LED indicators and a buzzer for visual and audio warnings. Notifications are also automatically sent to the Telegram application for remote monitoring. Test results show the system is able to respond to changes in water level with an accuracy of ±5.97%, updating data every 100 milliseconds, and sending notifications every 1 second. This system is considered effective as a flood early warning prototype and has the potential for further development through integration with a cloud platform for large-scale monitoring.

Keywords*: Flood, IoT, Ultrasonic Sensor, ESP32, Telegram, Early Warning System*