A Smart Bin to Detect the wastage and Provide Automatic Alert System

Kokila.S[1], Deepalakshmi.T[2], Dhanalakshmi. K[3],Rajasekaran. T[4]

Student, Department of Computer Science and Engineering, SRM Valliammai Engineering College, SRM Nagar, Kattankulathur, Tamilnadu, India [1],[2],[3],

Assistant Professor, Department of Computer Science and Engineering, SRM Valliammai

Engineering College, SRM Nagar, Kattankulathur, Tamilnadu, India[4]

ABSTRACT: In the present days, the garbage bins or Dust bin are those which are placed at public places in the cities are Getting overflow due to increase in the waste every day. It creates bad health condition for the people by spreading some deadlydiseases, to avoid such situation, we are planning to implement a project called IOT Based Smart Garbage Monitoring System.Detection, monitoring and management of wastes is one of the primary problems of the present era in metro cities. The traditional way of monitoring the wastes in smart bins is a complex, cumbersome process and utilizes more human effort, time and cost which is not compatible with the present day technologies in any way. These dustbins are interfaced with microcontroller based system having IR sensors, HUMIDITY Sensor & CAPACITIVE Sensors with wireless systems along with central system showing current status of garbage. Hence the status will be updated on to the application in real-time. The major part of our project depends upon the working of the Wi-Fi module essential for its implementation. The main aim of this project is to reduce the human resources and efforts along with the enhancement of a smart city vision.

KEYWORDS: IR Sensor, HUMIDITY Sensor, CAPACITIVE Sensor, PIC Microcontroller, GSM, IOT.

I. INTRODUCTION

While doing the research work and interviewing the common people and the government authorities associated with the garbage management (Municipal corporations) of various places, few very common things turned up: A nation always possess rules, regulations and technologies but the matter of grave concern is that the linking factor is missing, faithful following of duties by the officers and low grade workers is nowhere to be seen. Here arises an urgent need of developing a system which can handle the situation intelligently before it's too late. The invention named Garbage Monitoring and Detection using Sensors, GSM is very much related to society welfare and health. It is a scientific and faithful approach to achieve a garbage free, disease- free and healthy locality by providing the local government with a system which uses number of basic technologies at reasonable price. It is observed that often the garbage get collected due to irregular removal of garbage present in the dustbin. In the proposed paper, a new model for the municipal dustbins which intimates the centre of municipality for immediate cleaning of dustbin has been proposed.

II. RELATED WORK

2.1 IOT based garbage monitoring system

In this paper, garbage monitoring system is implemented with Internet of Things. This system monitors all the dustbins located inthe city and compare it with the garbage bins depth. Theultrasonic sensors are used for finding of the dustbins status. The fire sensors are used for finding of fire in the dustbins. This project presents cost effective monitoring solution with ATmega16A microcontroller. When the level of the bin containing dust reaches the threshold

limit, the device will transmit the level along with the unique ID provided to that dustbin. These details can be accessed by the respective authorities from their place with the help of internet and an immediate action can be made to clean the dustbins.

2.2 Garbage Monitoring System Using IOT

In the present scenario, we see the garbage bins being overloaded and all the garbage spills out resulting in pollution. The detection, monitoringand management of waste is the primary problems of the present ea. The usual way of monitoring the wastes in waste bins is complex, cumbersome process which takes more human effort, time and cost which is not compatable with the present day technologies in any way. Hence our problem statement is to design a system based on microcontroller using zigbee methodology for collecting garbage from particular area whose garbage bins are overflowing with prior concern. This method is advanced in which garbage management is automated. This project Garbage Monitoring system using IOT is a very innovative system which will help to keep the cities clean. Thisbin makes use of microcontroller, LCD screen, and zigbee methodology for sending data. Ultra sonic sensors are used to detect the level of garbage collected in the bins. The LCD screen is used to display the level of garbage collected in the bins

2.3Cloud computing based smart garbage monitoring system

Healthy surrounding is imperative to a healthy and happy community. With the old system of hiring people to regularly check and empty filled dustbins, the process has been prone to human error and neglect. In addition to the different usage of dustbins in different areas, routine checks which are based on time crevices is inefficient because a dustbin might get filled early and may need rapid attention or there might not be any need of a routine check for a long period of time. This makes current system resource expensive and ineffectual, as overflowing, stinking dustbins become more of a problem than a solution. In this paper weare presenting a solution named SmartBin which is a network of dustbins which integrates the idea of IoT with Wireless Sensor Networks. We also include the concept of a network of smart garbage bins based on the Stack Based Front End approach of integrating Wireless Sensor Network with the Cloud computing .We also discuss the Machine Learning techniques like Decision Forest Regression can be applied to the sensor data leveraged by the system to gain useful insights to improve the efficiency of the garbage monitoring.

2.4 A waste city management system for smart cities applications

This paper presents a new technique of smart waste city management which makes the environment of the city clean with a low cost. In this way, the sensor model detects, measures, and transmits waste volume data over the Internet. The collected data including trash binsgeolocation and the serial number is processed by using regression, classification and graph theory. Hence this method lay as a new method to dynamically and efficiently manage the waste collection by predicting waste status, classifying trash bin location, and monitoring the amount of waste. This latter recommends the optimized route to manage the garbage truck efficiently. Finally, the simulation results are presented and estimated.

2.5 Design and implementation of a smart solid waste monitoring and collection system based on Internet of Things

Solid waste generated is an ever growing problem at local regions or at global levels. There is proper disposal of solid wastes pollute all the components of the green environment (i.e., air, land and water) at regional and global levels. Since there is rapid increase in producing or consumptions, quantity of wastes generated by the urban society has increased. The problem is more faced in the developing countries than in developed countries, as the economic growth as well as urbanization is more rapid. The continuous flow of garbage in all places where public people move around creates the unhygienic situations. It may invoke several injurious diseases among the nearby people. To avoid such a situation and to improve the cleaning, 'smart waste management system' is proposed. In the proposed system, the completeness of waste in the dustbins is checked with the help of Sensorsused in the system, and information is sent tothe required control room through GSM/GPRS system. Renesas Microcontroller is used to communicate the sensor system with GSM system. An android application is been designed to monitor the information related to the waste for different selected locations. Through this the collection of garbage can be made efficiently.

III. WORKING METHODOLOGY

Fig 3.1 explains the architecture diagram of the Smart bin system.This project a smart bin to detect wastage and provide automatic alert systemis a very innovative system which will help to keep the cities clean. This system monitors the waste bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses IR sensors placed over the bins to detect the garbage level and compare it with other wastages like plastics & vegetables with other sensors such as capacitive & humidity with the garbage bins depth. The system makes use of PIC microcontroller, LCD screen, and GSM modem for sending data to cloud & SMS to corporate authority. The system is powered by a 12V transformer. The Liquid Crystal Display screen is used to display the status of the level of garbage collected in the bins whereas a web page is built to show the status to the user monitoring it. The web page gives a logical view of the garbage bins and highlights the garbage collected in color in order to show the level of garbage collected. The Liquid Crystal Display screen shows the status of the garbage level present in the bin. The system puts on the Infrared sensor when the level of garbage collected crosses the limit that is measured. Thus the smart dustbin helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via IOT web development platform.
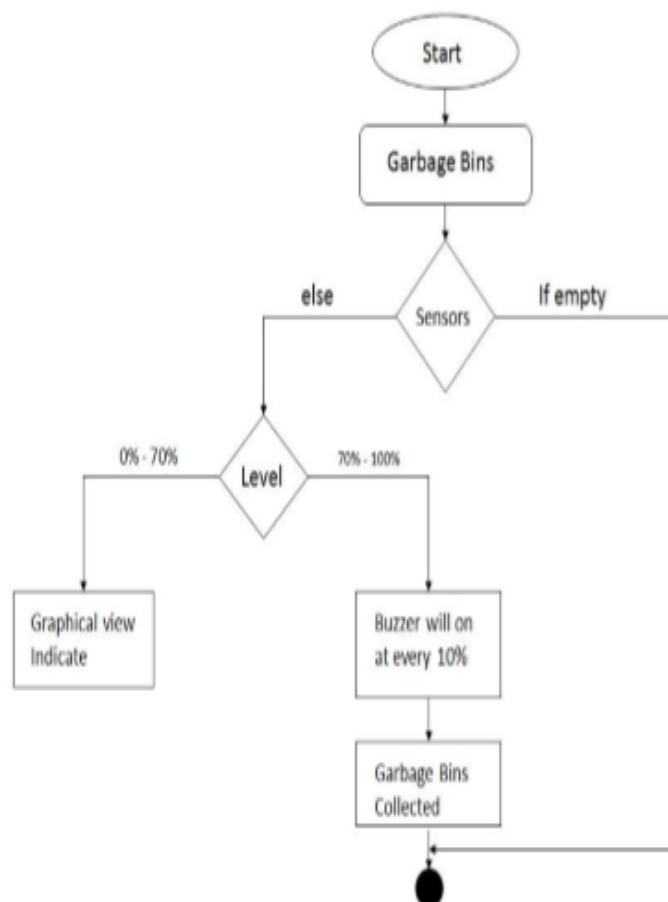

Fig 3.1 Workflow of the smart bin system

ARCHITECTURE DIAGRAM

Fig 4.1 explains the architecture diagram of the Smart bin system. It consists of IR sensor, Humidity sensor, capacitive sensor, pic microcontroller, GSM, IOT.

IR is an infrared sensor is an electronic device that sense some aspects of the surroundings. An Infrared sensor can be used to measure the heat of an object as well as detects the motion. Generally in the infrared spectrum, all the objects radiate some form of thermal radiations.A humidity sensor is used to sense, measure and report both moisture and air temperature. The percentage of moisture in the air to the highest amount of moisture at a particular air temperature is called relative humidity. Relative humidity becomes an essential factor, when looking for comfort. A capacitive sensor is a proximity sensor that finds nearby objects by their effect on the electrical field created by the sensor. Simple capacitive sensors are available for a very long time and have found a niche in non-metallic object detection, but are limited to short ranges, typically less than 1 cm. Global System for Mobilecommunications (GSM) is the famous standard for mobile phones in the world. This means that the data communication among the authorities was easy to build into the system. GSM EDGE is a 3rdGeneration version of the protocol.
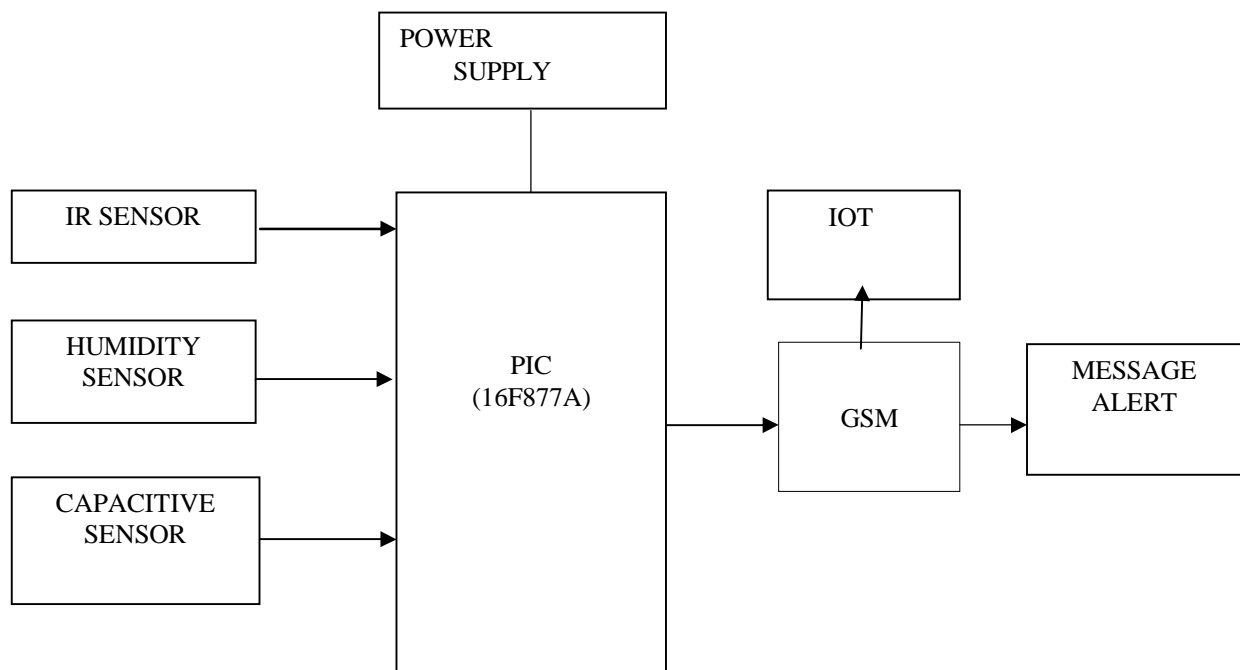

Fig 4.1 Overall view of the smart bin system.

APPLICATIONS
1. Real time based cleaning our cities.
2. Solid waste management.
3. Mainly used in "SMART CITY".
4. Empowered Swath Bharat Mission.
5. Reduced Environmental pollution.

IV. CONCLUSION AND FUTURE WORK

In this project we have implemented real time waste management system by using smart dustbins to check the fill level of smart dustbins whether the dustbin are full or not. In this system the information of all smart dustbins can be accessed from anywhere and anytime by the concern person Corporation authority and he/she can take a decision accordingly. The waterproof sensors are very much advanced and useful in detecting the level at very accurate measure. By implementing this system the cost reduction, resource optimization, effective usage of smart dustbins can be done and also indirectly reducing traffic in the city.

REFERENCES

1. Monika K A, NikithaRao, Prapulla S B, Shobha G, "Smart Dustbin-An Efficient Garbage Monitoring System" International Journal of Engineering Science and Computing, June 2016.Pp.7113-7116.
2. Hsiao, Shih-Hua, Jyh-Ling Lin, Yuan-Lung Chin, and Tai-Ping Sun. "Comparison of sol-gel and sputtering method properties of TiO 2 thin film ultraviolet sensor." In Sensors, 2008 IEEE, pp. 321-324. IEEE, 2008.
3. Chen, F. M., H. X. Yang, and Z. M. Li. "Influences of effective width of photo-electric sensor on acceleration measurement."2010 Asia-Pacific Conference on Power Electronics and Design. 2010
4. Jeong, Jin Wook, et al. "The emission properties of integrated organic light emitting diodes with organic photo sensor for emotional lighting applications."IEEE Electron Device Letters 32.3 (2011): 348-350.
5. Ho, Derek, Glenn Gulak, and Roman Genov. "CMOS field-modulated color sensor." 2011 IEEE Custom Integrated Circuits Conference (CICC).IEEE, 2011.Z
6. Kim, Donghyun, "A designated query protocol for server less mobile RFID systems with reader and tag privacy", Tsinghua Science and Technology, Vol.17, No.5, pp.521-536, Oct.2012R. Weinstein, "RFID: A technical overview and its application to the enterprise", IT Professional, Vol. 7, pp. 27 -33, May-June 2005.
7. KanchanMahajan, Prof.J.S.Chitode "Waste Bin monitoring system using Integrated Technology", International Journal of Innovative Research in Science engineering and Technology",vol 3,Issue 7,july 2014.