RESEARCH ARTICLE   OPEN ACCESS

IOT BASED GARBAGE MONITORING SYSTEM

Srilakshmi.CH[1], Neaha R K[2], Nivashini[3]

[1]Associate Professor, Department of CSBS ,R.M.D Engineering College
[2] UG Scholar, Pre Final year, Department of CSBS, R.M.D Engineering College, ucb20127@rmd.ac.in
[3] UG Scholar, Pre Final year, Department of CSBS, R.M.D Engineering College, ucb20201@rmd.ac.in

ABSTRACT

Waste management is a big problem for most cities in India. Current garbage monitoring and management systems are highlyineffective and expensive to transport and collect. Poor monitoring and collection can overwhelm trash bins in certain areas, leading to long-term problems such as foul odors and harmful diseases. On the contrary, in some places, garbage trucks collect garbage from bins with less garbage, resulting in higher gas consumption and increased air pollution. To solve these problems, "Node Mcu-based smart garbage monitoring system" can be introduced as an effective solution. This intelligent garbage monitoring system uses NodeMcu as the main microcontroller.It uses an ultrasonic sensor as a level detector to detect the amount of trash in the bin. This information is then sent over his Node Mcu-to Thing Speak channel. Thing Speak channels display real-time output data as easy-to-understand line charts. Therefore, this system provides a web platform for efficient garbage monitoring**.**.

Keywords - Smart garbage monitoring, Nodemcu, Ultrasonic Sensor, Potentiometer, Thingspeak.

INTRODUCTION

An IoT-based trash level monitoring system is a new technology used to monitor trash levels in public and industrial trash bins. The basic purpose of a garbage level monitoring system is to enable municipal services to collect garbage in a timely manner before the bins overflow and cause public annoyance. Advanced garbage monitoring systems not only measure the amount of garbage, but also use advanced sensors to detect toxic chemicals, combustible gases and even radioactive materials, helping to prevent catastrophic incidents from occurring. You can notify the authorities via the Internet. By installing these IoT-based trash monitoring systems, governments can operate efficiently when it comes to keeping cities clean, saving millions of dollars annually in fuel/energy, labor costs, and time savings. can save It can save millions of lives and billions of dollars around the world.

LITERATURE SURVEY

The paper on Smart Garbage Monitoring and Clearance System using the Internet of Things by S. Vinoth Kumar, T. Senthil Kumaran, A. Krishna Kumar and Mahantesh Mathapati

[1] proposed IOT based smart **waste clean management system** which checks the waste level over the dustbins by using Sensor systems. Once it detected immediately this system alerts concern authority through GSM/GPRS. Arduino-based Smart Garbage Monitoring System Analysis Requirement and Implementation by Namakambo Muyunda and Muhammad Ibrahim

[2] proposed a system which can monitor the state of a garbage bin and relay the monitored state to a central database, collect Sensor data from each bin

and display it on a webpage to alert the relevant authorities of the states of the various garbage bins in a given area, store sensor data for each of the garbage bins to provide analytical information for each of the garbage collection areas and provide route planning for the collection based on the selected fill level and priorities of each bin.

[3] proposed a project , authors are Alexey Medvedev,PetrFedchenkov,ArkadyZaslavsky,Theodoros,Anagnostopoulos Sergey Khoruzhnikov.Title of this project is "Waste Management as an IoT-Enabled Service in Smart Cities". This report scrutinizes the different ways by which the refuse is gathering and also the difficulties in accumulation for the period 2005 to 2011 in creating nation

[4] proposed a project, Authors are Krishna Nirde, Prashant S. Mulay, Uttam M.Chaskar. Title of this project is "IoTbased solid wastemanagement system for smart city". The main component usedin this project is GSM module and arduino
The paper "IoT based smart garbage alert system using Arduino UNO" by Ms.Srilakshmi.C.H , Mr.Arul , Ms.Sudha K [5]proposes a smart alert system for garbage clearance aided by the ultrasonic sensor to check the level of garbage-filled in the dustbin and sends the alert to the municipal web server once if garbage is filled. After cleaning the dustbin, the driver confirms the task of emptying the garbage with the aid of the RFID tag. the whole process is upheld by an embedded module integrated with rf id and IoT facilitation. an android application is developed and linked to a web server and the notifications are sent to the android application using wi-fi module.

METHODOLOGY

Detecting liquid waste level is no unsimilar from detecting solid waste level, the ultrasonic waves emitted from the sensor can reflect off the liquid surface.
You need to setup your Thingspeak account correctly to receive the garbage level data online. To do this you need to create a Thingspeak account
The NodeMCU , based on ESP8266, is the brain

of the project which does the following job:Measures garbage level by triggering sensor, display garbage level on the LCD and connecting to internet to sending garbage level data to Thingspeak account.
The LCD is paired to an I2C adapter module .It reduces the number of wires to 4 which connects Arduino to LCD.
The LCD display shows real-time garbage level . Thecircuit is generated from a micro USB power cable.
There are several problems with the current existing system that are being identified. This will reflect the need for a new efficient
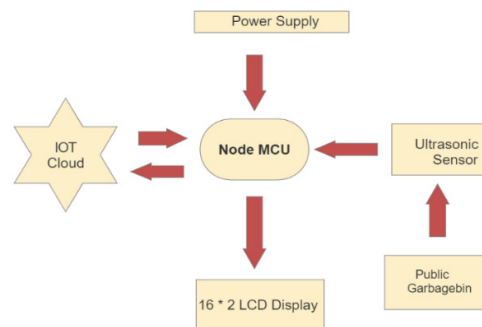

Block diagram for Garbage Monitoring System

system for managing the garbage. The problems are listed as below: 1. Current garbage collection is inefficient, time waste and required a huge amount of human energy. 2. It will create an unhygienic condition for surrounding environment and creates bad smell which can lead to spread some deadly disease.

We used an ultrasonic sensor and NodeMCU to build this **IoT dustbin project**. The ultrasonic sensor calculates the storage by detecting the garbage in the dustbin. The distance between ultrasonic and trash is converted to percentage so that instead of showing two or three levels, we can show the dustbin status in percentage. IFTTT Webhooks is used to get the data from NodeMCU and send an email whenever the trash level crosses the 70% criteria.

HARDWARE IMPLEMENTATION
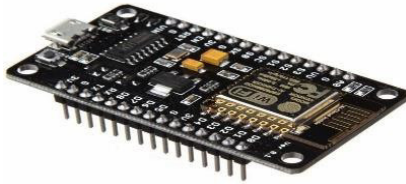
NodeMCU

NodeMCU

The NodeMcu is an open- source Wi- Fi system on chip produced by Espress if Systems. It's an intertwined chip that provides full internet connectivity to the bedded circuit in which it's present. It can be programmed through USB harborage using Arduino IDE. It has a aggregate of 30 legs in which 9 legs are digital legs while 1 leg is analog leg. It's a tool that's employed for Wi- Fi networking.

It has low power consumption. In this design it has been employed as the main microcontroller owing to its inbuilt WiFi connecting capacity which can be exploited to transmit real-time covered detector data to web and mobile interface

ULTRASONIC SENSOR

The ultrasonic sensor is employed for measuring distance between itself and the obstacle using ultrasonic waves. The head of the ultrasonic sensor emits a wave of ultrasonic wavelength and receives the reflected wave back from the object. The distance to the target is then calculated by measuring the time between the emission of the ultrasonic wave and reception of the same. It uses a single component for both sending and receiving the ultrasonic wave. The distance to the target is then calculated by using the formula:

*Distance = (Time * Velocity)/2*

In this project it has been employed for measuring the distance between the lid of the bin containing the sensor and the garbage level. The distance measured is then used for calculating the percentage of garbage level in the bin.

Ultrasonic Sensor

LIQUID CRYSTAL DISPLAY

LCD (Liquid Crystal Display) is the innovation utilized in scratch pad shows and other littler PCs. Like innovation for light-producing diode (LED) and gas-plasma, LCDs permit presentations to be a lot more slender than innovation for cathode beam tube (CRT). LCDs expend considerably less power than LED shows and gas shows since they work as opposed to emanating it on the guideline of blocking light.

A LCD is made up of an uninvolved lattice or a showcase network for dynamic framework. Likewise alluded to as a meager film transistor (TFT) show is the dynamic framework LCD. The uninvolved LCD lattice consists a matrix of conductors of the network.Two conductors on the lattice send a current to control the functioning framework has a transistor situated at every pixel crossing point, requiring less current to control the luminance of a pixel.

Some aloof network LCD's have double filtering, which implies they examine the matrix twice with current in the meantime as the first innovation took one sweep. Dynamic lattice, be that as it may, is as yet a higher innovation.

A 16x2 LCD show is an essential module that is generally utilized in various gadgets and circuits. These modules consists of more than seven segments and other multi fragment LEDs are liked. The reasons being: LCDs are easily

available; programmable; no restriction of showing exceptional characters.

A 16x2 LCD implies 16 characters can be depicted per line and two such lines exist. Each character is shown in a lattice of 5x7 pixels in this LCD. There are 2 registers in this LCD,. They are particular Command and Data.

The directions given to the LCD are put away by the order register. An order is a direction given to LCD to play out a predefined assignment, for example, introducing it, clearing its screen, setting the situation of the cursor, controlling presentation, and so forth. The information register will store the information that will be shown on the LCD. The information is the character's ASCII incentive to show on the LCD.

LCD

SOFTWARE USED

ThingSpeak

ThingSpeak is a web-based Internet of Things platform which is used to analyze and visualize sensor data obtained from hardware module of a project. It is used to stream live data..
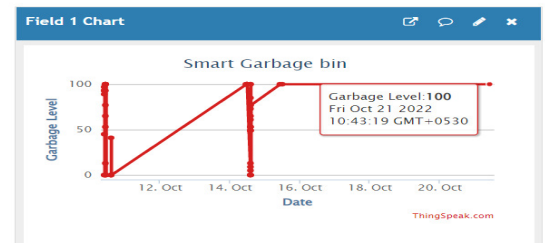
It has been employed as main web interface to display output of the ultrasonic sensor, gas sensor and DHT sensor in the form of line graph.

Thing Speak is **an IoT analytics platform service that allows you to aggregate, visualize and analyze live data streams in the cloud**.

RESULT AND OUTPUT

CONCLUSION

The garbage system needs to be cleaned when it is filled to maintain a hygienic environment. Our smart garbage collection system contains WIFI Module, Ultrasonic sensor, Thingspeak Cloud. The main aim of the project is to obtain real time data of percentage of garbage from garbage bins placed in various parts of the city. Along with the fill level data other important parameters such as pollution in ppm, humidity, and temperature of the bin are monitored and sent to ThingSpeak channel. When the garbage level in particular dustbin has reached the maximum level then the employees can be informed and they can immediately take certain actions to empty it as soon as possible. It will reduce the wastage of time, cost and energy of the human. It will also prevent the occurrence of any disease. The truck drivers easily get information about the clearing process and do their work immediately. Thus this method of

monitoring garbage level enhances the overall efficiency of the whole process.

REFERENCE

[1] Prof. R.M.Sahu, Akshay Godase, Pramod Shinde, Reshma Shinde, "Garbage and Street Light Monitoring System Using Internet of Things" INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING, ISSN (Online) 2321 – 2004, Vol. 4, Issue 4, April 2016.

[2] S. Vinoth Kumar, T. Senthil Kumaran, A. Krishna Kumar and Mahantesh Mathapati "Smart Garbage Monitoring and Clearance System using Internet of Things'' in 2017 IEEE International Conference on Smart Technologies and Management for Computing, Communication, Controls, Energy & Materials (ICSTM), Veltech Dr.RR & Dr.SR University, Chennai, T.N., India. 2 - 4 August 2017. pp.184-189.

[3] Namakambo Muyunda, Muhammad Ibrahim "Arduinobased Smart Garbage Monitoring System Analysis Requirement and Implementation" in 978-1-5386-0765-7/17/$31.00 ©2017 IEEE

[4] Dr.N.Sathish Kumar, B.Vijayalakshmi, R. Jenifer Prarthana, A.Shankar "IOT Based Smart Garbage alert system using Arduino UNO" in 978-1-5090-2597- 8/16/$31.00_c 2016 IEEE

[5] V. N. Bhat, "A Model for the optimal allocation of trucks for solid waste management," Waste Management & Research, vol. 14, (1), pp.87-96, 1996

[6] Twinkle sinha, k.mugesh Kumar, p.saisharan, "SMART DUSTBIN", International Journal of Industrial Electronics and Electrical Engineering, ISSN: 2347-6982 Volume-3, Issue-5, May2015.