Garbage Tracking System–Revolutionizing the Waste Management System

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In numerous cities, the lack of openness and predictability in garbage pickup creates considerable issues for people. Individuals are frequently unaware of when the garbage collection arrives, resulting in inefficiency and significant environmental hazards. The Garbage Tracking System is an intriguing waste management system that possesses the potential to counter this omnipresent communal issue. This ingenious approach efficiently addresses the traditional issue of not knowing when the garbage collector will arrive. With an optimized user-centric platform, it brings a plethora of possibilities for enhancing self-awareness for garbage management. This work leverages the use of various technologies, ranging from Next.js for both the frontend and backend to Firebase as the database. For storing user details, the database is created in Firebase, and in the first stage, we have small data, so we use the default database. Additionally, ESP32 (a microprocessor with a built-in Wi-Fi module) is used as an IoT aide. Alongside this, it uses HC-SR04 ultrasonic sensors that are easily attachable to public dustbins and continually monitor the dustbin's occupancy level. These sensors make use of the reflection phenomenon such that if signals transmitted encounter any obstacle, a delay is introduced at the receiving end of the sensor. This time delay is used to calculate the distance between the obstacles. Currently, the proposed work delivers a range of 2400 cm. Following this, the obtained data is sent to the real-time database that internally stores and forwards the data into the web system for valuable insights and further processing. On the other hand, for real-time tracking of garbage trucks, mobile GPS is used. This work provides a platform for centralized management of garbage. Individuals can create user accounts to access pertinent information on collection schedules and get real-time notifications of garbage trucks as they approach the user's preset location. This platform also addresses the need for continuous status updates of public dustbins, thereby facilitating a unique feature to deliver that. The Garbage Tracking System utilizes information technologies to revolutionize waste management by offering users optimized scheduling and real-time monitoring for efficient garbage disposal.

Keywords:

Smart Dustbin, IoT, Real-Time Monitoring, NextJs, Firebase