

Design of Monitoring System for Waste Management using IoT

Shreya Chougule¹, Shrutika Raut²

¹Usha Mittal Institute of Technology, Santacruz (W), Mumbai

²Usha Mittal Institute of Technology, Santacruz (W), Mumbai

³Prof. Kiran Dange, Dept. of Electronics and communication, Usha mittal institute of technology, Maharashtra, India.

Abstract— Today, waste management, from production to disposal, is one of the most significant issues facing municipal governments around the world. Dust bins put in public places around cities are overflowing due to the rise in waste each day, creating an unhealthy atmosphere for people. To mitigate such a situation, we have suggested IoT solid waste management. When the dustbin reaches its maximum level, the waste management department receives an update from a Wi-Fi module mounted at the dustbin, enabling the department to send a waste collector vehicle to the proper place to gather garbage. The project's aim is to improve the usability of an IoT-based solid waste collection and management system for smart cities.

Keywords — IOT, Solid waste management, WI-FI Module, Unhealthy, smart cities.

1. INTRODUCTION

Rapid population growth, urbanisation, and industrialization have all resulted in serious issues. In today's world, most countries are rapidly expanding, resulting in a large amount of unnecessary waste such as electronics, plastics, and a variety of biodegradable materials. Waste control, as one of the most pressing issues in developed nations, necessitates immediate action. The clearing of waste disposal in urban or city areas has been a gruelling job for the majority of the country all over the world. Holding the world green necessitates the implementation of a well-organized waste clearance scheme. There are numerous current expertise mechanisms for handling and managing information. Because of the lack of preparation and systematisation among government, residents, and local authorities for shipping and processing waste, creating a prototype in the waste management system is a major challenge. Currently, waste collection is done in a traditional manner, which requires a lot of effort and is a time-consuming operation.

1.1 Literature Review

A Number of academic papers have been surveyed in order to collect project-related information. A Smart Dustbin has been shown, which was based on IoT and featured a smart bin built on an Arduino Uno board and connected to an ultrasonic sensor, GSM modem and WI-FI Module. Several researchers have come to the conclusion that during the

construction of these bins, a number of concerns such as strength, sustainability, and affordability were observed. For more information we conducted an online survey on waste management. The result of survey is as follows:

Q1. Do people dump their waste alongside the garbage bins instead of putting it inside those?

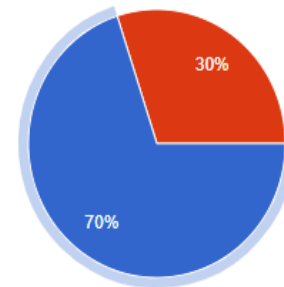


Fig .1 Pie chart (1)

From above pie chart 70% of people dump their waste alongside the bin instead of putting into a bin.

Q2. If Yes, Why, in your opinion, people behave like this?

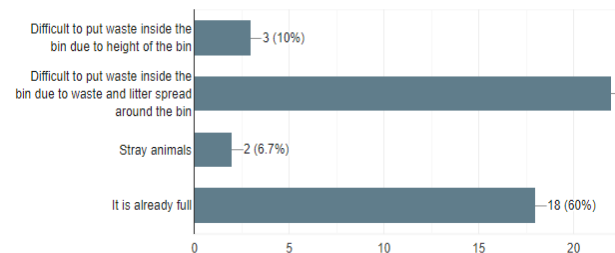


Fig .2 Pie chart (2)

From above pie chart, we get the result why people not dump their waste into the bin. Most people believe it is difficult to dump waste in bins when garbage is strewn everywhere. Some people Complain that garbage bin is already full, the administration does not dispose garbage on daily basis. To overcome this problem, the system we make which improve

the usability of an IoT-based solid waste collection and management system for smart cities.

2. Working Principle

In this project, we are attempting to create a smart dustbin that uses an ultrasonic sensor to constantly detect various amounts of garbage in dustbins. Four different colours of LEDs are used to show the amount of waste. When the PIR sensor detects motion near the dustbin, the lid automatically opens. If there is not any motion were detect then Microcontroller triggers the servo motor for automatically shutting down of lid of dustbin to prevent overflowing of garbage on the roads . Further, when the level of garbage in the bins exceeds the optimum level, through Wi-Fi module the alert message will send to the web server.

A. Block Diagram :

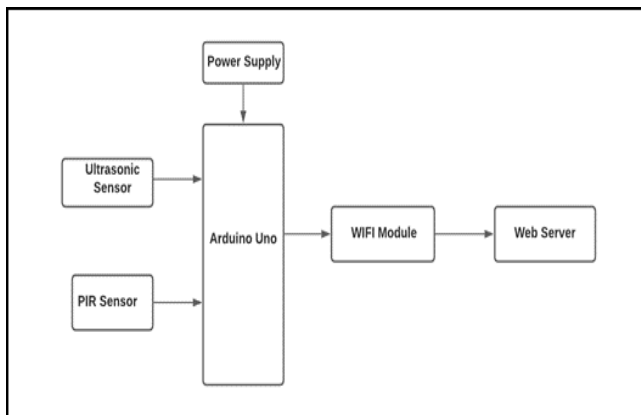


Fig. 3 Block Diagram

B. Project Flow:

- Detecting any human activity in the vicinity of the bin.
- The lid opens if the sensor suspects anything.
- The amount inside the bin is continuously tracked.
- When the bin reaches its maximum capacity, the message is sent to the web server through the Wi-Fi module.

2.1 RESULTS AND DISCUSSION

As the Result we can get the predicted time of when the bin will be filled by its current filled status and the data will be mailed to the certain person's mail. The data will be current data and predicted data.

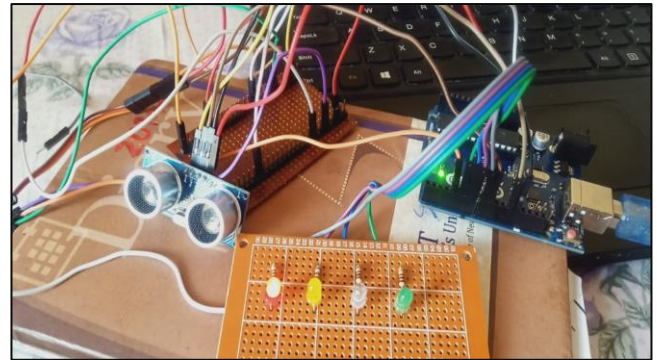


Fig.4 Hardware Implementation

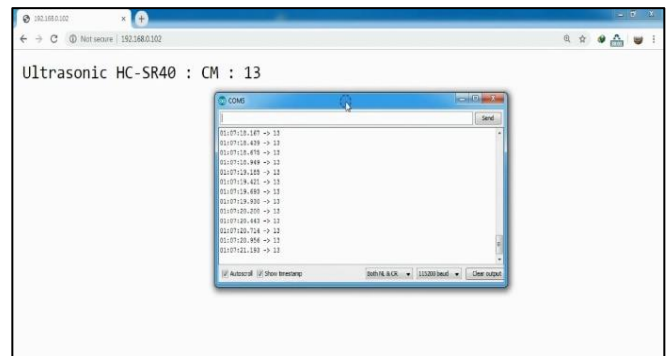


Fig.5 Calculating Distance

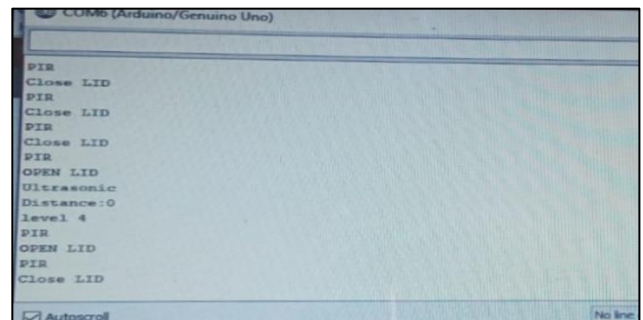


Fig. 6 Execution

3. CONCLUSIONS

Created a model for an automated open trash can that will open the lid until it identifies people who want to dispose of their trash, It's also capable of detecting the quantity of garbage in the trash barrel. And if there are those who want to throw out their garbage, if the trash barrel is full to a certain amount, the lid would not open. When the garbage bin gets full, the proposed system sends message on web server with the help of Wi-Fi module to clean the garbage bin properly on time.

4. FUTURE SCOPE

In future, we can install gas sensor in smart dustbin. A gas detector might be a device that detects the incidence of gases in order to avoid neighborhood, typically as a part of a security system. This sensor will observe the leak for different emission. This type of device is very useful since it may be useful to avoid harmful to organic life like human and animals.

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