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IOT Based Garbage Monitoring System

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Abstract – The term Internet of Things (often abbreviated IOT) was coined more than ten years ago by industry researchers but has emerged into mainstream public view only more recently. Some claim the Internet of Things will completely transform how computer networks are used for the next 10 or 100 years, while others believe IOT is simply hype that won't much impact the daily lives of most people.

This project IOT based Garbage Monitoring system is a very innovative system which will help to keep the cities clean. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors placed over the bins to detect the garbage level and compare it with the garbage bins depth. The system makes use of AVR family microcontroller, LCD screen, Wi-Fi modem for sending data and a buzzer. The system is powered by a 12V transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. A web page is built to show the status to the user monitoring it. The web page gives a graphical view of the garbage bins and highlights the garbage collected in color in order to show the level of garbage collected. The LCD screen shows the status of the garbage level. The system puts on the buzzer when the level of garbage collected crosses the set limit. Thus this system helps to keep the city clean by informing about the garbage levels of the bins by providing graphical image of the bins via a web page.

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1. INTRODUCTION

Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IOT). Communication over the internet has grown from user - user interaction to device – device interactions these days. The IOT concepts were proposed years back but still it's in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IOT. Yet not many articles have been published in this field of study. This paper aims in structuring a state of the art review on IOT. The technology, history and applications have been discussed briefly along with various statistics.

2. OBJECTIVES

The following are the objectives of this work

- Waste Level detection inside the dustbin.
- Transmit the information wirelessly to concern.
- The data can be accessed anytime and from anywhere.
- The real-time data transmission and access.
- Avoids the overflows of Dustbins.

This IOT based waste management is very useful for smart cities in different aspects. This can been seen that, in cities there are different dustbins located in the different areas and dustbins get over flown many times

and the concerned people do not get information about this. This system is designed to solve this issue and will provide complete details of the dustbin located in the different areas throughout the city. The concerned authority can access the information from anywhere and anytime to get the details. Accordingly they can take the decision on this immediately.

3. BLOCK DIAGRAM OF PROJECT

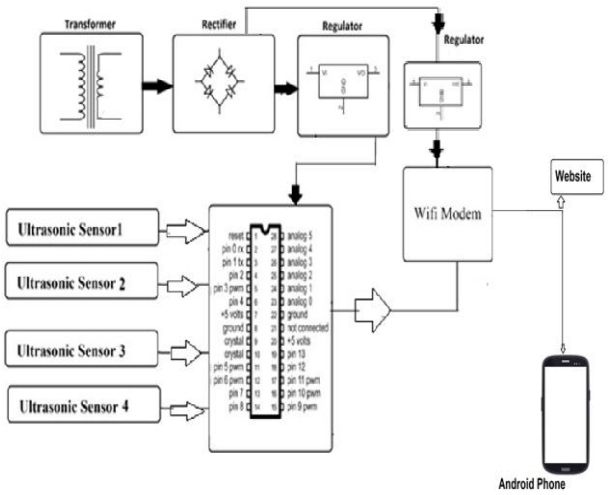

Figure 01: Block diagram of IOT based garbage monitoring system

4. METHODOLOGY

The circuit uses standard power supply comprising of a step-down transformer from 230Vto 12V and 4 diodes forming a bridge rectifier that delivers pulsating dc which is then filtered by an electrolytic capacitor of about 470µF to 1000µF. The filtered dc being unregulated, IC LM7805 is used to get 5V DC constant at its pin no 3 irrespective of input DC varying from 7V to 15V. The input dc shall be varying in the event of input ac at 230volts section varies from 160V to 270V in the ratio of the transformer primary voltage V1 to secondary voltage V2 governed by the formula V1/V2=N1/N2. As N1/N2 i.e. no. of turns in the primary to the no. of turns in the secondary remains unchanged V2 is directly proportional to V1.Thus if the transformer delivers 12V at 220V input it will give 8.72V at 160V.Similarly at 270V it will give 14.72V.Thus the dc voltage at the input of the regulator changes from about 8V to 15V because of A.C voltage variation from 160V to 270V the regulator output will remain constant at 5V.

The regulated 5V DC is further filtered by a small electrolytic capacitor of 10µF for any noise so generated by the circuit. One LED is connected of this 5V point in series with a current limiting resistor of 330Ω to the ground i.e., negative voltage to indicate 5V power supply availability. The unregulated 12V point is used for other applications as and when required.

5. INTERNAL CIRCUIT DIAGRAM

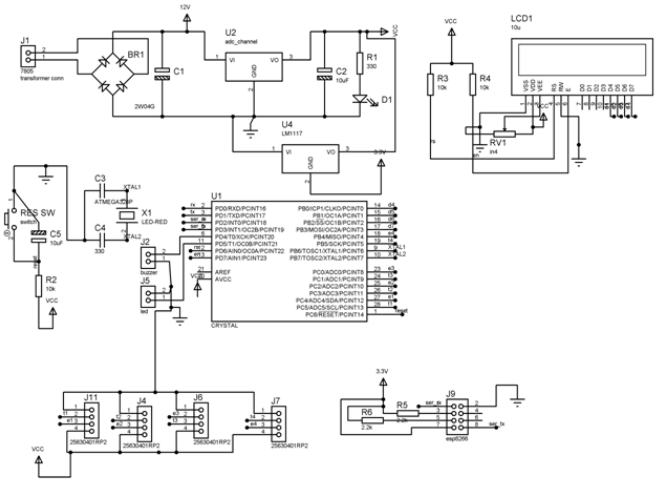

Figure 02: Internal circuit diagram

Working

This project uses an ultrasonic sensor module comprising of 1 transmitter band 1 receiver. The transmitter can deliver 40 KHz ultrasonic sound while the maximum receiver is designed to accept only 40 KHz sound waves. The receiver ultrasonic sensor that is kept next to the transmitter shall thus be able to receive reflected 40 KHz, once the module faces any obstacle in front. Thus whenever any obstacles come ahead of the ultrasonic module it calculates the time taken from sending the signals to receiving them since time and distance are related for sound waves passing through air medium at 343.2m/sec. Upon receiving the signal MC program while executed displays the data i.e. the distance measured on a 16X2 LCD interfaced to the microcontroller in cm.

In this system there are four ultrasonic sensors to detect the level of garbage in 4 bins. Each garbage bin doesn't need to be of the same size here they can be of different size, Whenever the system starts it automatically checks the depth of empty bins, after that when the garbage start filling in that particular bin it matches the current height of the garbage to the total depth and based on that it estimates how much garbage has been filled in that particular bin and it sends it data to web system.

The web system has a web page where level of garbage in bins is indicated in graphical user interface format. All 4 sensors are connected to AVR family Microcontroller which is in turn interfaced to LCD display to display the status of bins. WiFi modem is used to transmit the to the web page application and

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also we have a buzzer here which sounds whenever garbage in any of the bins is reached to its maximum.

6. RESULT AND DISCUSSION

Sl. No	No. of times System tested	No. Of times result displayed on LCD	No. Of times result displayed on Web page	Efficiency
1	5	5	5	100
2	10	10	10	100
3	15	15	15	100
4	20	19	19	95
5	25	24	24	96

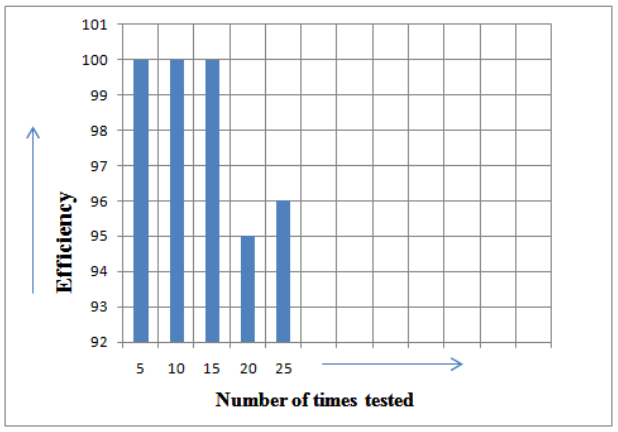


Figure 03: Number of time system tested v/s Efficiency of the system

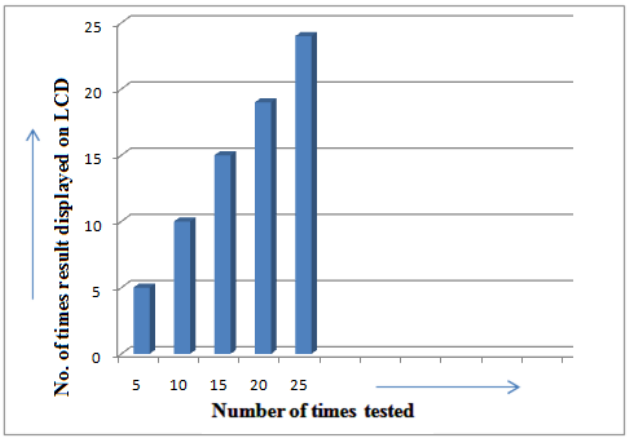


Figure 4: Number of times system tested v/s Number of times result displayed on LCD

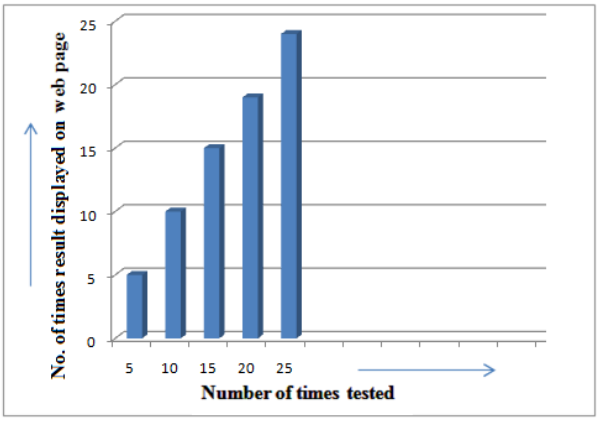
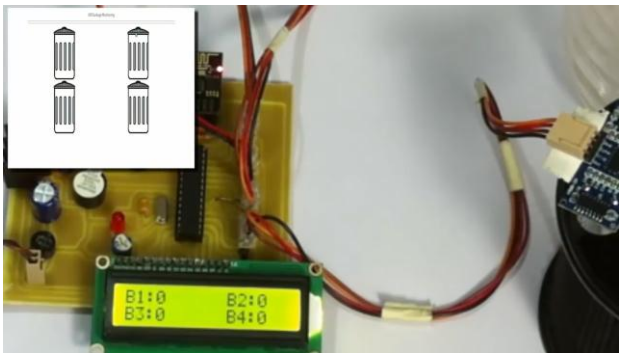


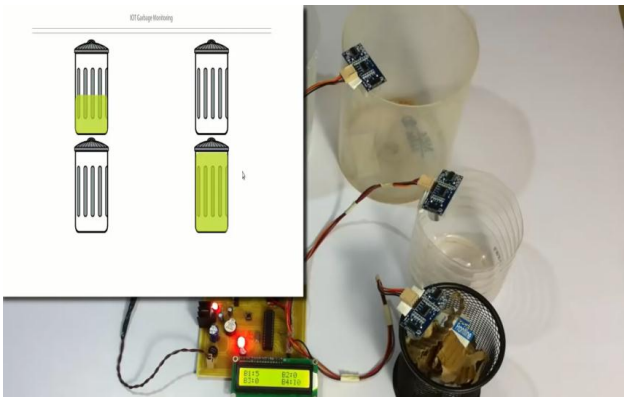
Figure 5: Number of times system tested v/s Number of times displayed on Web page

8. RESULTS OBTAINED

When all the bins are empty



When bin1 is 50% full and bin4 is 100% full



CONCLUSION AND FUTURE SCOPE

The scope for the future work is this system can be implemented with time stamp in0 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.

In this project, an integrated system of Wi-Fi modem, IOT, Ultrasonic Sensor is introduced for efficient and economic garbage collection. The developed system provides improved database for garbage collection time and waste amount at each location. We analyzed the solutions currently available for the implementation of IOT. By implementing this project we will avoid over flowing of garbage from the container in residential area which is previously either loaded manually or with the help of loaders in traditional trucks. It can automatically monitor the garbage level & send the information to collection truck. The technologies which are used in the proposed system are good enough to ensure the practical and perfect for solid garbage collection process monitoring and management for green environment.

REFERENCES

https://youtu.be/73AeOaCtyu4

Kanchan Mahajan (2014). "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science , Engineering and Technology, Issue 3 ,Issue 7.

Vikrant Bhor (2015). "Smart Garbage management System International Journal of Engineering Research & Technology (IJERT), Vol. 4 Issue 03.

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