

ABSTRACT

Drinking water is one of the most essential human needs, with an average requirement of about 2 liters per day. Problems arise when there is negligence in refilling water gallon containers, often due to the absence of an effective monitoring system that assists consumers. This study proposes a water level measurement system for gallon containers integrated with the Internet of Things (IoT). The system consists of an HC-SR04 ultrasonic sensor, GPS module, female-to-female jumper cables, an ESP32 microcontroller, and a rectangular microstrip antenna with dual-band frequency. This research integrates the HC-SR04 sensor, Global Positioning System (GPS), and a dual-band rectangular microstrip antenna. The antenna is designed to replace the built-in Wi-Fi module on the ESP32, aiming to transmit data received by the ESP32 to be visualized on the ThingsBoard Cloud dashboard. The data visualization on the website dashboard helps users understand the water content in the gallon container and provides precise location information of the container's owner. The test results show that this system is capable of accurately displaying water level data from the gallon, with an error value below 5% and in real time, thereby helping bridge the communication between the gallon owner and the water refill station to reduce the risk of dehydration.

Keywords : *Drinking water, dual band, GPS, HCSR-04, IoT (Internet of Things), ThingsBoard Cloud, Water level measurement*