

ABSTRACT

Floods are among the most common natural disasters in Indonesia, often causing significant disruption to communities. One of the main causes of flooding is the sudden rise in water levels without an effective early warning system. Therefore, a monitoring system capable of detecting rising water levels in real-time and providing timely information to the public is crucial for early prevention.

This final project presents the design of a water level monitoring system for early flood detection using the ESP32 microcontroller as the main controller. The system utilizes an ultrasonic sensor to measure the water surface level and is connected to the internet via Wi-Fi. The collected data is transmitted to the Blynk IoT platform for real-time visualization through a smartphone application. Additionally, the system is equipped with automatic alert mechanisms, such as buzzers or notifications, when the water level exceeds a predefined threshold. This system was realized in the form of an acrylic-based prototype (30×20×20 cm) that simulates real conditions of rising and falling water levels

Test results show that the system can accurately detect changes in water level, with a Mean Absolute Percentage Error (MAPE) of 6.69%, and is capable of delivering real-time notifications with a transmission delay of less than 3 seconds. This system provides a promising early solution for flood risk mitigation, especially in flood-prone areas.

Keywords: *ESP32, Flood, IoT, Ultrasonic Sensor , Water Level Monitoring*