Implementasi Smartbin Berbasis IoT Untuk Monitoring Kapasitas Sampah Menggunakan Metode Sistem Informasi Geografis

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Abstract

Waste is a global problem, especially in developing countries, often due to inadequate waste management infrastructure. A proposed solution is an IoT-based smartbin to monitor waste capacity and assist sanitation workers. This smartbin is equipped with HC-SR04 ultrasonic sensors that detect human presence, automatically open the lid, and measure waste capacity. Testing of HC-SR04 sensors 1 and 2 showed the best responsiveness when using a 5GHz bandwidth, with the ESP32 connection time being 3 seconds and the response to produce output being 1 second. Users will receive notifications when the smartbin is full via the Blynk and Telegram apps. The smartbin prototype measures 20 cm in length, 20 cm in height, and 12 cm in width. This prototype will be tested at Telkom University Surabaya using qualitative and quantitative research methods. Success parameters include device performance, sensor compatibility, and accuracy in monitoring waste capacity. The Blynk app provides real-time access for users to view the smartbin's condition, including waste capacity and lid control. Notifications are also sent via Telegram, including the smartbin’s location through Google Maps using the Geographic Information System (GIS). The highest usage of the smartbin was recorded in the hallway on the first floor of Telkom University Surabaya from 15:28 to 15:32, with a total of 325 uses. The study also includes a survey of respondent satisfaction, showing 80.4% rated it as very good, 17.4% as quite good, and 2.2% did not respond. The GIS system is effective with an external RPsma antenna and a 5GHz bandwidth on an ESP-32 with a 70MHz clock speed.

Keywords : Smartbin, Blynk, Sensor, Telegram, IoT, Monitoring