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The Swachh Bin

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THE SWACHH BIN

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ABSTRACT:

In the recent decades, Urbanization has increased tremendously. At the same phase there is an increase in waste production. Waste management has been a crucial issue to be considered. This paper is a way to achieve this good cause. In this paper, smart bin is built on a microcontroller-based platform Esp 32 microcontroller board which is interfaced with GSM modem and Ultrasonic sensor. Ultrasonic sensor is placed at the top of the dustbin which will measure the stature of the dustbin. The threshold stature is set as 10cm. Arduino will be programmed in such a way that when the dustbin is being filled, the remaining height from the threshold height will be displayed. Once the garbage reaches the threshold level ultrasonic sensor will trigger the GSM modem which will continuously alert the required authority until the garbage in the dustbin is squashed. Once the dustbin is squashed, people can reuse the dustbin. At regular intervals dustbin will be squashed. Once these smart bins are implemented on a large scale, by replacing our traditional bins present today, waste can be managed efficiently as it avoids unnecessary lumping of wastes on roadside. Foul smell from these rotten wastes that remain untreated for a long time, due to negligence of authorities and carelessness of public may lead to long term problems. Breeding of insects and mosquitoes can create nuisance around promoting unclean environment. This may even cause dreadful diseases.

KEYWORDS: Esp32 interface, GSM modem, Ultrasonic sensor….

INTRODUCTION:

Smart bin is an innovative community dust bin designed for efficient and reliable waste management for smarter India. India faces the issue of disposal of 0.1 million ton of waste it produces daily. Everyday garbage is produced from industries, work places and houses to dispose off. The common collection methods for waste disposal in India are –

- Door to door collection • Curb side collection • Block collection • Community bins

Smart bin targets a crucial aspect of its solution- the collection of waste. Smart bin bears following features-

• Innovative design to decrease chances of interaction of waste with atmospheric agents. • Compaction of waste to increase capacity of trash bin. • Wireless status update to the central municipalserver. • Easier provision for removal of bin.

PROBLEM STATEMENT

Design a Swachh Bin system which benefits government to overcome various drawbacks identified in the existing system.

OBJECTIVES

Objective 1 - Providing municipal heads a means to know when the dustbins in the city are filled 100% in real time , using IOT technology and web application. Objective 2 -To create different sections in the same dustbins as recyclable, dry and wet waste sections. Each section will open with the help of buttons.

BACKGROUND STUDY AND LITERATURE SURVEY

In this paper[1], Along with smart level detection, in the proposed system, after cleaning the trash can, the ultrasonic sensor checks the trash whether it is empty or full, if the trash is empty, then it sends the information to the arduino, the it initiates the cleaning process by switching on the centrifugal pump by which the water with a force is applied to clean the trash. It will be very useful and can be installed in the Trash Cans at public places as well as at home. The limitation is that when wastes are put on water it results in bad odour. And its only alerts if the bins are full. There is no live tracking.

In [2] The system embedded in this technology is ultrasonic sensors. Ultrasonic sensors are embedded at both places i.e. inside the bin and outside the bin. Inside the bin to know that the waste level in the bin is below the alerting mark and outside the bin to check Any movements outside the bin so that it can open automatically based on movements. The technology behind this approach is using Ultrasonic sensors for checking the levels of dustbins, how much it's loaded or what percentage of dustbin is filled with waste. ARDUINO UNO sends the real time data to the app, it sends the alerts to the app if the dustbin is about to get full. The limitation is that The app used will get only the alerts. The live percentages on amount of trash filled is not shown. And the location of dustbins are also unknown.

In paper [3], This system uses the Arduino board and GSM module to transfer data. A message will be sent to the selected numbers when the dustbins are filled. PIR sensors are used for automatic opening of the lid. Alerts can be sent even to the works for fast clearance of wastes.

In [4] The web-based real time monitoring system provides a GUI for displaying the waste bin data so that user can monitor the waste bin status and collection activities using web browser from any devices. This monitoring system is developed using Bootstrap 3 Admin and Dashboard open source template and morris.js dashboard API. The location of waste bin [latitude and longitude] is retrieved from database server and marked on the map by using Google Map API. Solar is the main source of power supply. In [5] They have built a framework in which a Camera will be set at each garbage collection point alongside load cell sensor at base of the trash can. The camera will

take continuous snapshots of the garbage can. A threshold level is set which compares the output of camera and load sensor. The comparison is done with help of microcontroller. After analyzing the image an idea about level of garbage in the can and from the load cell sensor, weight of garbage can be known. Accordingly, information is processed that is controller checks if the threshold level is exceeded or not. In paper [6] Here, Metal sensors are used and object sensor is used to detect whether the waste is given through the feeder. To take action on input and output as per program logic feed to PLC. It contains rotating conveyor belt (which starts rotating when the feed is given to it and stops for a predefined time when any metal is detected).It also contains robotic arm (which starts its movement when metal is detected and conveyor belt stops). The advantage of PLC is the automation with a relatively small amount of cabling and a low error rate. In paper [7], The basic idea before starting the project was to segregate the waste based on three different criterions, A. Ferro- metallic scrap material- Attracting metals to electro magnet. B. Light weight waste segregation- Using blower to separate light particles. C. Centrifugal segregation- Dc motor is used to create centrifugal force to separate heavy particles.

PROPOSED MODEL

- IOT enabled monitoring of waste in the bins which uses ultrasonic sensors in the bins which is connected to microcontroller which is used to sense the trash level in the dustbin through continuous transmitting and receiving of ultrasonic waves.
- Instant message is shown in the web application in real time which can be monitored by the corporation office administrators and which deploys them to collect the garbage in no time.
- A mobile app for public is made to locate the dustbins nearby and check its level of trash filled. This helps to keep the city clean.
- A central management admin dashboard to access details of all the Bins remotely as represented in Figure 3.1 which represents the different dustbins and the amount of trash filled in each dustbin.
- The dustbin opens the required section when the respective button is pressed. This results in bifurcation of different kinds of waste and it would be easy to discard the trash.

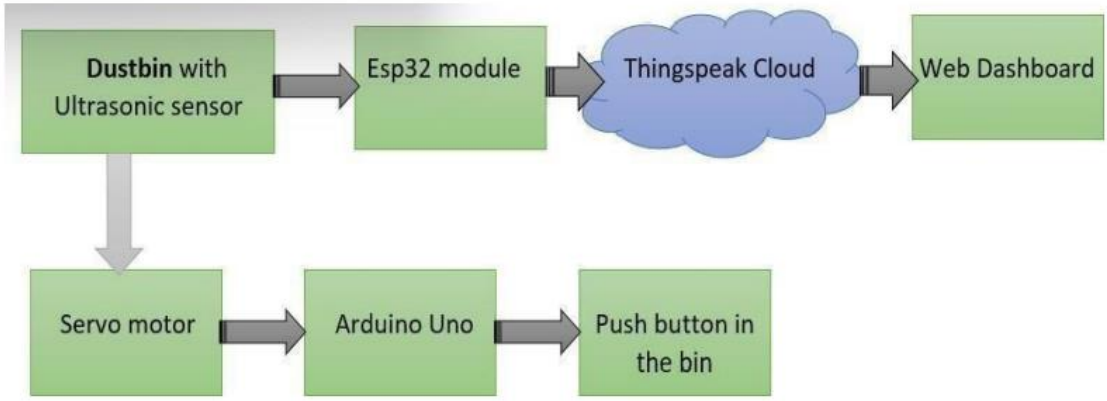

***Figure 3.8** - Working block diagram*

RESULT

Decompostion and Stabilisation of wet waste will be converted into compost so it will be help for the plants. Reduced landfill impact, avoids smell segregating waste allows to compost the wet waste and it will help the municipality by make income by selling the organic compost. Swachh bin will help the municipality to empty the bin when its filled the sensor send the message to the respective department to empty the dry waste when it is filled.

By this both public and the Government as benefits.

CONCLUSION

From the above paper, the proper disposal of waste and its management has been studied. The risks due to waste pollution due to overflowing of the dustbins has been observed and rectified. It has been known that by using Internet of things (IOT) for a proper waste management, we can have a proper and pollution free city and thereby making the nation neat and clean. Using of smart sensors like Ultrasonic sensors, embedding them into the smart bin we can have an efficient way of waste management. The developed system provides improved database for garbage collection time and waste amount at each location.

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