

Location-based Smart Waste Management System

Project Guide:

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Abstract

Smart cities integrate various mobile and web solutions to enhance the quality of urban living. One such solution involves establishing an eco-friendly, efficient, and effective waste management system. The current waste collection approach relies on regular garbage trucks making daily or weekly rounds. However, this method falls short in covering all city zones and is an inefficient utilization of government resources. The proposed system, under administrator management, is an online-based garbage monitoring and analysis application. Administrators oversee bins, drivers, user complaints, and driver work reports. This paper introduces a cost-effective mobile or web-based solution that empowers the government to efficiently handle the substantial daily waste accumulation, while also providing a superior waste disposal solution for citizens. This is achieved through a driver application that offers predictive and guided routes specifically designed for garbage trucks. The driver updates their work status, and the collected data is stored. An Android or web application is developed for the workforce and citizens, primarily offering complaint submission and access to intelligent bin information.

Proposed System

- The proposed system encompasses comprehensive solid waste management, including segregation, collection, and transportation.
- The server gathers and stores data in a database, which is then analyzed and presented on two dashboards accessible to the workforce and clients.
- Data analytics generate reports that administrators can monitor via the admin dashboard.
- Utilizing the collected data, garbage trucks can be provided with optimized routes generated using various algorithms and the Google Maps API, ensuring efficient navigation to essential garbage bins and the disposal site.

Software Prerequisites

- Front-End: HTML, CSS, Bootstrap
- Back-End: Python/Django, MYSQL

System Modules

Administrator

- Login
- Garbage Bin Creation
- Garbage Bin Modification/Deletion
- Optimal Route Assignment for Drivers
- Driver Management
- Garbage Report Review
- Public Complaint Assessment

General Public

- Registration
- Login
- Complaint Registration
- Status Tracking

Driver

- Login
- Daily Work Updates Inspection
- Optimal Route Selection
- Garbage Load Update

Module Description

Administrator

- Login: This module records the login credentials exclusively for administrators.
- Create Garbage Bin: Administrators can create waste bins for different areas, designated for waste collection.
 - Update/Delete Garbage Bin: Administrators can modify or remove unused or malfunctioning waste bins.
 - Assign Optimal Routes for Drivers: Administrators allocate drivers based on efficient route planning.
 - Manage Drivers: Administrators oversee and manage drivers, including route optimization.
 - View Garbage Reports: Administrators review waste reports from various areas.
 - Review Public Complaints: Administrators address and manage public grievances submitted through the platform.

General Public

- Registration: The general public registers with basic details to access the application's services.
- Login: Registered users authenticate themselves to utilize available services.
- File a Complaint: Users submit complaints about overflowing waste bins or related issues.
- View My Complaint & Status: Users can monitor the status of their filed complaints.

Driver

- Login: This module captures the login credentials exclusively for drivers.
- Check Daily Work Updates: Drivers stay informed about daily work updates, aiding in their relocation for waste collection duties.
- Select Best Routes: Drivers make informed decisions regarding optimal routes for their designated areas.
- Update Garbage Load: Drivers update the waste load within their trucks, subsequently transmitted to administrators.

Main Project

Smart Garbage Bins: The system incorporates smart garbage bins equipped with **advanced sensors** to detect and monitor garbage levels in real time. These sensors utilize ultrasonic technology to accurately measure the fill level of the bins.

IoT Connectivity: The IoT-enabled smart garbage bins are integrated with communication modules to transmit data seamlessly to the backend server. This ensures timely and accurate updates regarding the status of each bin.