A Review on Smart Garbage Monitoring System Based on IoT

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Abstract -*In the upcoming years, India has many challenges to overcome from and waste management is one of them as statistics say that over 377 urban people live in 7935 cities and towns and produce 62 million tons of garbage per year out of which only 42 million tons of garbage is collected by the municipal corporation and only 11 million tons of garbage is treated and rest of the 31 million tons of garbage goes to dump yards. Many experts believed that India is following a fallacious system for the collection of garbage under municipal corporation which does not collect the 20 million tons of garbage per year from towns and cities due to its less effective waste collection system. these municipal corporations do not make changes to their waste collecting method due to some of the reasons like funding, complexity etc. but we are providing a solution to it. our system makes a better waste collecting system with fewer funding and with less complexity. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via an application with just Login and a one-time password anyone can get this application in their smartphone easily from the play store. This application can be installed in garbage collection vehicles so that, they can decide their path according to all the information given by that application.*

Key Words: **Ultrasonic Sensor, IoT, Smart waste management, Android application, Garbage collecting vehicle**

1. INTRODUCTION -

According to the estimates of the Central Pollution Control Board (CPCB), Mumbai and Delhi generate about 11,000 and 8,700 tons per day of solid waste respectively. Mumbai is ranked seventh in the most populated cities in world list with a population of roughly 20 million. In such crowded cities, we have less space to live which causes us to make tall buildings and managing waste in such tall buildings is very challenging for us and the municipal corporation too. The problem with these tall buildings is that they have tons of flats and they have to share the trash bins or disposal bins among them which immediately cause an issue of overfilling the trash bins which may again cause uncleanliness which

may lead towards illness of the flat owners. there are some cases in which irresponsible flat owners directly throw the garbage from top floors which causes scattering of the waste in the whole building as well as a city. So, to overcome such issues we have to take some steps like time to time collecting of trash bins, sending data of trash bins to the manager or secretary of the society and also to the garbage collecting vehicle of a municipal corporation to collect these trash bins in very less time with effective way. This smart garbage monitoring system project gives you all the above features to manage the waste of cities because in the process of waste management the first and most important step is to collect the waste and then transport, treatment, disposal.

1.1 LITERATURE SURVEY -

According to [1] Management of Municipal Solid Waste for various cities and towns has been widely studied throughout the world. A large amount of solid waste generated in the metropolitan cities is the major problem, majority of researchers concentrated on this issue.

Mahar et.al., 2007 [2] reported the review and analysis of solid waste management situation in urban areas of Pakistan. According to him improper solid waste management is a reason for environmental degradation in Pakistan.

According to Rajput et.al., 2009 [3], municipal firm squander production displayed divergent fashion and a beneficial parallel with monetary development in expression of kg/capita/day firm waste production at humanity weighing machine.

Maqsood and Hayashi, 2006 [4], evaluated solid waste management practice in Japan and found that 20.3% of total solid waste generated in Japan is land filled, including ash from incineration. According to Maqsood and Hayashi, the "waste management hierarchy" (minimization, recovery, transformation and disposal) has been adopted by Japan in recent times as the menu for developing solid waste management strategies.

2. PROPOSED WORK -
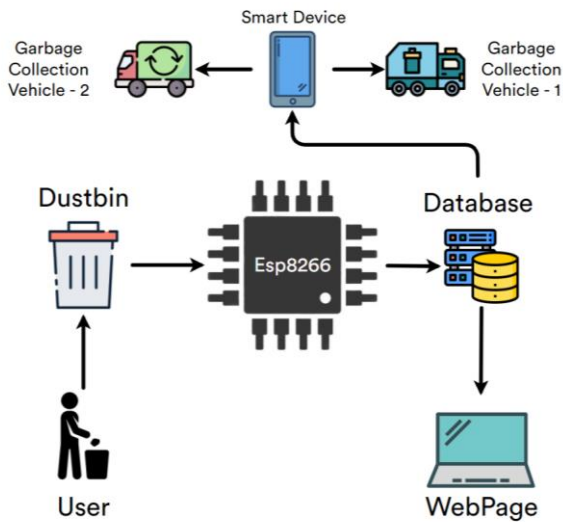
2.1 SYSTEM ARCHITECTURE -

Fig -2.1.1: System Architecture Diagram

As we know that every system has one main component and if we compare our body as a system then our brain is the main component that decides what to do similarly in this project we have Esp8266 Nodemcu which is a microcontroller which controls all the action in this system as you can see in the fig-2.1.1 that the user fills the dustbin and that data is collected by an ultrasonic sensor which will send the respective value to the esp8266 then this controller sends the respective data to the real-time database popularly known as firebase which a platform developed by Google for web and mobile applications.

we also created an android application named 'Dross' which will have a very clean and neat user interface with the best user experience which contains all the information about dustbin and waste segregation. again, to add more to this we have created a static webpage to display the information over the internet as we discussed problems in metropolitan cities the society members or the secretary can monitor the whole system from anywhere by using the Dross app or with use of Webpage.

Nowadays each and every person has a smartphone so we can also make this system robust by attaching the Dross app to municipal corporation garbage collecting vehicles the respective person gets detailed information about particular area and it can collect the garbage very effectively and within less time.

In this whole cycle some people like society member, the municipal corporation employee if they do not work properly any respected authorities can directly monitor it by using webpage or application.
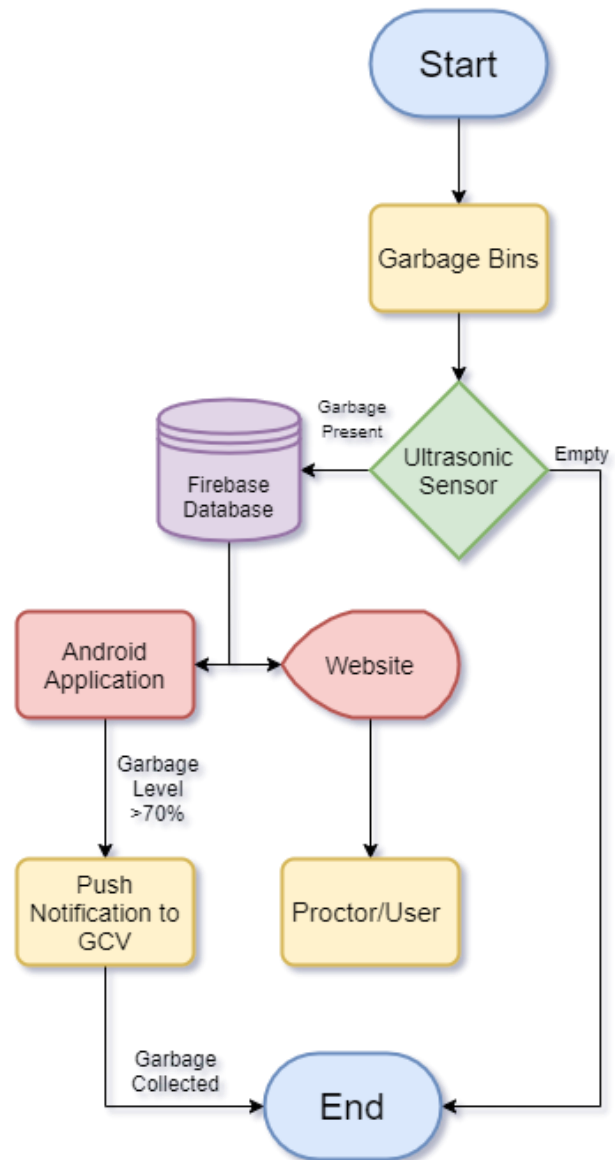
2.2 FLOWCHART -

Fig -2.2.1: Flowchart

As we all know that the flowchart is a diagrammatic representation of the algorithm of any system Fig -2.2.1 is the flowchart of the project in which you clearly see that how one process initiates the other process and we have set some thresholds to sensors according to those thresholds they send the data to the end-user.
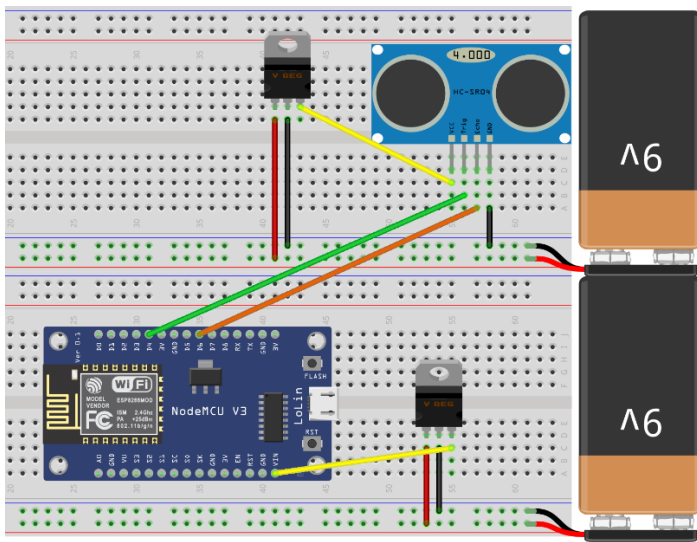
2.3 CIRCUIT DIAGRAME –

Fig -2.3.1: Circuit Diagram on Breadboard

2.4 HARDWARE USED –

1) Nodemcu Esp8266 – This esp8266 is one of the best modules for this project because it is operating on 5v which is very less voltage also we used the 12E module version of this esp8266 which has an inbuilt-Wi-Fi module that can connect to the local network to send the data over the internet through an Internet transfer protocol.

2) Ultrasonic Sensor – This ultrasonic sensor is used to detect the distance it has 4 pins out of which two are VCC and ground respectively and the other two are trigger and echo which sends and receives the signal and from that duration, we can calculate the distance for this specific project we have used HC-SR-04 ultrasonic sensor which needs 5v power supply which is given from a 9v battery with voltage regulator.

3) Voltage Regulator (LM7805) – This is a very specific functional integrated circuit (IC) that has 3 pins one is input which is, in this case, is 9v and the second is ground and then the third pin is output which is reduced voltage, in this case, it is 5v.

4) Battery – In this project, we have used a 9v battery to power up the microcontroller and the sensor with a voltage regulator.

5) Jumper Wires – In this project, we have used jumper wires for all the connections.
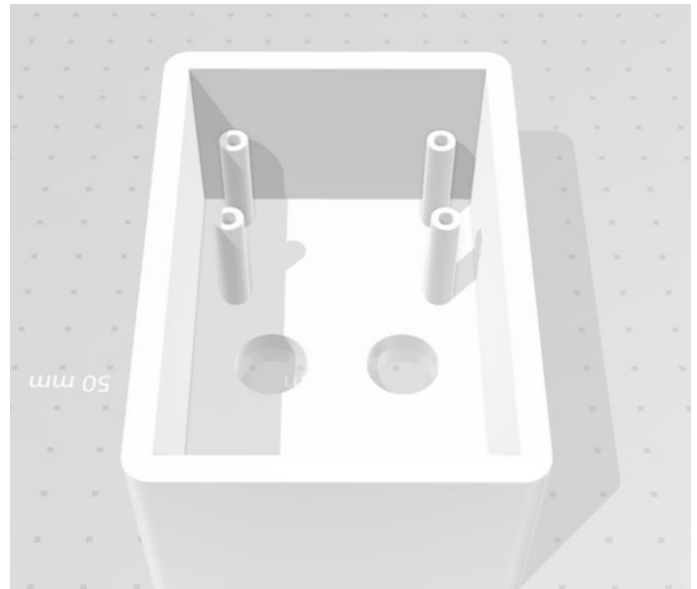
2.5 3D-MODEL –

2.5.1 CASE BOTTOM -

Fig -2.5.1: 3D-Model Case Bottom

2.5.2 CASE TOP -

Fig -2.5.2: 3D-Model Case Top

3. ADVANTAGES –

1) This system is very robust to manage the waste.

2) This system is very cost effective.

3) This system provides a better and easy fault detection.

4) This system gives a real-time database.

4. APPLICATIONS -

This project can be implemented at –

1)   Society Waste Management
2)   Municipal Corporation

5. CONCLUSION –

This system provides a better benefit for society because it helps us to clean the surrounding less cost-effectively and also this will increase the healthy nature by reduction of diseases caused due to unclean surroundings. We can also keep track of garbage collection of society or city with this easy and effective way. We can also keep track of garbage and make an effective garbage collecting plan for garbage collecting vehicle driver.

6. ACKNOWLEDGEMENT -

7. REFERENCES -

[1]   Dr. K. Alice Mary, Perreddy Monica, A. Apsurrunisa, Chathala Sreekanth, G. Pavan Kumar "International Journal of Scientific & Engineering Research", Volume 8, Issue 4, April-2017, ISSN 2229-5518.

[2]   Mahar, A., Malik, R.N., Qadir, A., Ahmed, T., Khan, Z., and Khan, M.A., (2007), "Review and analysis of current solid waste management situation in urban areas of Pakistan", (pp. 34-41).

[3]   Rajput "Scenario of Solid Waste Management," IEEE Journal on Emerging and Selected Topics in Circuits and Systems, vol. 3, no. 1, pp. 45-54,2009.

[4]   Maqsood M. Azizul and Shigenori Hayashi (2006), "An Evaluation of Solid Waste Management Practice in Japan" Daffodil International University Journal of Science and Technology, Vol. 1(1), pp39-44.

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