

IOT BASED GARBAGE MONITORING SYSTEM

Akash k t, Dineshchoudhari S Y, Sandeep C U, Prof. Rashmi P M
Department of Electronics & Telecommunication Dr D.Y.Shool of Engg,Pune,India.

Abstract - In this paper, garbage monitoring system is implemented with IoT. This system monitors all the dustbins located throughout the city and compare it with the garbage bins depth. The ultrasonic sensors are used for detection of the dustbins status. The fire sensors are used for detection of fire in the dustbins. This project presents cost effective monitoring solution with ATmega16A microcontroller. When the level of the dustbin 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 concern authorities from their place with the help of internet and an immediate action can be made to clean the dustbins.

Index terms – IoT, ATmega 16A, Ultrasonic sensor, Fire sensor .

I. INTRODUCTION

Nowadays the population is increasing rapidly throughout the entire world, which causes in lack of health awareness in public and results in people investing less money in programs related to the waste management in society. This creates huge issues over people's health all over the world. Proper management of waste materials urban and rural areas is very important to maintain hygienic and healthy living environment to live. The Government of India has been struggling from many years to find a cost efficient and effective way to manage the country's increasing amount of garbage.

Majority of infections are spread because of bacteria and viruses in unhygienic and polluted environment. The technology sources are needed for safeguarding the environment at present. Majority of the environment in the public and residential areas are being polluted with the waste materials in public, residential and industrial areas.

The IoT based garbage monitoring system is a very innovative system which will help to keep the environment and cities clean. This system monitors the garbage bins throughout the city and informs about the level of garbage collected in the garbage bins to a person in the administrative department.

For number of times we have seen that the dustbins are being overflowed with the waste materials and the concern person don't have any information about it within the time, due to which unsanitary conditions are formed in the surroundings environment and living area. Bad smell is spread

out due to waste in dustbin at the same time. Also the bad look of the city which leads to air and environmental pollution and to some harmful infections and diseases around the locality which is spreadable easily.

The traditional system has some major issues like unhygienic environment and look of the city. One of the most common issues in the over populated and residential urban areas are garbage bins overflowing on to the streets and footpaths causing environmental pollution and unhygienic living conditions in surroundings. This is mainly due to the routines for cleaning the dustbins by the government municipal corporation, without taking the waste disposal rate of the areas. There are number of unwanted manual checks of garbage bin's level by municipal corporations which is less effective and time consuming. Trucks are sent to empty the dustbins whether they are full or not. And the trucks need fuel which is costly. The bad smell is spread and which may cause illness to living beings in the surroundings.

This paper has tried to overcome the above mentioned problems. Presented section is divided into sections. The introduction of the presented system is described in the first section of paper.

II. SYSTEM DESCRIPTION

The implemented design of the system is used to monitor garbage level of dustbins. The main aim of the paper is to effectively perform the internet data acquisition process and using the AVR accurately. This system monitors the garbage bins to detect the garbage level and compare it with the garbage bins depth and informs the level of total garbage collected in the garbage bins to the monitoring person at the different place. The one of the main aim of this system is to stop overflow of garbage in dustbins which can be achieved by managing the time of garbage collection. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. This project could be a lead taken towards clean environment.

ATmega16A microcontroller is used in this monitoring system. A 16*2 LCD is used at the dustbins to display the garbage levels. Ultrasonic sensors HC-SR04 are used to detect the garbage level of dustbins in different regions. Fire sensors are used in the system to detect the fire in dustbin if any. A power supply circuit is used for supplying power the circuit.

Crystal oscillator is used for applying pulses to trigger the process of level detection in the system.

A. BLOCK DIAGRAM:

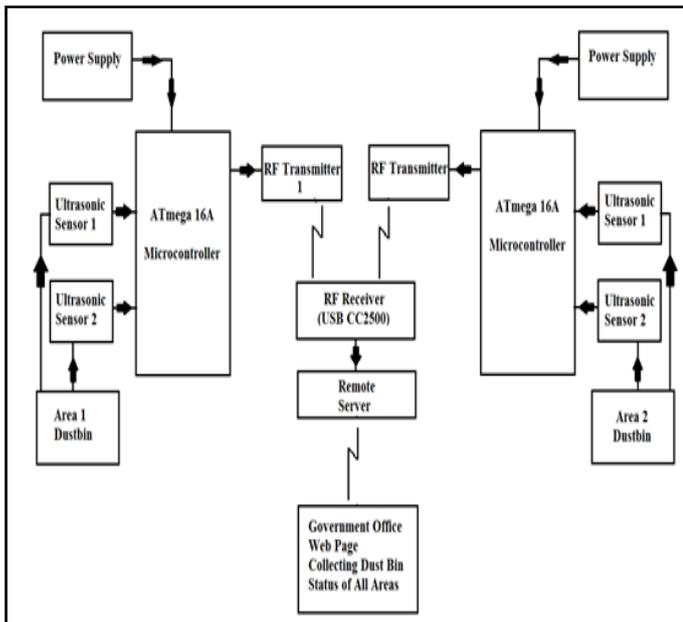


Fig.1 Block Diagram

This system basically consists of ultrasonic sensor, fire sensor, power supply circuit, RF CC2500 transceiver, LCD display, remote server and IoT. The presented system uses ultrasonic sensors placed over the dustbins to detect the garbage level and compare it with the garbage bins depth. Level is monitor via web page. Fire sensors are used in the presented system to detect if there is any fire incident currently going in any of the dustbins. Also ATmega16A is used as microcontroller for the presented monitoring system.

B. Circuit Diagram:

The circuit diagram shows the interfacing of components like sensors, LCD, etc. to the ATmega16A microcontroller. Port A pins 0 and 1 are interfaced with the ultrasonic. Port A pins 2 and 3 are interfaced with fire sensors. Port C pins 0 to 7 are interfaced with the 16*2 LCD for displaying data. Port D pin 1 is connected to reset circuit. Port D pins 5, 6 and 7 are interfaced for controlling contrast and brightness of 16*2 LCD display. Also crystal oscillator circuit is connected to ATmega16A microcontroller to generate and provide oscillator frequency to the system. Each component is connected to Vcc (+5V) i.e. power supply and ground. RF module is connected to port D pin.

The basic step of designing any system is to design the power supply for that system. The steps involved in the designing of the power are as follows, the first is to determine

the total current that the system sinks from the supply. Second step is to determine the voltage rating required for the different components in the circuit of the system.

System monitors the garbage bins. To detect the garbage level and compare it with the garbage bins depth. The system informs about the level of garbage collected in the garbage bins. Main aim is to stop overflow of garbage in bins. This system helps to make smart cities.

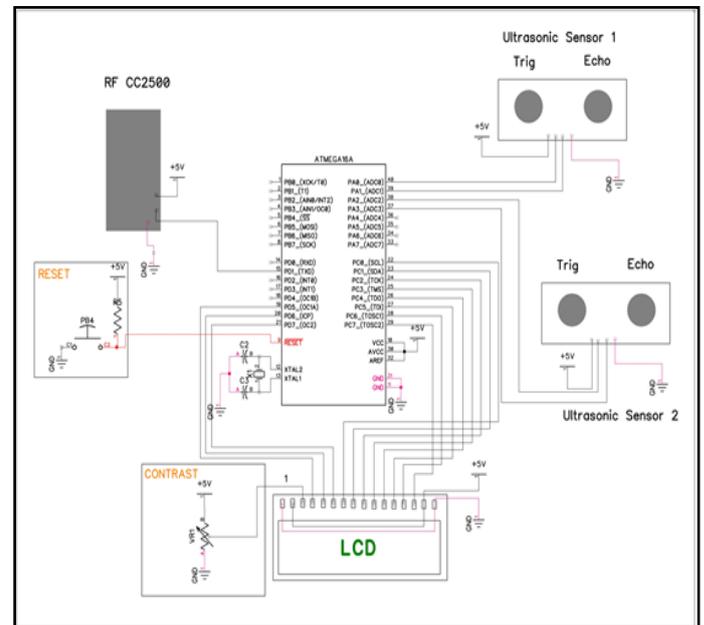


Fig.2 Circuit Diagram

Implementation of real time waste management system by using smart dustbins to check the level filled of smart dustbins and to check whether the dustbins are full or not. In this system the information of all smart dustbins can be accessed from anywhere and anytime by the authenticated person and authenticated person can take a decision accordingly. By implementing this system the cost reduction, resource optimization, effective usage of smart dustbins can be done. By reducing unnecessary rounds for garbage collection this system indirectly reduces traffic in the city. In urban cities the garbage collection vehicle visit a particular area's everyday twice or thrice depends on the population of the particular area and sometimes these dustbins may not be full. This system will inform the status of each and every dust bin in real time located throughout the city, so that the concerned authority can dispatch the garbage collection vehicle only when the dustbin is completely full or is about to full.

The traditional garbage collection system is changed into a smart and intelligent system. The integrated IoT system is very useful to remotely monitor the garbage levels in dustbins in cities. This system reduces cost and saves huge time. This system also reduces human efforts and it is user- friendly system.

C. FLOW CHART

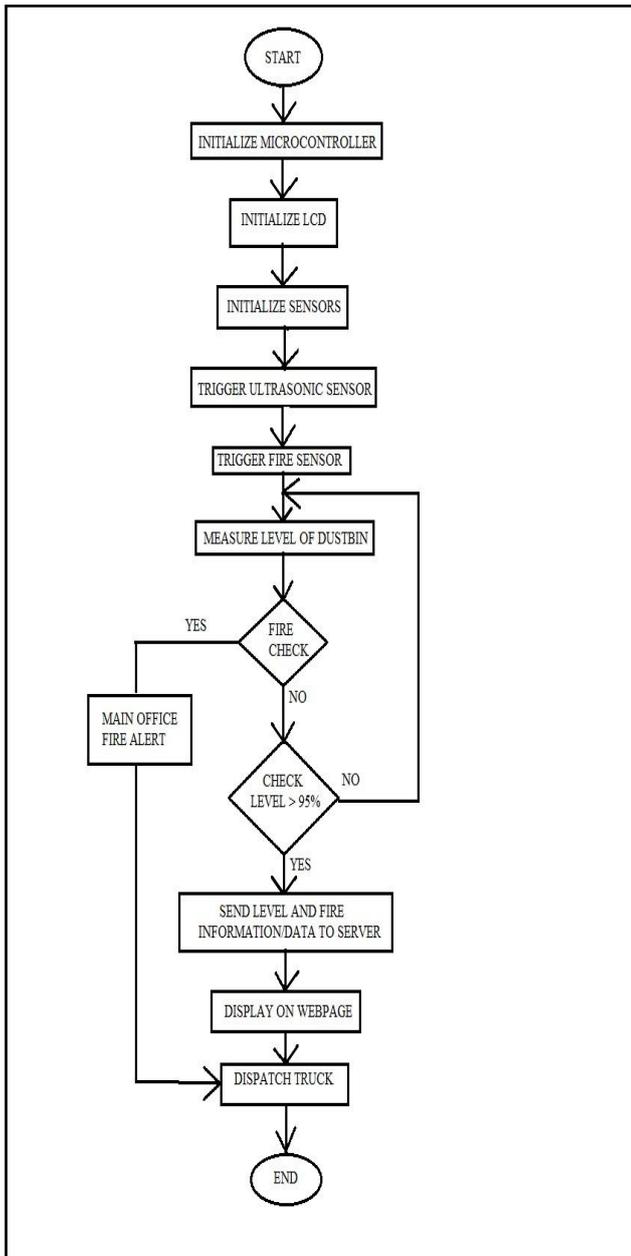


Fig.3 Flowchart

III. ADVANTAGES & APPLICATION

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IV. CONCLUSION

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