AN IOT ENABLED WASTE MANAGE SYSTEM THAT OPTIMIZES GARBAGE COLLECTION ROUTE

ABSTRACT

This project presents a Smart Trash Bin with Shortest Path Finder designed to improve urban waste collection through IoT and route optimization. The system uses an ESP32 microcontroller paired with ultrasonic sensors to monitor bin fill levels in real-time. A switch differentiates between multiple bins, and when a bin is full, its GPS location is updated to the cloud. A Python-based shortest path algorithm, such as Dijkstra's or A*, is then used to calculate the most efficient route for the garbage collection vehicle, starting from its current location. This intelligent routing minimizes fuel consumption, reduces collection time, and enhances operational efficiency. By integrating real-time monitoring, cloud connectivity, and predictive route planning, the system offers a scalable solution for smart cities aiming to automate and optimize their waste management processes.