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Smart Waste Management System

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Abstract: ***Environmental hygiene is very important for a healthy life. In our daily lives, waste containers should be stored without proper supervision until they overflow and fill up to leak and produce environmental pollutants that cause serious problems for human and environmental health. Is often. In smart cities, garbage containers need to be monitored and managed to ensure a healthy and smooth environment. In the field of technological progress, real-time monitoring and manipulation of waste treatment is a difficult topic that arouses urgent interest in the research community. Traditional methods of monitoring waste in strategically located waste bins are time-consuming, labour-intensive, costly, highly tedious and inefficient methods that do not meet the needs of smart cities. This study paper continuously detects the layout and implementation of IoT, as well as the percentage and location of waste in the bin, displays a "full" message when the bin is 85% full, and has a 15-time margin. Provides an ultrasonic sensor to give. % Will be supplied. Visual display if the emptying process is delayed.***

Keywords: Ultrasonic sensor, Internet of Things (IoT), LCD display, I2C Converter, Node MCU

I. INTRODUCTION

Waste is any substantial that is undesirable or unusable. It is any substance which is discarded after primary use, or is worthless, flawed and of no use. The rapid growth and accumulation of waste in our society is a major problem, especially when monitoring and management tools are not properly maintained. In a smart city that continuously reduces pollution, hygiene is essential and cleaning begins with the setting up of waste treatment facilities in strategic locations. Real-time monitoring and management of strategically placed containers and final destination dumping is essential. As we know that, house to house garbage collection is critical issue for the respective garbage management authority so, to overcome this kind of problem, we came up with the new and refreshing idea. Therefore, this study presents an innovative system that helps keep cities clean by applying a system to monitor and control the level of garbage cans.[1]

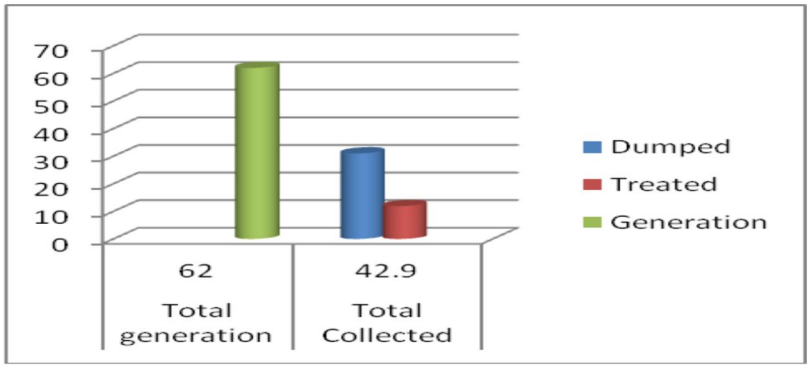


Figure1: Collection vs Dumped Statistics (numbers in million MT per annum) (Source: PIB, Government of India)

II. LITERATURE REVIEW

1,27,486 TDP (tones per day) solid waste are generated in India out of which only 87000 TDP are collected by the municipal corporation and rest of solid waste are spread on the roads. According to solid waste review of India 90% of municipal solid waste are disposed of in open dumps and landfills which create problems to public health and environment. Nowadays the main problem we people face is how we can tackle garbage which is spreading on the roads which affects our environment and also harms the people's health so to overcome these problems we have implemented the smart garbage collector system. The traditional way to tackle with Garbage was too difficult and also utilises human effort, time and cost which has no use even in the presence of modern technology. Solid waste management is the biggest challenge in urban areas. Lots of systems have been developed and various methods have been used for waste management systems. This project also implemented using RFID (radio frequency identification) to improve waste management by providing early automatic identification of waste at bin level.[2][3]

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III. PROBLEM STATEMENT

In today's world there is no proper management and control system for proper garbage collection. Humans have a tendency to avoid their duty. People in the societies use to throw garbage in filled garbage containers and garbage authorities also do not collect the garbage timely. Hence it leads to various types of pollution and many serious health issues.

IV. PROBLEM SOLUTION

Component required for this project :

1) *Ultrasonic Sensor:* It is a type of sensor which measures the distance by targeting the object by emitting a sound wave and converting the sound wave into electrical signal.The waves of ultrasonic sensor is faster then the audible sound . it have two main components that are transmitter and receiver[Fig 2].[4]



Fig. 2

2) *Node MCU:* It is iot source platform which have very low cost as compare to other iot platform .it is initially included firmware which runs on ESP8266 wi-fi SoC from espressif system,and hardware which was based on ESP12 module[Fig.3] .[5]



Fig.3

3) *LCD Display:* It is liquid crystal display .it is one kind of electronic display module which are used in small circuit and calculator these displays are mainly preferred for multi segment light emitting diode and seven segment .the main benefit of this display is simply programmable and there is no limit for displaying custom character[Fig.4].[6]



Fig.4

4) *I2C Converter:* I2C converter stands for "inter integrated circuit" is a serial computer bus invented by philips semiconductor it has inbuilt PCF8574 I2C chip that converts I2C series data to parallel data for LCD display[Fig.5].[7]



Fig.5

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5) *Buzzer:* A buzzer or beeper is an audio signal device which may be mechanical ,electromechanical or piezoelectric[Fig.6].[8]



Fig.6

6) *Web Application:* A web application is an application program that is stored on a remote server and delivered over the internet through the browser interface.
7) *Local Host:* For the uses of web applications we create a server within our system which is accessible locally and host the website in local host.

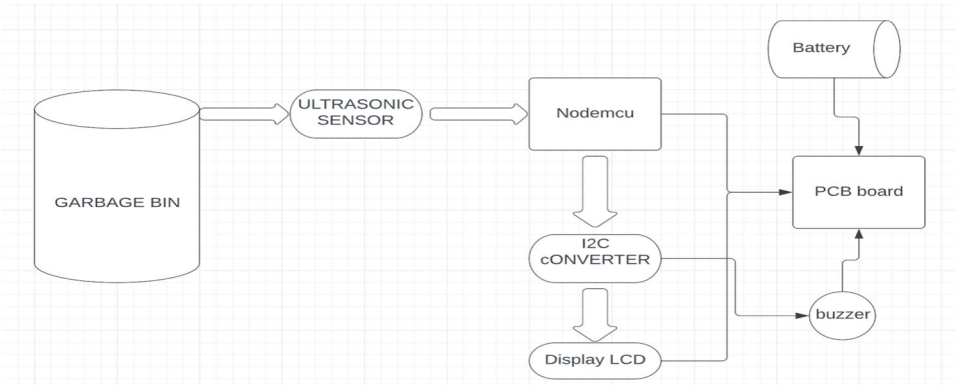


Fig.7

These all component plays their particular role, we know that ultrasonic sensor is responsible measuring the distance by targeting the object so in this smart waste management system ultrasonic sensor detect the waste inside the bin and then sent data to the NodeMCU then data will stored on local server through the NodeMCU then it displays the output using web application , it can also display output through the lcd and buzzer start beeping when waste got full in the bin[Fig.7] .

V. FUTURE SCOPE

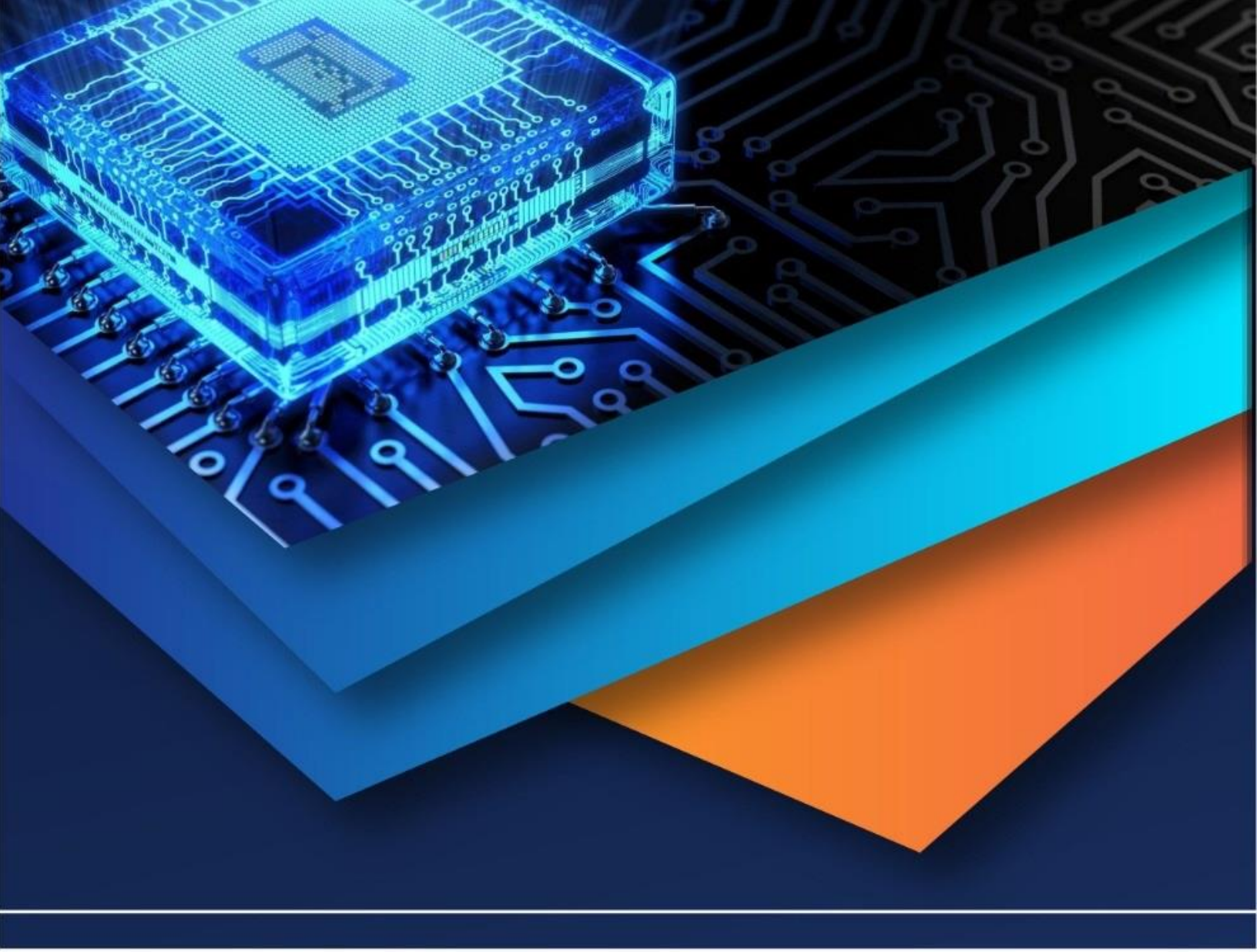
We can add GPS to this project. This will help to track the position in case there are more dustbins and also we can make separate dustbins for dry waste and wet waste . There are many birds and animals like dog , cat roaming around so we can add a cage to protect the dustbin from them.

VI. CONCLUSIONS

Due to the absence of sustainable waste management technology, the current waste disposal situation is likely to worsen.This work presents an enhanced solution to the problem of waste management by the littering of the garbage bins once they are full.Littering of the environment and the health hazards are minimized as timely disposal of the wastes is ensured as the system automatically sends a message alert to the garbage collector or the management authority once the bin is full thereby ensuring that the bin is made empty to avoid dumping of refuse on the floor.

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