SMART GARBAGE MONITORING SYSTEM

R. ROBERT

Assistant Professor,

Dept. of Electronics and Communication Engineering,

Annai Velankanni College of Engineering,

Kanyakumari .

Email id: rrobertraj@gmail.com

Dr.V.V. VINOTH., M.E, Ph.D

Associate Professor,

Dept. of Electronics and Communication Engineering,

Annai Velankanni College of Engineering,

Kanyakumari.

Email id: vinfo.vv@gmail.com

Abstract - **IoT based garbage level monitoring system is an emerging technology for the detection, monitoring and management of waste and filling level of public and industrial garbage bins. It helps the municipal services to pick up the garbage bins overflow. The main contribution of this project the IoT based Garbage Monitoring system will help to keep the cities clean. It allows the waste management to monitor based on the garbage depth inside the dustbin. The ultrasonic sensor used in this project will capture the level of garbage in the dust bin.**

Keywords- Microcontroller, Ultrasonic sensor, ARDUINO

I. INTRODUCTION

Smart garbage monitoring system is essential for cities to reduce cost and manage resources and time. Majority diseases and infections are created in a polluted environment. Garbage bins are overfull and spilled out from the bins causes various diseases as large number of insects and mosquitoes breed on them. Environmental prevention using technological sources is needed at present. The majority of the public environment is polluted with the waste material raised by modern cities for waste collection and disposal.

This project will help to minimize the garbage disposal problem using the Internet of Things (IoT) is a recent communication in which the objects of everyday life will be equipped with microcontrollers. This project IOT Garbage Monitoring system will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage.

For this system uses ultrasonic sensors fixed over the bins to detect the level of garbage and the garbage bins depth. The system makes use of the Arduino family microcontroller, LCD screen, Wi-Fi modem for sending data and a 12V transformer. The LCD screen is used to display the level of garbage collected in the bins. The web page gives a graphical view of the garbage bins and show the level of garbage collected. Thus this system helps to inform about users the garbage levels of the bins by keeping the city clean.

II. LITERATURE REVIEW

[1]. Prof R.M. Sahu et. al. has built a garbage monitoring system with camera set to each garbage collection point and fixed sensor at the base of the dust bin. The camera will take snapshots of the garbage bin, once the threshold level is sets which compare the output of the load sensor and the camera. The microcontroller checks if the threshold level is exceeded or not and compares the result. After analyzing the level of garbage in the dustbin and from the load cell sensor, then the weight of garbage can be known. This method is convenient to use but economically not reliable.

[2] Meghana et.al. proposed a garbage monitoring system with Infrared sensor is used to detect the level of garbage. IR sensor consists

of IR transmitter and IR receiver that emit light, which is invisible to the naked eye but the electronic components can detect it. The sensor senses the level of the dust bin and gives the output of what level of garbage is filled. When the level in a dust bin reaches the threshold, the LED placed in the bin starts blinking. When the LED blinks display opens it shows the location of the bin, bin gets filled, and the text message is sent to the concerned person.

[3]. Jaekeun et.al. proposed an IOT-based smart garbage system to reduce the amount of food waste using wireless mesh networks, and analyze the information for service provisioning. This system increases the battery lifetime. This method 33% food waste could be decreased.
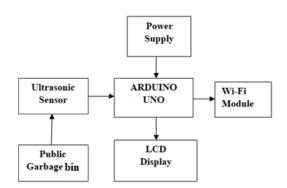
III. PROPOSED METHOD

Fig.1 Block diagram

The IOT Garbage Monitoring system will help to keep the cities clean, this system monitors the garbage bins continuously and informs about the level of garbage collected in the dust bins via a web page. The system uses a 12V transformer. Garbage level detection is done by the HC-SR04ultrasonic sensor. The ultrasonic sensor is fixed on top of the dustbin facing the bottom to detect the garbage level and compare it with the garbage bins depth. The ESP8266 is used to act as the WiFi module, it connect to the Arduino for sending data.

ESP8266 is integrated with TCP/IP protocol give any microcontroller access to Wi-Fi network. Then the LCD display is used to show the reading of the garbage inside the dustbin;the type of waste (will be displayed. Finally, the Blynk applications (apps) is used to indicate the cleaner through the smartphone.
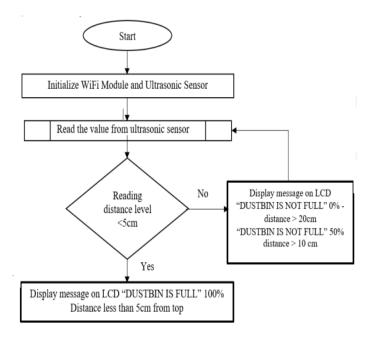

Fig.2 Flow chart

Fig. 2 shows the flow chart of a garbage monitoring system. Ultrasonic sensors sense whether the dustbin is filled or not, when the distance measured by the sensor is less than the threshold value programmed in the microcontroller.The distance from the top lid is less than 5cm, the LCD display the message Dustbin is Full-100% . The same message is intimated to the mobilephone through WiFi module (IoT). In Blynk apps display the message as "Dustbin is Full-100%". If the distance of waste from the top of the lid is more than the threshold value, then the LCD is displayed the message "Dustbin is Not Full-0%" or "Dustbin is Not Full-50%".

III. HARDWARE USED

Microcontroller

It gets information from sensors and compares the received data with the threshold level set and output is generated. Based on a 16/32-bit ARM7TDMI-S CPU the LPC2131/32/34//38 microcontrollers are used with real-time emulation and high-speed flash memory. Power Supply: 12v power supply is used to provide DC voltage to the components.

WI-FI Modem

This ESP8266 module has a powerful processing and storage capability. ESP8266EX achieves low power consumption in IoT applications with a combination of several technologies. Active mode, sleep mode and deep sleep are the three modes of the power-saving architecture; this allows battery to run longer.

Ultrasonic Sensor

The Ultrasonic Sensor sends a high-frequency sound pulse. The sensor will continuously emit the waves, when the emitted light hits the object and reflects back, it also calculates the distance of the object.
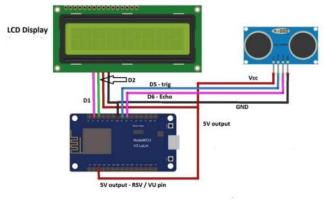

Fig.3 Circuit diagram

The ARDUINO ESP8266 measures the garbage level by triggering the ultrasonic sensor, displaying the garbage level on the LCD and sending garbage level data through the internet.

IV. CONCLUSION

This smart garbage monitoring system contributes to the clean and hygienic environment in building a smart city, also avoiding the overflow of garbage in residential areas. It can automatically monitor the garbage level and send the indication to a collection truck or users. The proposed system is to ensure a practical and perfect solid garbage collection process for a green environment. This smart garbage monitoring system can reduce the humidity and time waste management and monitor the level of the garbage, whether it is full or not.

REFERENCES

[1] Garbage and Street Light Monitoring System Using Internet of Things, Prof. R.M. Sahu, Akshay Goadse, Pramod Shinde, Reshma Shinde, International journal of innovative research in electrical, electronics, instrumentation and control engineering, Volume 4, Issue 4, April 2016.

[2] IOT Based Intelligent Bin for Smart Cities, Meghana K C, Dr. K R Nataraj, IJRITCC May 2016.

[3] Jaekeun, Mahfuzulhoq Chowdhury and Md. Arafin Mahamud, Dissipation of Waste using Dynamic Perception and Alarming System: A Smart City Application, 2nd Int'l Conf on Electrical Engineering and Information & Communication Technology (ICEEICT) 2015 Jahangirnagar University, Dhaka- 1342, Bangladesh, 21-23 May 2015

[4] Kanchan Mahajan, Prof.J.S.Chitode, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 3, Issue 7, July 2014.

[5] Md. Shafiqul Islam, M.A. Hannan, Maher Arebey , Hasan Basri , "An Overview For Solid Waste Bin Monitoring System", Journal of Applied Sciences Research, ISSN 181-544X, vol.5,lssue4, February 2012.

[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.

[7]   Richu Sam Alex, R Narciss Starbell, "Energy Efficient Intelligent Street Lighting System Using ZIGBEE and Sensors", International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-3, Issue-4, April 2014.

[8]   Narendra Kumar G., Chandrika Swami, and K. N. Nagadarshini, "Efficient Garbage Disposal Management in Metropolitan", Cities Using VANETs Journal of Clean Energy Technologies, Vol. 2, No. 3, July 2014.

[9]   Emily Gertz, Patrick Di Justo,"Environmental Monitoringwith Arduino"Copyright © 2012 Emily Gertz and Patrick Di Justo. All rights reserved. Printed in the United States of America,ISBN: 978- 1-449-31056-1, January 20, 2012.

[10]   P. G. Jose, S. Chatterjee, M. Patodia, S. Kabra, and A. Nath, "Hash and Salt based Steganographic Approach with Modified LSB Encoding," Int. J. Innov. Res. Comput. Commun. Eng., vol. 4, no. 6, pp. 2257–2263, 2016.

[11]   S. S. Navghane, M. S. Killedar, and V. M. Rohokale, "IoT Based Smart Garbage and Waste Collection Bin," Int. J. Advanced Research in Electronics and Communication Engineering (IJARECE) vol. 5, no. 5, pp. 1576–1578, 2016.

[12]   V. Bhor and P. Morajkar, "Smart Garbage Management System," Ijert, vol. 4, no. 3, pp. 1117– 1120, 2015.

[13]   A. Theodore, Z. Arkady, M. Alexey, "Top-k Query based Dynamic Scheduling for IoT-enabled Smart City Waste Collection" 2015 16th IEEE International Conference on Mobile Data Management.

[14]   S. Dugdhe, P. Shelar, S. Jire, and A. Apte, "Efficient waste collection system," Int. Conf. Internet Things Appl. IOTA 2016, pp. 143–147, 2016.

[15]   P. Chattopadhyay, R. Chaudhuri, S. Dasgupta, and P. Chattopadhyay, "Smart Garbage Monitoring System" School of Computer Science and Engineering, vol. 6, no. 5, pp. 705– 710, 2017.

[16]   K. Akash, D Choudhari, C. U. Sandeep and P Rashmi. "IOT based garbage management system", Ijarcet, Volume 6, Issue 4, April 2017, ISSN: 2278-1323