SRI VENKATESWARA COLLEGE OF ENGINEERING AND TECHNOLGY(Autonomous)

Batch No : 17

Project Name : Smart Waste Management System for Small Urban Areas

Group Member : C.GANESH KUMAR REDDY(21781A0439)

C.HARSHA VARDAN(21781A0437)

B. BHANUPRASAD(21781A0422)

D.MUDDARAJU(21781A0453)

Problem Statement No 6

SMART WASTE MANAGEMENT SYSTEM FOR SMALL URBAN AREAS

AIM OF THE PROJECT:

The aim of this project is to develop and enhance the operational efficiency of the smart waste management system for small urban areas to monitor waste levels in bins, thereby improving cleanliness and sustainability

PROBLEM STATEMENT AND SOLUTION:

Small Urban areas often struggle with inefficient waste management practices , leading to environmental pollutions and public health hazards.Develop a Smart waste Management System using sensors and microcontroller to monitor waste levels in bins, thereby improving cleanliness and sustainability .Smart waste management system mainly concentrates on Monitoring the waste management, providing a smart technology for waste system, avoiding human intervention, reducing human time and effort and which results in healthy and waste ridden environment.

PROJECT DESIGN SPECIFICATION:

1 .Components:

1. Ultra sonic sensor.
2. NodeMCU.
3. Batter or power supply.
4. Jamper wires.

5. ThingSPEAK.

2. Functional Requirements:

1. Ultra sonic senor

• As the name indicates, ultrasonic sensors measure distance by using ultrasonic waves.

• The sensor head emits an ultrasonic wave and receives the wave reflected back from the target. Ultrasonic Sensors measure the distance to the target by measuring the time between the emis□sion and reception.

2. NodeMCU

• Node MCU Development board is featured with WI-FI capability, analog pin, digital pins and serial communication protocols.

• To get start with using Node MCU for IoT applications first we need to know about how to write/download Node MCU firmware in Node MCU Development Boards. And before that where this Node MCU firmware will get as per our requirement

• It works as a co-ordinator.

3.Battery

• Power supply to the Arduino

4.Jamper wires

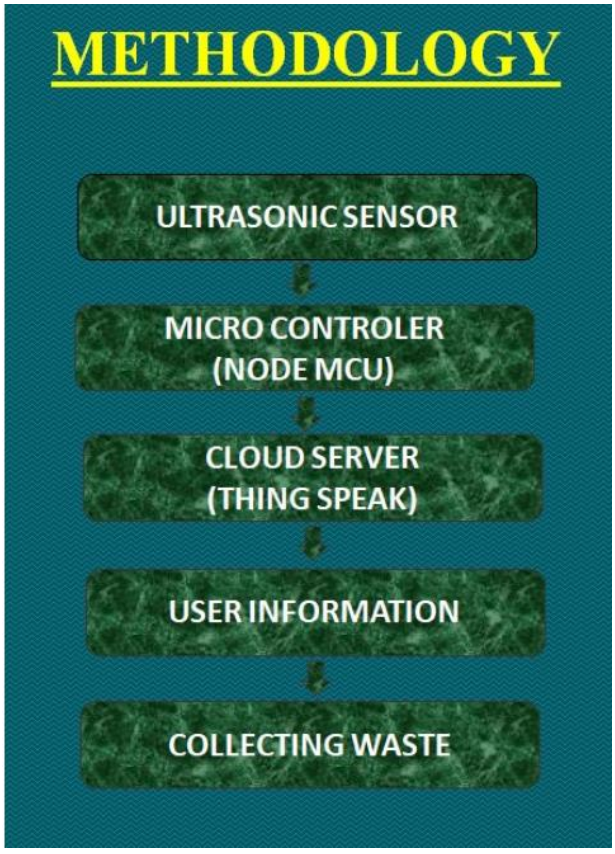
• Used for the connecting NodeMCU,Ultra sonuc sensor and battery

5.ThingSPEAK

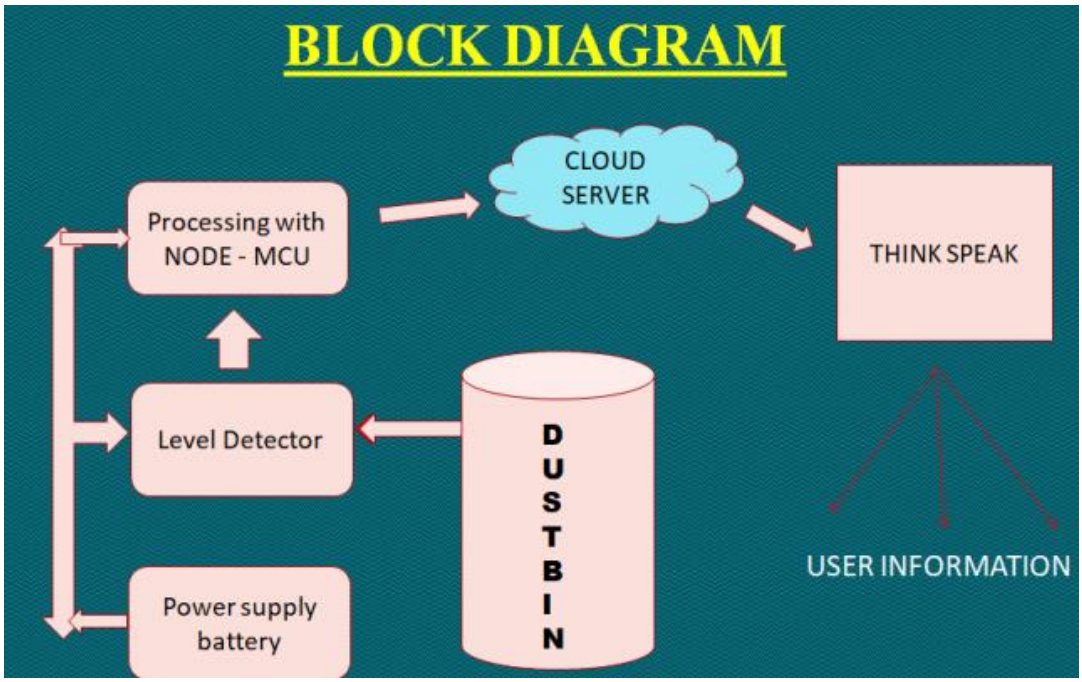
• Thing Speakis an Internet of Things (IoT) platform that lets you collect and store sensor data in the cloud and developIoTapplications.

• TheThing SpeakIoTplatform provides apps that let you analyze and visualize your data in MAT□LAB, and then act on the data. 15 Chapter 6 Smart waste management us

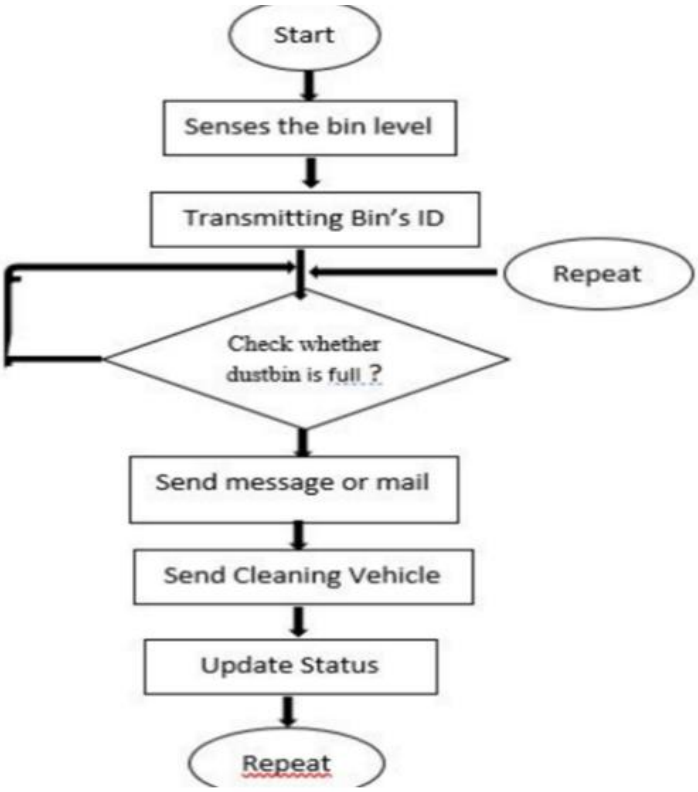
PROJECT ARCHITECTURE & METHODOLOGY:



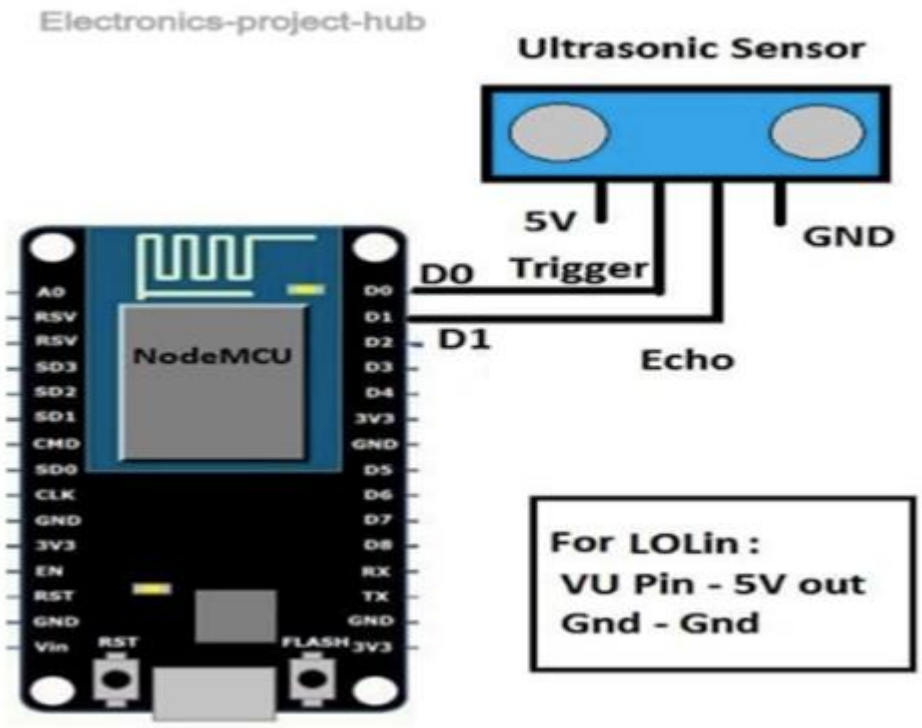
BLOCK DIAGRAM:



FLOW EXPLANATION:



CIRCUIT DIAGRAM:



COMPONENTS WORKING PRINCIPLE/ FUNCTIONALITY:

The smart waste management system for small urban areas typically consists of several key components, each contributing to the overall functionality of the system. Here's a breakdown of these components and their roles:

Our project involves in three stages

1. **Sensor work.**
2. **Fixing the sensor to the garbage bin.**
3. **Thing speak.**

1.Sensor work

• As we discussed above the sensors used are NodeMCU ,ultra sonic sensor.

• Ultra sonic sensor connected to Wi-Fi module i.e., NodeMCU , Ultra sonic sensor sense the depth of the bin and timely inform to the sensor (full/empty).

• As we know that NodeMCU is having Wi-Fi connection it will receives the information and sends the information to cloud server.

2.Fixing the sensors to the garbage bin.

• The sensors are connected at the top of the dust bin

3.ThingSPEAK.

• All sensor data transferred to the cloud server, it will show the statistics of the bin graphically.

CODE FOR SOLUTION:

[5:21 PM, 7/27/2024] Harsha Ashaa : # include ”ThingSpeak.h”

include ¡ESP8266WiFi.h¿

//——— Enter you Wi-Fi Details———//

char ssid[] = ”POCO”; //SSID

char pass[] = ”bharathkumar”; // Password

//————————————————-//

const int trigger = 16;

const int echo = 5;

long T;

float distanceCM;

WiFiClient client;

unsigned long myChannelField = 985327; // Channel ID

const int ChannelField = 1; // Which channel to write data

const char * myWriteAPIKey = ”CU3LH9GYEPAMPKK7”; // Your write API Key

void setup()

Serial.begin(115200);

pinMode(trigger, OUTPUT);

pinMode(echo, INPUT);

```
WiFi.mode(WIFI STA);
ThingSpeak.begin(client);
void loop()
if (WiFi.status() != WL CONNECTED)
Serial.print(”Attempting to connect to SSID: ”);
Serial.println(ssid);
while (WiFi.status() != WL CONNECTED)
WiFi.begin(ssid, pass);
Serial.print(”.”);
delay(5000);
Serial.println(Connected.”);

digitalWrite(trigger, LOW);
delay(1);
digitalWrite(trigger, HIGH);
delayMicroseconds(10);
digitalWrite(trigger, LOW);
T = pulseIn(echo, HIGH);
distanceCM = T * 0.034;
distanceCM = distanceCM / 2;
Serial.print(”Distance in cm: ”);
Serial.println(distanceCM);
ThingSpeak.writeField(myChannelField, ChannelField,
distanceCM, myWriteAPIKey);
delay(1000);
```

PROJECT OUTCOME:

- Understanding the problem statement in the smart waste management system for small urban areas
- Small in size and lightweight
- Easy to use and integrate
- Accurate and reliable
- Compatible with various platforms and devices
- Affordable and cost-effective

CONCLUSION:

In conclusion, the smart waste management system project successfully addresses key challenges in urban waste management through innovative technology. By utilizing sensors, data analytics, and automated processes, the system improves efficiency in waste collection, reduces costs, and minimizes environmental impact. This approach not only streamlines waste management operations but also contributes to a potential for further advancements in smart technologies to address

By executing this proposed framework we can build up the sharp city thought and cost is re□duced. By the productive utilization of sharp dustbins can the advantage is advanced. This framework diminishes the improvement in the awe inspiring city, with the target that condition will be cleaned.