iJRASET
International Journal For Research in Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 5 **Issue:** IV **Month of publication:** April 2017

DOI: http://doi.org/10.22214/ijraset.2017.4002

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

Volume 5 Issue IV, April 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

Trash Bin Monitoring System using IOT

Ms. S. Nirmala[1], G. Vani Priya[2], M. Rathna Bala[3]
[1,2,3]*Department of Information Technology*
Velammal College of Engineering and Technology , Madurai, Tamil Nadu.

***Abstract**: In the present day scenario, we see that the Dumpster or Dust bin placed in the cities is overflowing due to increase in the waste. It causes unhygienic condition and leads in spreading deadly diseases & human illness, to avoid such a situation we are planning to design "Dumpster Monitoring System". In this proposed system each dumpster contains an embedded device to track the level of the garbage in the dumpster and unique ID will be provided to easily detect which dumpster gets filled. The embedded device consists of IR Sensor, Arduino Uno and Arduino Wi-Fi Shield. Once the level gets filled it will transmit the level of the garbage with the unique ID through the mobile application. The notifications are accessed by the concern authorities through the internet and they can take immediate actions to clean the dumpster.*
Keywords: Garbage, IR Sensor, Arduino Uno, Arduino Wi-Fi Shield, Internet.

I. INTRODUCTION

Due to the increase in population, and rapid growth of industries, the amount of Municipal Solid Waste is increasing at a very high pace. At present, the amount of solid waste produced in urban India is 68.8 million tons per year .This shows the need for proper waste management solutions so that the harmful effects can be reduced. The waste management includes the generation of the waste from industries, houses, markets etc. from which the waste is thrown in the garbage bins. This waste is further picked up by the municipal corporations to finally dump it in dumping areas and landfills. But due to lack of resources, ineffective groundwork, some waste is not collected which poses serious health hazard to the surrounding environment. Proper cleaning intervals may provide a solution to this problem. But keeping track of the status of the bin manually is a very difficult task. The solution to this problem is discussed in this paper. This paper proposed a system for detecting the level of the garbage in the dustbin and transmits this information through mobile application to the corporation. [1] Things (Embedded devices) that are connected to Internet and sometimes these devices can be controlled from the internet is commonly called as Internet of Things. In our system, the Dumpster is connected to the internet to get the real time information about the levels of the dustbins.

II. EXISTING SYSTEM

In [3], GSM (Global System for Mobile Communication), PIC16F73 microcontroller, HC-SR04 Sensor forms the Integrated system to monitor the waste bins. The sensors are attached to the waste bin to monitor the level. The system encloses sensor circuit and GSM module for monitoring the smart bin. The sensor circuit used here is Ultrasonic sensor and it has two pins i.e., Trigger and Echo, which are used for calculating the time duration by generating sound waves and thus calculating the time duration of the echo that is generated.

Every smart bin is equipped with ultrasonic sensor which measures the level of dustbin being filled up. Every time the garbage crosses a level the sensor receives the data of the filled level. Every level the dustbin gets filled up is received at the interface end using message service. SMS received from the GSM modules of our bin is taken in the form of text files. [4] The bin will send the data about the levels of the garbage collected in different parts of the city. This system will send the messages which contain the updated level of garbage along with the date and time stamp. The route optimization algorithm can be used for the route planning by predicting the fill due date of each bin based on their updated level.

©IJRASET: All Rights are Reserved

Volume 5 Issue IV, April 2017
ISSN: 2321-9653
International Journal for Research in Applied Science & Engineering Technology (IJRASET)

III. PROPOSED SYSTEM

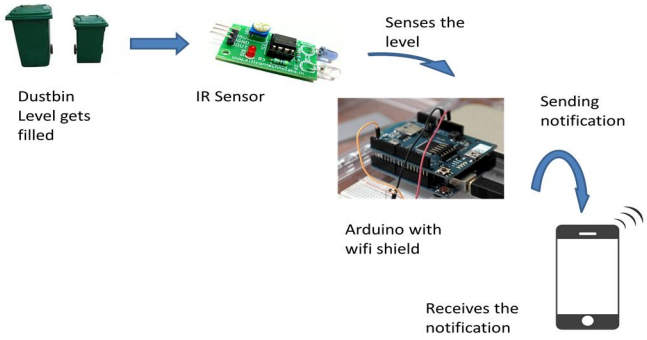


Fig 3.1. Framework for Dumpster Monitoring System

A. Arduino Microcontroller

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board. The Arduino platform has become quite popular with people just starting out with electronics. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board – you can simply use a USB cable. Finally, Arduino provides a standard form factor that breaks out the functions of the micro-controller into a more accessible package.

B. IR Sensor

An Infrared (IR) sensor is used to detect level in the dustbin whether the dustbin is full or not. An IR sensor consists of an emitter and detector. Emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, its resistance and correspondingly, its output voltage, change in proportion to the magnitude of the IR light received. This is the underlying principle of working of the IR sensor[9].

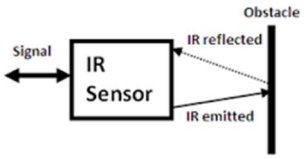


Fig 3.2. IR sensor

C. Arduino Wi-Fi Shield

The Arduino WiFi Shield connects Arduino to the internet wirelessly. Arduino WiFi Shield is open-source hardware. There is an onboard micro-SD card slot, which can be used to store files for serving over the network. It is compatible with the Arduino Uno and Mega. The on board microSD card reader is accessible through the SD Library. Arduino communicates with both the Wi-Fi shield's processor and SD card using the SPI bus. Digital pin 7 is used as a handshake pin between the WiFi shield and the Arduino.



Fig 3.3 Arduino Wi-Fi Shield

©IJRASET: All Rights are Reserved

D. RF Reader

A radio frequency identification reader (RFID reader) is a device used to gather information from an RFID tag, which is used to track individual objects. Radio waves are used to transfer data from the tag to a reader. RFID is a technology similar in theory to bar codes. However, the RFID tag does not have to be scanned directly, nor does it require line-of-sight to a reader. The RFID tag it must be within the range of an RFID reader, which ranges from 3 to 300 feet, in order to be read. RFID technology allows several items to be quickly scanned and enables fast identification of a particular product, even when it is surrounded by several other items. RFID tags have not replaced bar codes because of their cost and the need to individually identify every item

IV. METHODOLOGY

A. Arduino IDE

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino and hardware to upload programs and communicate with them. It is a open source software. It uses the concept of a sketchbook- a standard place to store the sketches. The Arduino Software (IDE) is easy-to-use for beginners, yet flexible enough for advanced users to take advantage of as well.

V. WORKING PRINCIPLE

The block diagram shows the different components used in the Dumpster monitoring system. IR Sensor, Arduino Uno Microcontroller, Arduino Wi-Fi Shield, RF reader and the Android application.

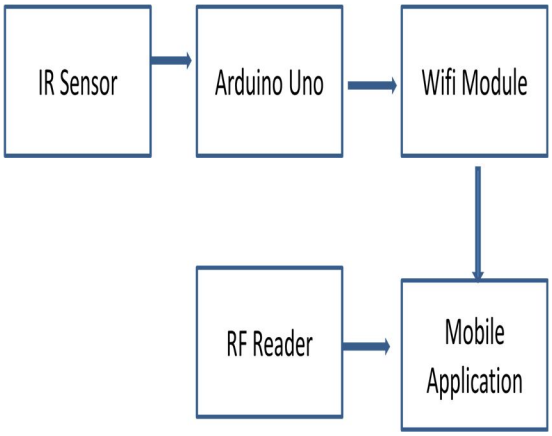


Fig 5.1.Block Diagram of the Proposed System

IR sensor is used to detect the level of the dustbin whether it is full or empty. The sensor senses the content of the dustbin and sends the date to the Arduino microcontroller. Power supply is given to the microcontroller to execute the system. Arduino Uno reads the data from the sensor and process the data received from the sensor.

Arduino Microcontroller is connected to the Wifi Shield. Digital Pin 7 is used for connection of the Arduino and Wifi shield. Arduino Uno sends the processed date to the Wifi shield. [8] Using this shield the data will be transmitted wirelessly to the mobile application. The mobile application will display the status of all the dustbin in the city. The data will be transmitted to the mobile application along with the unique id.

VI. FUTURE WORK

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 and he/she can take a decision accordingly. By implementing this proposed system the cost reduction, resource optimization, effective usage of smart dustbins can be done. This system indirectly reducing traffic in the city.

The scope for the future work is this system can be implemented with time stamp in which real-time clock shown to the concern person at what time dust bin is full and at what time the waste is collected from the smart dustbins. Instead of light weighted particles occupying the dustbin space, dustbin can be compressed using piston so that when the compressor reaches the maximum level for compression, it blocks the inlet lid such that no garbage from outside can be dumped into the dustbin.

©IJRASET: All Rights are Reserved

Volume 5 Issue IV, April 2017
ISSN: 2321-9653

VII. CONCLUSION

Urbanization is at its rapid growth stage around the world, as more number of people desire to live in the city lights with more opportunities for growth and success. Cities are expanding like never before to accommodate this growth and in this process the concept of smart cities came into action. The parameters like cleanliness and hygiene are the topic of concern in these smart cities and concrete measures should be taken for that. Also, the growth should go hand in hand with the green environment and research should be further done on such technology. Our work is a small but efficient step towards cleanliness and we believe that this paper would encourage people to do good work on the similar topics.

In this paper, a new solution is developed to enhance solid waste monitoring. The developed system provides improved performance on real bin status. The system is also contributed to reallocate the location of the bin from solid waste amount that have been thrown daily. Hence, the control server of the system can plan for better bin distribution and solid waste amount that can detected from the system. Thus, solid wastes bin, its status and position can be managed and monitored using the developed system.

REFERENCES

[1] Twinkle Sinha, K.Mugesh Kumar, P.Saisharan “Smart Dustbin” International Journal of Industrial Electronics and Electrical Engineering, Volume-3, Issue-5, May-2015

[2] Tarandeep Singh, Rita Mahajan, Deepak Bagai “Smart Waste Management using Wireless Sensor Network”, Vol. 4, Issue 6, June 2016, International Journal of Innovative Research in Computer and Communication Engineering.

[3] Akshay Bandal, Pranay Nate, Rohan Manakar, Rahul Powar “Smart Wi-Fi Dustbin System” Internaional Journal of Advance Research, Ideas and Inovation in Technology, ISSN: 2454-132X Volume2, Issue5.

[4] Oyndrila Roy, Aranyak Roy, Dr.Debasis Roy, “Automatic water level indicator” Issue 6, Vol. 2 March 2016, International Journal of Emerging Trends in Engineering and Development.

[5] Maher Arebey, M A Hannan, Hassan Basri, R A Begum and Huda Abdullah “RFID and Integrated Technologies for Solid Waste Bin Monitoring System” Proceedings of the World Congress on Engineering Volume I.

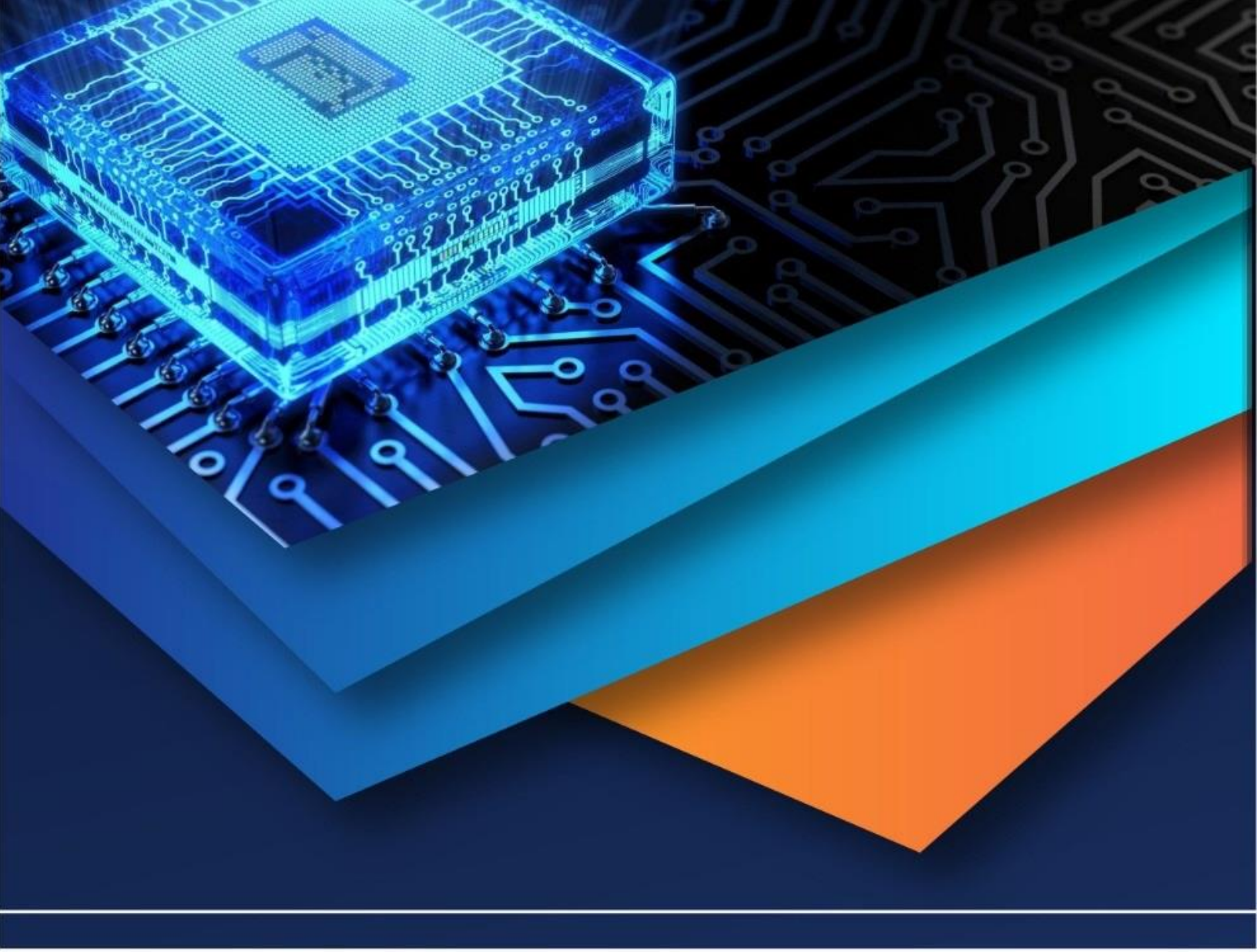
[6] Mohd Helmy Abd Wahab, Aeslina Abdul Kadir, Mohd Razali Tomari, “A Conceptual Approach of Smart Waste Management with Integrated Web based System” WM2008 Conference.

[7] Narayan Sharma, Nirman Singha, Tanmoy Dutta, “Smart Bin Implementation for Smart Cities”International Journal of Scientific & Engineering Research, Volume 6, Issue 9, September-2015

[8] Md. Asaduzzaman Miah, Mir Hussain Kabir, Md. Siddiqur Rahman Tanveer and M. A. H. Akhand “Continuous Heart Rate and Body Temperature Monitoring System using Arduino UNO and Android Device” EICT, International Conference on Electrical Information and Communication Technology.

[9] Baharuddin Mustapha, Aladin Zayegh, Rezaul K. Begg “Ultrasonic and Infrared Sensors Performance in a Wireless Obstacle Detection System” Volume I, First International Conference on Artificial Intelligence, Modelling & Simulation.

©IJRASET: All Rights are Reserved



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)