



Waste Management in Smart Cities through Smart Dustbin

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Abstract: One of the main issues preventing cities from developing into "Smart Cities" is solid waste management. The trash is detrimental for escalating pollution, which directly impacts both the environment and living things. Although the government has launched numerous initiatives to minimize trash, the lack of public awareness makes them largely ineffective. The problems with solid waste management include overflowing trash bins, people who don't always know where trash bins should be placed, and trash bins that are either full or empty. The primary goal of the project is to create a smart waste system that locates the closest trash bins, calculates how far those bins be from the user's position, and determines the status of those bins. The system uses sensors to determine the placement of trash bins, the amount of trash within the bins, and to transmit an alert message to the server at the municipal office. Where is My Dustbins is the application to use if a dustbin search is required the connection between the server at the municipal office and the trash can on a mobile device. The sensors are left free to indicate when the trash bins have been cleaned, and the procedure is then repeated.

Keywords- Detection, Sensors, Indication, Monitoring, Utilization

I. INTRODUCTION:

Smart cities are a novel idea that is being developed and suggested quickly. The community of the future must look to technologies, services, and apps relevant to various fields for solutions. The objective is to foster sustainable economic growth in order to raise citizens standards of living. The ability of the city to raise the living standards of its residents while assisting with their social, economic, and environmental well-being is what makes it smart. Thus, smart cities are seen as an effective approach to use new technologies to raise citizen quality of life and promote economic growth. The nation refers to itself as smart because of how networks and communication technology may enhance quality of life, open up new economic opportunities, and do a variety of other things that make life simpler. Smart cities make use of data.

Due to a surge in waste and poor waste management, we frequently see overflowing trash bins in public areas in many cities. It produces unsanitary surroundings and an unpleasant odor. Due to a scarcity of trash bins and lax behavior on the part of the populace, waste disposal has become more informal. The one-of-a-kind Smart Dustbin offers a unique answer to the precise irregular waste management issue. The initiative offers us one of the most well-organized means of maintaining a clean, green atmosphere. In this study, we tried to use sensors to create intelligent trash bins.

II. PROBLEM IDENTIFICATION:

We saw the actual situation of garbage bins being overfilled and all the trash spilling out while the municipal office is unaware of where the dustbin overflowed on a daily basis. This results in the prevalence of illnesses and difficulties. Growing waste requires a clever waste management system to control the waste in the trash bin. When the trash bin will overflow, the municipal corporation does not receive a message. The problems with waste management include overflowing trash bins in public areas, individuals not always knowing where trash bins should be placed, and the lack of separate trash bins for wet and dry waste.



Fig. Improper Management of Waste

III. RELATED WORK:

Numerous studies have been conducted globally in this topic. This concentrated on the use of manual waste collection and the advancements made in the management of waste through the use of intelligent trash bins. According to a study in paper [5], trash containers are burned, causing environmental disturbance and pollution. The report finishes with continued development of the current management system after providing the highlights and an overview of the municipal solid waste management system. In paper [3], the trash bins were set up to detect humans, and if a user was found, additional sensors would check the trash can's level and open it. The sensors in the dustbins are connected to the internet (IoT), which monitors the amount of waste and sends a warning notice. In article [4], the system employs image processing to avoid potential roadblocks. Line following procedure is employed for the movement of the bin. The level of trash is determined using the available sensors. It can automate the transportation of the trash can from one location to another and display the status of the rubbish that is currently in the trash can. to create a Force sensor that will be utilized to gauge the dustbin's weight. In a paper [6], the functionality of smart trash bins is discussed. It includes the ability to recognize organic and inorganic waste, monitor waste, manage real-time information, and detect the fullness of waste.

IV. SMART DUSTBIN:

Public spaces, educational institutions, government buildings, societies, etc. can all use the smart trash can. It is an eco-friendly method that aids in city cleaning and promotes a healthy atmosphere. A smart trash can system is built with ultrasonic sensors, a GSM module, a GPS, and level-specific LED indications. The dustbin model was designed with low cost, high accuracy sensors, and high accuracy cloud database monitoring. The trash can is connected to the municipal corporation office, allowing users of the Android application to know when and where the trash can is actually available.

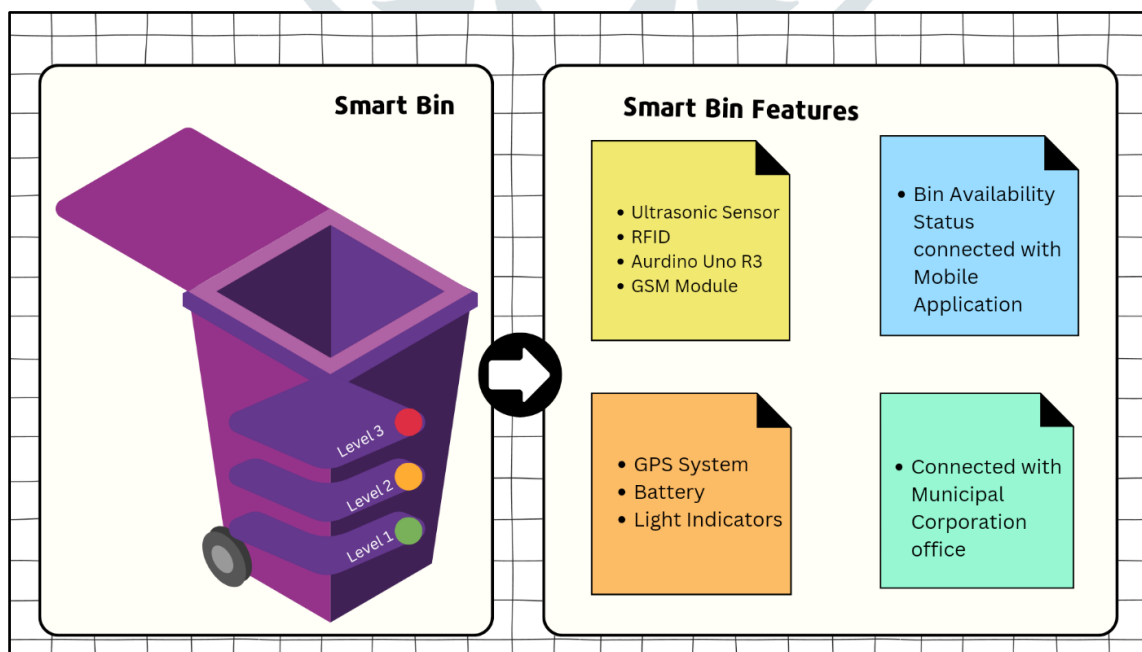


Fig. Smart Dustbin System

V. IMPLEMENTATION:

We must create an IoT-enabled waste management system for smart cities, where each trash can has ultrasonic sensors to measure the amount of trash present, a GPS module to track its location in real time, and sensors to monitor its availability. Ultrasonic sensors and the Global System for Mobile (GSM) make up the planned solid waste management system. When the level is achieved in accordance with the level given, when rubbish is put into the bin, ultrasonic sensors alert the user when the dustbin has reached its maximum capacity. It gives the GSM model instructions to update the state of the bin and notify the municipal corporate office via message. By using light fidelity (Li-Fi), we can measure the distance from the top of the smart bin to the waste in order to calculate the waste level. Energy usage is significantly influenced by wireless technology's data forwarding and sensing rates. Data collection and transmission can occur twice or three times each day.

Where is My Garbage Can? A dustbin's precise position can be determined by the user, and an android app will indicate whether it is currently available. The user finds the closest dustbin by verifying the dustbin's availability status and choosing it for garbage disposal using the application that displays the closest dustbin nearby. Transmitted data will be stored in the cloud, allowing us to access it via the internet from any location. Garbage collection truck drivers and waste management authorities can both use the continually detected data from trash bins that is stored in a cloud server. The technique results in the garbage being unloaded, making the whole process quick and hygienic. The technology enables communication between the municipal office and the garbage collector and allows for the updating of bin status after emptying. By only cleaning up the waste when the trash can is full, the system therefore saves time.

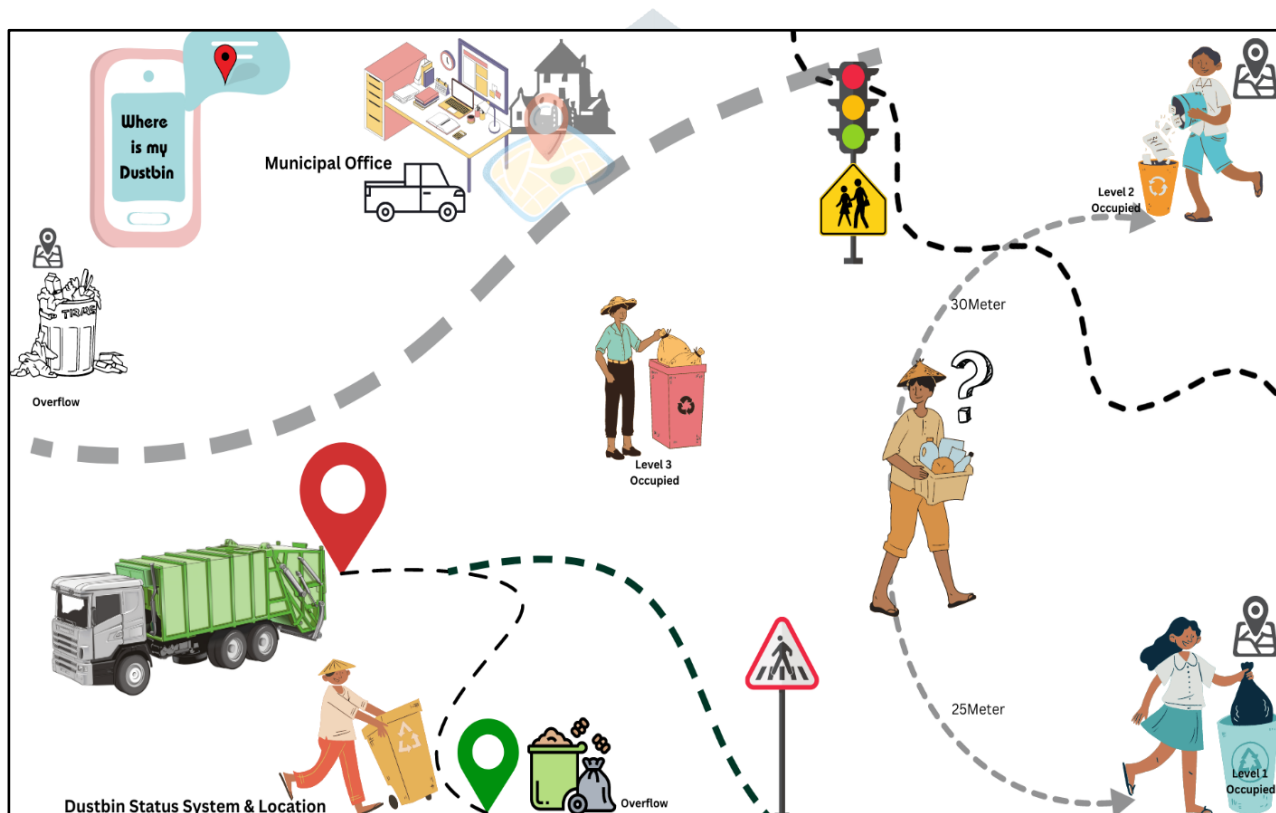


Fig. Real Imagination of Dustbin

VI. CONCLUSION:

The trash management system is built on the Internet of Things concept, which has proposed features with time management and sensible management of all garbage bins situated across the city. We are creating an android-based application that will provide real-time waste bin information. The Internet of Things will be used to enable the operation of smart trash bins, identify garbage level-to-level fullness, monitor waste, and manage real-time information.

The test results indicate that the first level is occupied by the glow green light, the second level is occupied by the glow orange light, and the dustbin will be entirely occupied by the glow red light, signaling the need to send a message to the municipal corporate office. They will be examining the precise position and sending the garbage collector there to collect the garbage and empty the dustbin. The same case will go through that process again. Future campus environments can be made smarter with the aid of this vocabulary.

VII. FUTURE SCOPE:

Future scope for the proposed system as follows:

- The automatic division of organic and inorganic garbage that has been proposed.
- A smart management system web site with a GUI model to connect all the cities and streets.
- Suggest a smoke detection system that uses this trashcan to detect nearby smoke from burning materials and notify the municipal corporation.
- Made the automatic garbage collection system a suggestion.

VIII. ACKNOWLEDGMENT:

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