

Monitoring and Maintaining of Municipality using IoT

Dr.M.Yuvaraju¹ P.Santhiga²

¹Assistant Professor ²PG Scholar

^{1,2}Department of Electrical & Electronics Engineering

^{1,2}Anna University Regional Campus, Coimbatore, India

Abstract— In the present days due to rising population there is increasing in waste from domestic as well as industrial and way they disposed is not in proper way for example there is separate bin for placing degradable and Non Bio degradable but they put it in single bin. Therefore bin gets filled quickly than the normal filling. After filling gets blow-out over streets and leads to formation of leeches and other diseases causing insects. Then the intimation to the municipality is very late when the drainage leaked and spread waste water throughout road leads to diseases. The main thing is need of human effort for monitoring the huge tank of whole area and there is any problem in steps it leads to damage or loss of human life. In order to avoid these problems we place the bin, water tank and drainage in a single server and monitor the whole area using IoT. This is the best solution for monitoring and maintaining of municipality with economic rate.

Key words: WiFi module, IoT, Infra-Red Sensor, Gas Sensor, Level Sensor, Floating Sensor

I. INTRODUCTION

Recent days major problem is a lot of diseases that spread through water and other waste materials. The major cause for this entire problem is human only. In order to overcome these problems we give a solution that if the waste bin filled means get intimated to the control room by server through the wireless module by placing ultrasonic sensor and thing like water filling and water level of whole area water tank is monitored by the floating sensor. Then whole area is also monitored by in order to prevent from leaking through streets by avoiding these problem we make our area clean and hygiene. All the projects are invented to human more comfortable zone for these reasons we monitor the whole area in single server.

II. OVERVIEW

Most of the projects about the garbage are based on the segregation of the bio degradable and non-bio-degradable waste, then disposal of the waste electronics items in waste bin causes serious problems but the disposal of these wastes is difficult to do and it is not a easy job. But filling of dustbin is easy with this waste. Monitoring of dustbin is very low in the recent days; there is no control about the cleaning and monitoring of the municipality dustbin.

A. Burning:

Open burning is a legacy heat producing treatment that is environment harmful. The method used in such process has no pollution control devices. They release elements such as hexachloro benzene, dioxins, carbon monoxide, particulate matter, volatile organic compounds, polycyclic aromatic compounds, and ash.

B. Dumping:

But in case of liquid waste it is difficult to remove and burn, the formation of disease causing insects are high in these waste there is a solution for these waste also that is dumping of waste.

C. Landfills:

Sanitary landfills provide the most common used waste disposal solution. These landfills are desired to remove or reduce the risk of environment or public health issues due to waste disposal. These sites are situated where land features work as natural medium between the environment and the landfill. For instance, the landfill area can be comprised of clay soil which is quite resistant to hazardous wastes or is characterized by an absence of surface water bodies or a low water table, preventing the risk of water pollution. The use of sanitary landfills presents the least health and environmental risk, but the cost of establishing such landfills is comparatively higher than other waste disposal methods. There is another solution is *Controlled dumps* are more or less the same as sanitary landfills. These dumps comply with many of the requirements for being a sanitary landfill but may lack one or two. Such dump may have a well-plan capacity but no cell-planning. There may be nil or partial gas manages, base record keep, or regular cover.

D. Recovery:

There is a lot of solutions for disposal of but the major problem is maintaining of dustbins in lot of areas and for the huge cities in very difficult due to the large populations and overall maintain of drainage waste facility cleaning is not available we waste the human efforts for monitoring of water tanks and the drainage cleaning if it gets automated the loss of human life due to sucked in drainage and climb in large tank for watching of water level gets reduced if there any chance they miss their grip it leads to death. So the major part of engineering development is to reduce risking job to human and safely if we introduce IOT in any area it leads to maintain the complete database of the system for what purpose there are invented.

III. TECHNICAL BACKGROUND

In the existing system there is no sensor control and monitoring of urban wastes. The source of solid waste generation. Among the various sources, solid waste generation is expected to be high in residential areas. And the process of collecting is scheduled according to the time and so though the waste bins are overflowed it is collected only at the scheduled time. This leads to obnoxious odour and fly formation. In the past there is no information about the collecting time and area. Lack of accurate monitoring system for tracking all activities linked to solid waste management makes the social order polluted. The performance of the drivers are not notified so that there is no

quick response to urgent cases There is no quick way to response to client's complaints about uncollected waste.

IV. PROPOSED SOLUTION

A. Sender Section

Level detector consists of Infrared sensors which are used to find the height of the waste in the dustbin. The output of level detector is given to microcontroller. Four IR sensors are used to indicate the different levels of the amount of garbage collected in the dustbin which is placed in public area when the dustbin is filled up to the highest level the output of the fourth IR sensor becomes active low the output is given to the microcontroller to send the message to the controller room via Wi-Fi module the entire system is monitor by the person sitting in the control room. The module is used to send message to the contractor for cleaning the dustbin.

B. Receiver Section

At receiver, control room is present where all the activities are manage. The no. of control room in is depends on the dustbin presence in the area the person sitting in the control room monitors the entire system .Module is collected to the computer of the control room through micro controller the entire system monitor by the person sitting in the controller room the module is used to send the message to the contractor for the cleaning the dustbin. GUI is developed by PROTEUS software. This GUI displayed on the computer screen in the control room to display the status of the garbage level in the dustbin.

V. OUTPUT UNIT

Output unit is the third section of the based cost efficient solid waste management output unit has a weight unit, voucher unit. All the output units are interfaced to the PIC microcontroller. If BIN IS FULL! Message when the trash can is full.

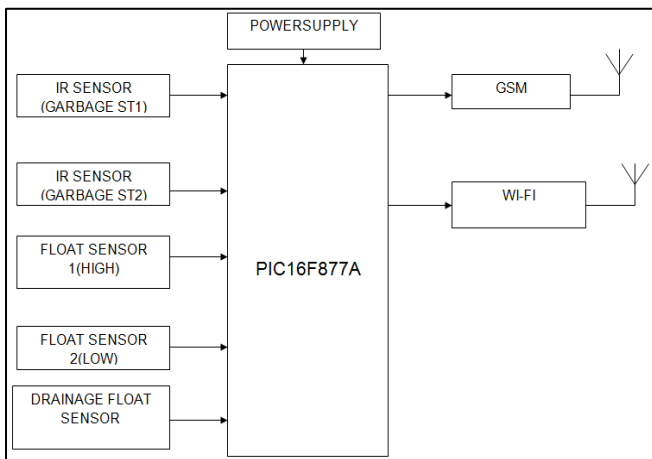


Fig. 1: Block Diagram

A. Applications and Advantages

- 1) To collect dustbins placed at the public places in city.
- 2) The project can also be used in college/university campus
- 3) The project can also be used in companies.
- 4) Many times compost dustbin is surplus and many animals like dog or goat enters inside or near the

dustbin .This creates a bad scene. Also some birds are frustrating to take out garbage from dustbin. The project can avoid such situations.

VI. HARDWARE DESCRIPTION

A. PIC Microcontroller

PIC controller is controlled by software and programmed in such a way that it performs different tasks and controls a generation line. This microcontrollers are used in different new applications such as smart phones, audio accessories and advanced medical devices.It contains more RAM and much more I/O pins, a UART, A/D converter and a lot more features.It utilizes 5V power supply *fig(2)*

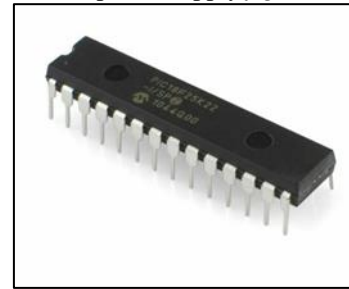


Fig. 2:

B. GAS Sensor

Gas detectors can be used to detect combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in industry and can be found in locations, such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic. *fig(3)*



Fig. 3:

C. IR SENSOR:

An Infrared sensor is an electronic device which is used to sense certain characteristics of its surroundings by either emitting and/or detecting IR radiation. Infrared sensors are also capable of measuring the high temperature being emitted by an system and monitoring motion *fig(4)*.

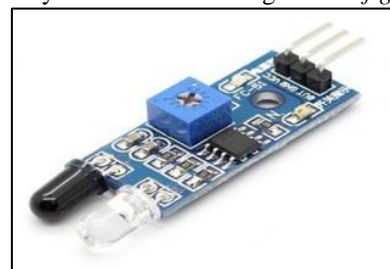


Fig. 4:

D. Float Sensor:

A float sensor is a device used to find the height of water within a tank. The sensor may be used to control an

indicator, an alarm, a pump or to control other devices. One type of float sensor uses a mercury switch inside a hinged float. Another common type is a float that rises a rod to actuates a microswitch fig(5)



Fig. 5:

VII. SIMULATION RESULTS:

A. Normal Condition

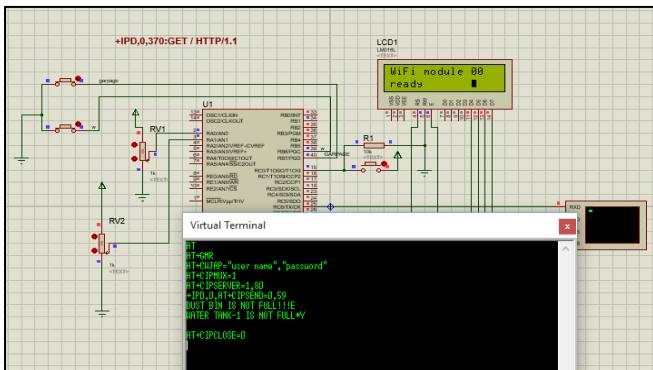


Fig. 6:

Initially water level sensor and IR sensor is active. If they both are full it will intimate to the control through wifi module and it will not fill also intimate the level for every changes it may be rise or fall. It is shown in fig(6)

B. During Full Condition

If dustbin is full or water level is full sensor will intimate to controller and then controller send information to the control room via WIFI module. Drainage and odour sensor is also

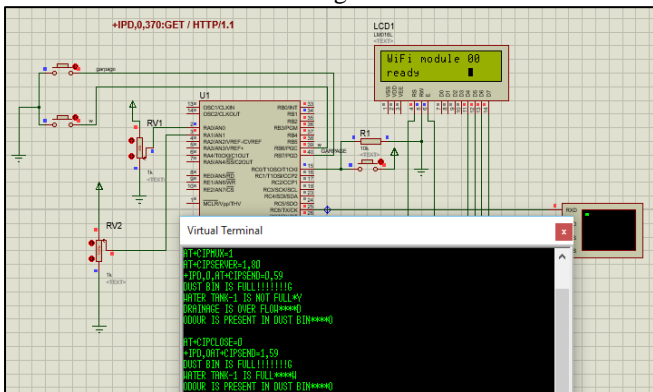


Fig. 7:

Available with module both can active but it will intimate only when odour is present and drainage gets leak. It will shown in Fig(7)

C. Some Fill & UNFILL Condition

In other cases all the sensors are active if any changes in normal operation it will send information directly to the control room through WIFI module. According to sensor

information controller act and produce the response via human resources. Fig (8)

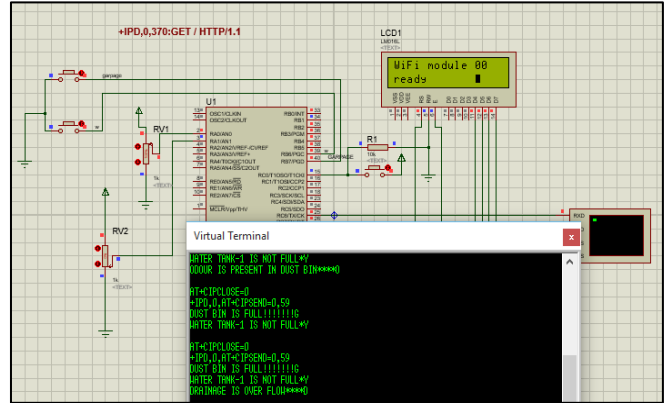


Fig. 8:

HARDWARE RESULTS

In hardware all the sensors are active when power supply is ON all the devices come to exciting condition according to sensors information microcontroller acts and send details to control room via WIFI module and actions will be taken to control all things. fig(9)

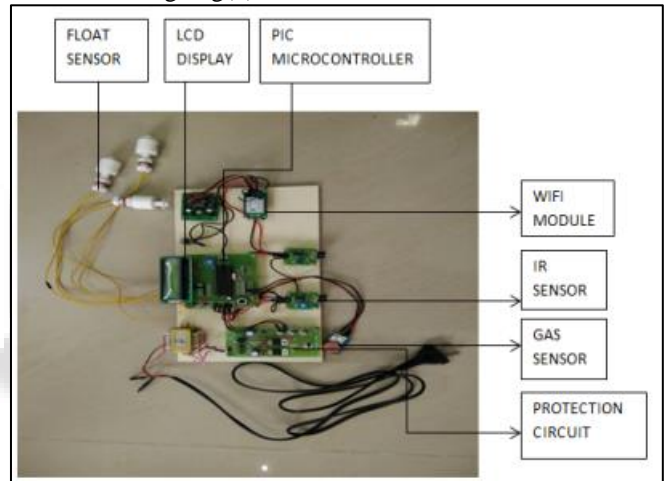


Fig. 9:

VIII. CONCLUSION

The intelligent alert system for proper monitoring and maintaining of garbage, odour, water level monitoring and also drainage for municipal surveillance using IOT is done. The GSM based segregation of waste and monitoring has been successfully designed to segregate waste and monitored at periodic interval of time for proper disposal of waste at right time in order to dispose the litter without causing any overflow and any hygiene risks.

IX. FUTURE WORK

In future may control over all municipality of all big cities in one place. In order to make our country clean and safe these system must be present. Communication speed level may be increased with GSM and increase the generation of internet world. It may extend upto which the whole district or city in place by surveillance system. This may change whole country and every system is automated.

REFERENCE

- [1] P.Suresh1J. Vijay Daniel2, Dr.V.Parthasarathy4” A state of the art review on the Internet of Things (IoT)” International Conference on Science, Engineering and Management Research (ICSEMR 2014)
- [2] Arkady Zaslavsky, Dimitrios Georgakopoulos” Internet of Things: Challenges and State-of-the-art solutions in Internet-scale Sensor Information Management and Mobile Analytics” 2015 16th IEEE International Conference on Mobile Data Management
- [3] Theodoros.Anagnostopoulos1,Arkady.Zaslavsky2,1, Alexey Medvedev1, Sergei Khoruzhnicov1” Top-k Query based Dynamic Scheduling for IoT-enabled Smart City Waste Collection” 2015 16th IEEE International Conference on Mobile Data Management.
- [4] Vikrant Bhor, Pankaj Morajkar, Maheshwar Gurav, Dishant Pandya4 “Smart Garbage Management System” International Journal of Engineering Research & Technology (IJERT) ISSN: 2278-0181 IJERTV4IS031175 Vol. 4 Issue 03, March-2015
- [5] Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, and Sehyun Park, “IoT-Based Smart Garbage System for Efficient Food Waste Management”, The Scientific World Journal Volume 2014 (2014), Article ID 646953
- [6] D.S. Khatriwal, P. Kraeuchi, M. Schawinger, “ A comparison of electronic waste recycling in Switzerland and in india,” Environmental Impact Assessment Review, Elsevier- Science Direct 25, pp. 492-504, 2012
- [7] Sung-woo Chung, R. Murakami-Suzuki, “A comparative study of e-waste recycling systems in Japan, South Korea and Taiwan from the EPR Perspective: Implications for developing countries,” Promoting 3Rs in developing countries: Lessons from the Japans experience, Chiba, IDEJETRO, pp. 125-145, 2008.
- [8] A. Jain, “Development and evaluation of existing policies and regulations for e-waste in India,” IEEE. In the year of 2013 pp.124-148
- [9] European parliament; Directive 2002/96/EC of the European Parliament and of the council; Official Journal of European Union, 37, pp. 24-38. 2003.
- [10]Waste Electrical and Electronic equipment, Source: Euro stat, 2010. Elsevier- Science Direct 25, pp. 492-504, 2005
- [11]European Parliament; Directive 2012/19/EU of the European parliament and of the council; Official Journal of European Union, 197, pp. 38-71, 2012.