

MONITORING OF GARBAGE AND COLLECTION SYSTEM USING INTERNET OF THINGS

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Abstract— In the present era, we see the garbage bins being overloaded and all the garbage spills out resulting in pollution. The detection, monitoring and management of waste are one of the primary problems which we are facing today. The traditional way of monitoring the wastes will utilize more human time, cost and money. We have observed that the regular way of collecting the garbage from the doorstep through tricycles/vans are irregular, creating a havoc of households. Due to this civilians dump their garbage in a free space and it will in turn creates environmental pollution. We got inspired from “Swachh Bharat Abhiyan” and “Smart Cities Mission”, which are two national campaigns by the Government of India. Hence our solution statement is to design a system based on microcontroller using Iot technology for collecting garbage from particular area whose garbage bins are overflowing with prior concern. This method is advanced in which garbage management is automated. This project Garbage monitoring system using IOT is a very innovative system which will help to keep the cities clean. This system makes use of microcontroller, LCD screen, Iot methodology for sending data. Ultra sonic sensors and soil moisture sensors are used to detect the level of garbage collected in the bins. The LCD screen is used to show the level of garbage collected in the bins and also to see the location of the system.

Keywords AT mega micro controller,, Arduino Uno, ultrasonic sensor, soil moisture sensor

I. INTRODUCTION

Pollution is the spread of contaminants into an environment that causes instability, disorder, harm or discomfort to the environment. Solid waste management is one of the major environmental problems of India. Solid waste management is the collection, transport, disposal, managing and monitoring of waste material. Garbage may consist of the municipal solid waste construction waste, commercial Garbage may consist of the municipal solid waste construction waste, commercial waste, industrial waste etc., left over the city. This project is useful for creating “Smart City” and it is based on “Internet of Things”. For healthy lifestyle cleanliness is needed and it begins with the use of trash bins. This project will help to eradicate or minimize the solid waste disposal problem. In present scenario, many times we see the garbage bins gets overloaded due to increase in solid waste every day. It creates unhygienic environment and bad smell in the society and because of this many disease get spread in the society to avoid this situation we are designing “Garbage monitoring system using Internet of Things” In this proposed system the multiple trash bins are located throughout the city, these trash bins are embedded with low cost embedded device. When the dustbin gets half filled that is when the threshold value become 50% then the corporation will get notification and when the garbage level will reach the threshold value 80% then the notification will get half filled. The proposed system is cost effective because it will notify twice to the organization and they will get time to optimize the cost of transportation.

II. LITERATURE REVIEW

[1] Efficient Waste Collection System

Authors: Saurabh Dugdhe, Pooja Shelar, Sajuli Jire and Anuja Apte; Waste is an important issue, which needs to be tackled smartly. We observed trash vans/trucks come irregular to homes creating a havoc of households. Due to this many civilians empty their overloaded dustbins in open spaces. This in turn increases environmental pollution. We got inspired from “Swachh Bharat Abhiyan” which is a national campaign by the Government of India, to clean the streets, roads and infrastructure of the country. The citizens want to have better service, lower cost and having easy accessible reports on what has been done and how much it cost.. The system will consist of setting up smart waste bins/ trash cans per society, which will be IoT enabled. These smart bins will transmit information about its fill status. The system provides estimated dates for collection of waste, real time bin status, expected fill up dates for the bins, and optimized shortest path for waste collection. The system will summarize the collected information and generate reports.

[2] Internet of Things [IoT] Based Smart Garbage Monitoring and Clearance System

Authors: Janaki.S, Nanthini.N, Yamini.S
Swachh Bharat Abhiyan is a campaign by the government of India that aims to make it as best and clean country of the world. With expansion of Internet of Things (IoT), devices such as Smart phones & sensors, we present a solution about the Smart bin is a network of dustbins which integrates the idea of IoT with wireless Sensor Network. It is possible to collect large amount of garbage. In the metropolitan cities, it is not possible to check each and every place where the garbage dump yard is full or not. So these dustbins are interfaced with microcontroller based systems having sensors system.

[3] Smart Garbage Monitoring System using Internet of Things (IoT)

Authors: Prof. Dr. Sandeep M. Chaware, Shriram Dighe, Akshay Joshi, Namrata Bajare, Rohini Korke

The Internet of Things (IoT) shall be able to incorporate transparently and seamlessly a large number of different and heterogeneous end systems. Building a general architecture for the IoT is hence a very complex task, mainly because of the extremely large variety of devices, link layer technologies, and services that may be involved in such a system. One of the main concerns with our environment has been solid waste management which in addition to disturbing the balance of the by detection, monitoring and management of wastes are one of the primary problems of the present era.

III. OBJECTIVE

The main objective of our project is to collect and monitor the garbage level in the bins. The garbage level is updating the remote server with the help of wi fi module and altering the concerned person also it prevents the over flowing of garbage in the dust bins as the dustbin is automatically closes upon reaching certain level and the lid will automatically close and sends the information to the concerned authority.

IV. HARDWARE REQUIRED

A. Camera module:

The camera module is a image sensor and it consists of course our lens system, an IR filter, voice coil motor for focusing and fan-out ribbon cable. If the vehicles or any other moving object will enters it will automatically sense and the motor will operate according to that.



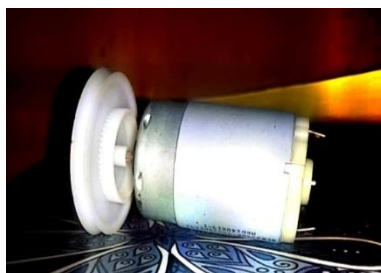
B. Arduino board:

This is the latest revision of the basic Arduino USB board. It connects to the computer with a standard USB cable and contains everything else you need to program and use the board. It can be extended with a variety of shields: custom daughter-boards with specific features. It is similar to the Duemilanove, but has a different USB-to-serial chip the ATmega8U2, and newly designed labeling to make inputs and outputs easier to identify



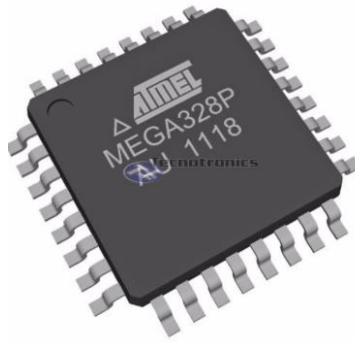
C. Gear motor:

A gear motor is a specific type of electrical motor that is designed to produce high torque while maintaining a low horsepower, or low speed, motor output. Gear motors can be found in many different applications, and are probably used in many devices in your home.

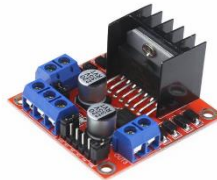


D. AT MEL 328 Micro Controller:

Microcontroller receives information from sensors and processes on it. Here we are using Arduino ATmega2560. It operates on maximum +5 Volt. Input voltage range is (6–20) V. It has a number of facilities for communicating with a computer, another Arduino or other microcontrollers. The regulated power supply 5V is used to power the microcontroller and other components on the board.

**E. Motor driver:**

This dual bidirectional motor driver is based on the very popular L298 Dual H-Bridge Motor Driver IC. This module will allow us to easily and independently control two motors of up to 2A each in both directions.

**F. Ultra sonic sensor:**

It is an instrument that can be used for distance measurement using ultrasonic sound waves. It can be placed inside the top level of the bin and can continuously monitor the garbage level and also send the information to the control room by using Wi-Fi module.

**G. Soil moisture sensor:**

Similar to ultrasonic sensor it can be placed inside wet bin.

It consists of two probes which are used to measure the wet waste in the bin. When the garbage level in the wet bin rises to the level of probes it can automatically sense and send the information to the control room with the help of Wi-Fi module.



V. SOFTWARE REQUIRED

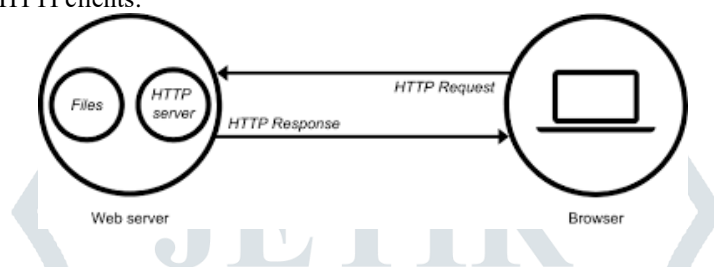
A. ARDUINO IDE:

The Arduino ide is a open source software and it makes easy to the code and upload it to the board .it runs on the different Platform of windows.



B. Web server:

A web server is a program that uses HTTP to serve the files that form web pages to users, in response to their requests, which are forwarded by their computers' HTTPclients.



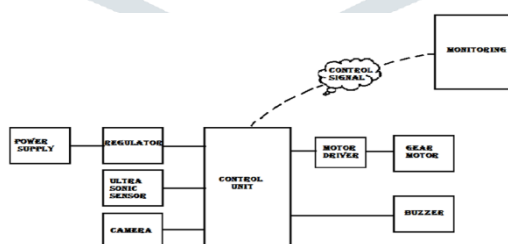
VI. WORKING

Initially the robotic machine can be controlled by the control unit. If the machine is at first home it will sounds an alarm signal with the help of buzzer, the corresponding house people can come and put there trashes in the corresponding bins. The two separate bins can be provided for dry waste as well as wet waste. The bin provided for dry waste consists of ultrasonic sensors and the bin provided for wet waste consist of soil moisture sensors. Ultrasonic sensor can be provided for distance measurement if the trash level is keep on increasing the distance between trash level and sensor is decreasing, once the trash level is reaching the maximum level can be sensed by ultrasonic sensor and sends the information to the control room, they can come and collect the trash. Similarly if the wet bin touches the soil moisture sensors lead the same information can be sends to the control room. The robotic machine can be controlled by the gear motor; the supply given to the gear motor is supplied by the motor driver which is attached to the battery

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VII. BLOCK DIAGRAM

The block diagram consists of power supply module, regulator, ultrasonic sensor, camera module, control unit, soil moisture sensor, motor driver and gear motor.



VIII. ALGORITHM

- Ultrasonic sensor will be placed at the interior of the lid. the one facing the solid waste.
- As trash increases, the distance between the ultrasonic and trash decreases. This live data sent to our micro controller.
- Our micro controller then processes the data and through the help of wi-fi sends it to an app.
- The app represents the amount of trash in the bin with a small animation.
- When the bin is full, messages will pop-up, so that controller can inform the Municipality and they can collect the garbage.

IX. ADVANTAGES

- Real-time info on the extent of the trash in dustbin.
- Saves environment and money.
- Ensures that the dustbin is empty and not overflowing with garbage.
- Saves life of workers from any type of harmful or infected objects in the garbage.
- Intelligent management of the services in the various areas.
- Effective usage of dustbins.
- Waste management can be done in a faster and in a smarter manner.

X. APPLICATIONS

- Support digital India.
- Empowered swatch Bharat mission.
- Real time based monitoring waste collection.
- Waste level detection inside the garbage bins and transfer the information to the concerned municipals.
- Avoids the overflow of garbage bins and effective garbage collection.

XI. CONCLUSION

The novel cloud based system for waste collection in smart cities. The developed system provides improved data base for garbage collection time and quality of garbage collection at each location. 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. Development of applications for city administrations municipal staff. In this way time can be effectively managed and waste can be monitored in the smarter way.

XII. REFERENCES

- [1] Swarna M1, K JAnoop2, K Kanchana3, "Iot Based Garbage Box Monitoring System", International Journal of Pure and Applied Mathematics Volume 119 No. 15 2018, 2713-2723.
- [2] Sagnik Kanta, Srinjoy Jash, Himadri Nath Saha, "Internet Of Things Based Garbage Monitoring System", 978-1-5386-2215-5/17/\$31.00 ©2017 IEEE
- [3] Nikita Nathrani1, Monika Belani2, Akansha Agrawal3, Shivani Pathak4, Yash Tawarawala5 Sanket Kasturiwala6, "Waste Monitoring System using Internet of Things", International Research Journal of Engineering and Technology (IRJET), Volume: 05 Issue: 04 | Apr-2018
- [4] Saurabh Dugdhe1, Pooja Shelar, Sajuli Jire and Anuja Apte "Efficient Waste Collection System", 2016 International Conference on Internet of Things and Applications (IOTA)
- [5] Prof. Dr. Sandeep M. Chaware1, Shriram Dighe2, Akshay Joshi3, Namrata Bajare4, Rohini Korke5 "Smart Garbage Monitoring System using Internet of Things (IOT)", International Journal of Innovative Research in Electrical, Electronics, Instrumentation and Control Engineering (IJIREEICE), Vol. 5, Issue 1, January 2017