International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 08 Issue: 02 | Feb 2021 www.irjet.net p-ISSN: 2395-0072

Automated Dry and Wet Waste Segregator and Monitoring System

Varsha Pathak[1], Shubhi Atri[2], Sneha Shahu[3]

[1,2,3]*Student, Dept. of Computer Engineering, Amity University, Maharashtra, India.*

Abstract - *In past few decennium there is an instant growth in the rate of urbanization and thus there is a need of sustainable urban development plans. Due to the development process the amount of waste generated every day is extreme so, the workload posed on the municipal corporation is extremely high. An efficient method to segregate the waste easily that has been designed in our project, "Automated Dry and Wet Waste Segregator and Monitoring System". As the use of technology is increasing day by day, by taking the advantage of this new age technology we are focusing on managing waste effectively. This project will be helpful in our society at primary level for segregating waste initially it will make the process easy and less time consuming.*

Keywords: Automated waste segregator, Android Application, Monitoring system, IR Sensors, Arduino Micro-controller.

1. INTRODUCTION

As the world is in a stage of scaling up still there is one major problem, waste is the foul smell around us and we have deal with it most often that is Garbage. Most of the time we see garbage bin is overfull still some people keep on adding garbage over it which makes the surrounding look untidy. This unclean surrounding leads to cause number of diseases as large number of mosquitoes and insects procreate on it. Managing waste appropriately has always been an issue not only in India but also in some other parts of the globe. Therefore, such a system must be developed which can reduced this problem at minimum level. With this growing generation our prime need begins with cleanliness and cleanliness begin with our surroundings. So, we have to say no to the old traditional method of collecting and segregating waste manually which is not an efficient method, it also consumes a lot of time and workload increases. In India total 60 million tonnes of waste are generated per year. 10 million tonnes garbage is generated only in metropolitan cities of India which is a big amount of waste and it is a serious concern for the authorities to manage it efficiently without much workload. The ideology of "waste management hierarchy" has been accepted by most nations as the step for developing municipal solid waste (MSW) control policy. Thus, we have propounded a constructive Automated waste Segregator and Monitoring System which helps to monitor the level of waste in the bin. Once the bin is 90% full it will send the notification to the nearest truck driver to the collect the waste as soon as possible. Which will prevent the overflow of that dustbin which will help to keep that area hygienic. This paper contributes a solution to achieve automatic segregation of waste at the initial levels i.e. where the wastes are produced. If the waste items are segregated properly at their initial level, a major portion of the waste management cycle is covered. The utilization of automation in segregation of waste items can significantly enhance its efficiency and at the same time reduce the health hazards related with manual segregation.

2. Literature Survey

"Smart bin implementation for smart cities" - In this project mainly Solid waste management is a huge challenge in urban areas for most of the countries throughout the world. It has always been challenging to manage waste properly and this problem start at primary level. If we will efficiently manage waste at initial level it will not be much difficult to handle waste. An efficient waste management is a pre requisition for maintain a safe and green environment as the amount of waste generating daily is increasing in all kinds of waste disposal.[3] The main concept is that it monitors only one particular area. There is one place in your locality where all the waste is dumped of that locality. It will monitor only that one dustbin and will check the garbage level of it as and will inform the municipal authorities. Every bin is equipped with ultrasonic sensors which check the level of dustbin being filled up. The container in which the waste will be collected is split into three levels of garbage being collected in it. With its continuous use the levels get fill up gradually with time. Every time the garbage crosses a level the sensors receives the information of the filled level. This data is further sent to the garbage analyzer as rapid messaging using GSM module. Every message which is obtain at the garbage analyzer endpoint is being saved as data which is further used for the process of analysis and predictive modelling. The information is obtained at real time is used by the application interface for better observation of the filled level. The data obtained is saved in the database keeping the entire attribute related to time and date. The application interface shows the real time level to the garbage analyzer and using that it run its team of garbage collector to collect the garbage to avoid overflow. The real time check of the filled level of all the container is developed in Microsoft Excel. Every level the dustbin gets filled up is received at the interface endpoint using messaging service. This message received is taken in the form of text files which is connected to the excel sheet showing the filled level of every container. SMS received from the GSM modules of the dustbin is taken in the form of text files. The text file in connected to the excel sheets. The updated values of the dustbin level are taken to form the real time report. The chart is the indicator of all three levels. The

color coding of the levels is done as: Yellow for level 1, Green for level 2 and Red for level 3.[1] It only focuses on the level of the garbage in the bin by three different level. To overcome this project, we have added a segregation method with monitoring which will be working effectively at primary level. In our project "Automated Dry and Wet Waste Segregator and Monitoring System". Our main aim is to segregate waste at the primary level in two separate type in two different dustbins rather than segregating it manually. By doing this process in automated manner will be extremely helpful and effective will consume less time and manpower it. This process will help to decrease the workload on the municipal corporation authorities by segregating the waste and even monitoring it to avoid overflow of garbage and making it hygienic. This process followed on primary level will surely help provide good outcomes in near future.

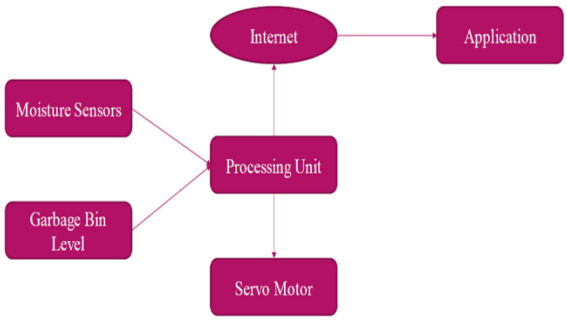
3. PROBLEM STATEMENT

- Urban India generates 62 million tonnes of municipal solid waste (MSW) each year. Of this about 43 million tonnes (70%) is collected and 11.9 million tonnes (20%) is treated. About 31 million tones (50%) is dumped in landfill sites.
- It required lot of manpower to segregate the waste manually after collection, because of that more lives are in hazards surrounding.
- Efficiency of waste segregation is less.
- Frequently, in our city we see that the garbage bins or dustbins placed at public places or in private building are overloaded. It creates unhygienic conditions for people as well as ugliness to that place leaving foul smell.

4. RELATED WORK

For the topic Waste Management, we referred several journals which inline to several waste management ideas to decrease the impact of hazardous impact of waste on human, plant and animals' life. Because when we segregate the waste; the potential of recovery, recycle and reuse gets High. The organic waste can be either converted into compost or methane gas. The compost can replace the demand of chemical fertilizers and Biogas can be used as a source of energy. And the metal waste can be recycled or reused.[2]. Using IoT (Internet of Things) in the waste management system helps in eradicating or minimizing the garbage disposal problems. The system monitors the garbage level in the bin and IoT helps to keep surrounding clean by sending the notification to the garbage collecting workers, when the garbage bin gets full.[3]. The IoT system is used to keep track on the garbage bin level and to create or improve the coordination between the garbage transportation and garbage collection.[5]. And the segregation of waste after a certain level is not easily possible but if we segregate the waste at the initial stage it will be much easier for the municipal workers to work and segregate waste which will lead to easy recycle and reuse of the waste, so by keeping all the important things or facts in view, We were tried to make a system based on the essential features that a normal dustbin should have in order to maintain a Clean and Green City.

5. BLOCK DIAGRAM



In this project we will be segregating two types of waste Wet and Dry waste before collecting it into the garbage bin. When the Waste is dumped into the waste gets segregated into two separate bins using a Moisture Sensor Unit.

When the dry waste bin is full 90% it will give notification to collect the waste to the nearest Dry waste Truck or If the Wet waste bin is full 90% it will give notification to collect the waste to the nearest Wet waste Truck.

A moisture sensor will sense the moisture contents of the waste then it will send the detail to the Processing unit and it will inform the servo motor about the type of waste. We will prefeed the information in the servo motor

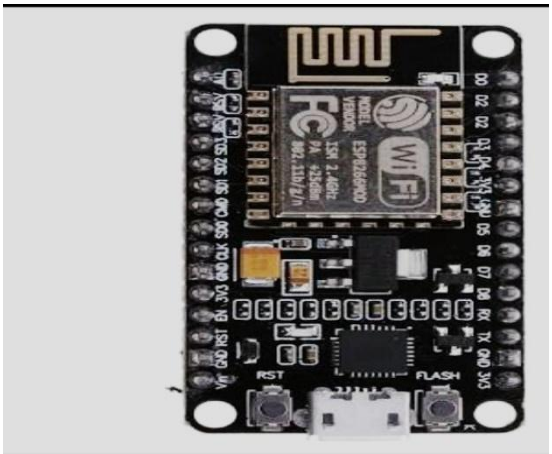
for example: if we have set the direction for the dry waste as left and for wet waste as right then the waste will be thrown in the dustbin accordingly.

Garbage bin level will check the level of the garbage till how much level it has been filled with the help of IR sensor. If the bin is 90% filled, then it will pass the instruction to the processing unit and the instruction is further passed through the internet and it will send the notification on the application.

6. COMPONENTS

ESPA.8266 Node MCU Micro-controller+ Wi-Fi-shield

Node MCU is a IoT platform(Internet of Things) that is an open source software and hardware environment which is built around system on a chip (SoC) which is ESP8266.We have to build programs in it at low level machine instructions, which can be easily interpreted by the hardware chips.

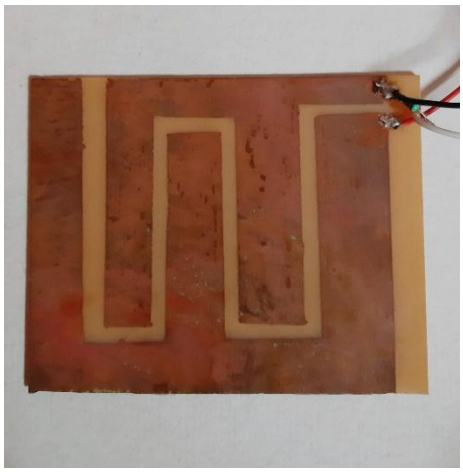


Servo Motor

A Servo motor is an electrical machine which is used to push or rotate an object with great precision. To rotate an object at some specific angle or distance then servo motor is required. It is just a simple motor which runs through the servo mechanism.

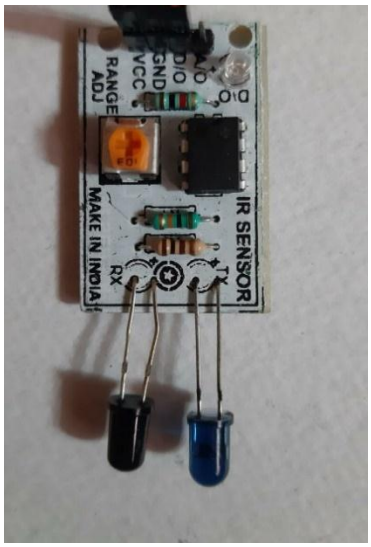
Custom Made Moisture Sensor

The moisture sensor uses capacitance which is used to measure dielectric permittivity of the surrounding medium. The sensor creates a voltage that is proportional to the dielectric permittivity. The sensor averages the water content over the entire length of the sensor.



Infrared Sensor

An Infrared sensor emits or detects infrared radiation to sense certain characteristics of its surroundings. Infrared sensors are also capable of measuring the heat being emitted by an object and object and detecting motion.

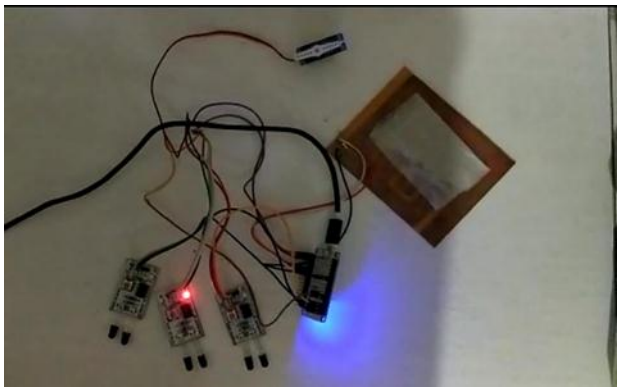


7. WORKING

In this project we are doing garbage segregation using IOT. Firstly, using IR sensor, we will detect the garbage and then the next step is to analyze the garbage whether it is dry or wet. The time the garbage analyzed with the help of moisture sensor to check that moisture is less or more and then moisture input is given to the micro controller. Micro controller has the all decision power I.e. if the moisture is less then micro controller will get to know that the garbage is dry, and it will rotate the servo motor 90 degrees and the garbage will fall into dry bin. But if the moisture is more than micro controller will get to know that the garbage is wet, and it will rotate the servo motor 180 degrees and the garbage will fall into wet bin. Further there is a garbage tank into which all sensors and controller is embedded. Now after the waste is segregated into wet and dry waste further the signal will be given to the driver through and application whenever any of the bin gets full. The application has been made using android studio. The information regarding the bins will get updated after every five seconds in the database with the help of internet that will run on Wi-Fi. The database is firebase that we are using which is easily used through the google accounts. If the dry bin gets full then the database will get signal as 1 and further it will transferred on the application and the driver of the bin car will come and collect the garbage but if the bin is not full then database will get signal 0 and no signal will be given to application and the process will continue after every 5 seconds till the garbage bin is not full. And through all this process the garbage will be segregated and monitored.

8. RESULT

As a result, the servo motor is at 90 degrees in the initial position, further it rotates 180 degree when it is wet waste and rotates 0 degree when it is dry waste. Database gives the information to the application regarding weather the bin is full or empty and which bin is full or empty. All in all, the proposed system is working as planed in real time situation.



9. CONCLUSION

As a conclusion to thus project the proposed system would be able to monitor the solid waste collection process and management of the overall collection process. This project is very effective in managing waste in any big city rather than segregating the garbage using old segregation methods that is manually. With help of this project the dustbin overflow problems will be resolved which makes the surrounding neat, clean and hygienic. The proposed system is the most efficient way to collect and segregate the garbage.

10. REFRENCES

1. Aleena V.J, Kavya Balakrishnan, Rosmi T.B., Swathy Krishna K.J., Sreejith S, T.D Subha "Automatic Waste Segregator and Monitoring System "Holy Grace Academy of Engineering, Thrissur, Kerala-India.

2. Bhoomika P, Sonika, Suma, Vismitha S, Mrs. Sangeetha "Segregation of waste- A survey" K.S Institute of Technology Bangalore, Karnataka.

3. Mr. Sujitkumar Sambhaji Pote,Prof. F.I.Chavan, Mr. Lokesh Ramdas Jawale "survey paper on Domestic Waste Management" Maharashtra, India.

4. Narayan Sharma, Nirman Singha, Tanmoy Dutta "smart Bin Implementation for Smart Cities"

5. Suraj Singh, Pratik Vaje, Rohit kamble, Prof. Pranoti Nage " Smat Waste Segregation and monitoring System" Atharva College of Engineering, Mumbai, India.

BIOGRAPHIES

1st Author Name: Varsha Bimlesh Pathak. Student of Computer Engineering Dept. in Amity University Mumbai.

2nd Author Name: Shubhi Atri Student of Computer Engineering Dept in Amity University Mumbai.

3rd Author Name: Sneha Shahu Student of Computer Engineering Dept in Amity University Mumbai.