

## SMART TRASH CAN USING IOT

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### ABSTRACT

*The problem in India is population as it is increasing exponentially day by day but the atmosphere/environment is not clean as it should be. One reason behind unusual environment can be our Garbage management system which is handled by government through municipal corporation as we see overflowing of garbage bins in our city. This project is done to make our society clean. In the proposed system when the bin will be fully filled then it will notify to the*

*house owner to empty it. Apart from this our bin will also do Segregation (i.e. it will separate Wet and Dry) with the help of Sensors (Moisture and Ultrasonic). As result we get the dry and wet garbage in separate dustbins. We got 90% of accuracy in Dry Waste segregation and 88% of accuracy in Wet waste segregation. We can know that how much dustbin is filled with garbage using android application..*

### INTRODUCTION

As the population is increasing day by day the usage of material is also increased exponentially and amount of waste generated everyday is also very large. and it has no stop.

Generally, in metro cities there is a very big issue of Managing the large amount of waste generated every day. These peoples are very busy in their own life that they don't have time to look and protect their own surrounding. As we know that bins on the road side are not managed properly. This is not completely the Municipal's fault. The Vans do come regularly but it is also possible that the bins are filled before they come and so they are overfilled and the waste is lying on the road. Due to this many harmful diseases are being spread and they can easily affect the infant and older people. It can also be used for proper time management and fuel management system, suppose the bin is only 20% filled then the van will not come and the fuel and time both will be saved. So, this is a very useful system. In this system we have used an Arduino. Sensors are connected with the Arduino for the processing. We have used two sensors Moisture sensor and Ultrasonic sensor. Ultrasonic sensor is used for the distance

measurement purpose and Moisture sensor is used to detect that the waste is Wet or Dry.

During this project we have seen the following thing that when the signal detected by the moisture sensor is HIGH the wet waste will be thrown in the WET's bin as the way will be blocked by the wooden obstacle which will be operated by the motor connected to the circuit.

In conclusion we can only say that this system is and will be very helpful for the segregation of the waste as people here in india are used to throw the waste in a single bin i.e they are mixed. So, by this project it will be very easy for us to separate them

### METHODS AND MATERIAL

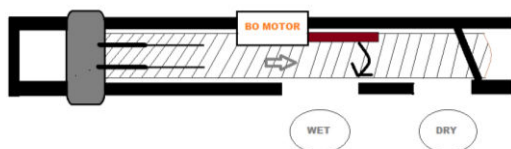
This System is composed of two phases first is physical Model and second is coding. Coding is done in C language in Arduino. which makes the coding part easy Main challenge is to make a physical model which can be used to segregate the waste and can successfully give the depth of the bin.

We have connected one Arduinouno and two Arduinonano to two bins. Both bins can be easily removed from the system for the cleaning purpose. The

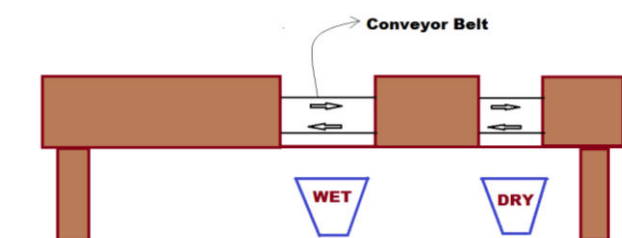
base of the system is made strong using the wooden straps depending in the size of your system.

Following are the two views of our project. i.e. TOP view and other is SIDE view

### TOP VIEW:



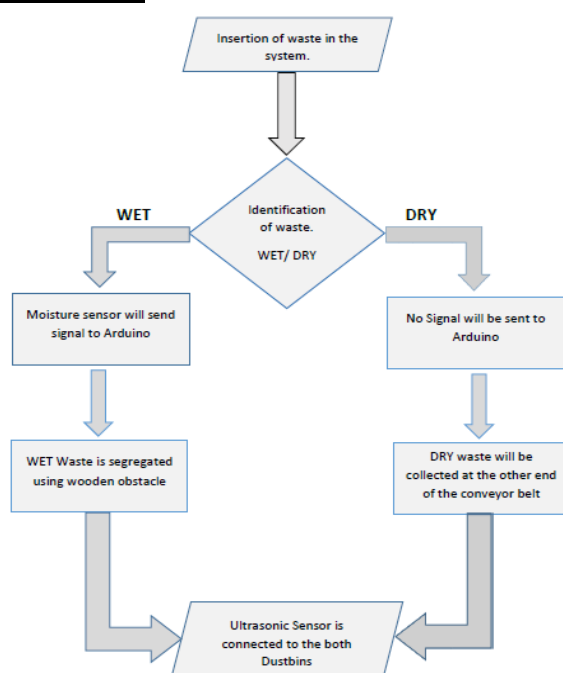
### SIDE VIEW:



### Components Used:

- Arduino UNO and Arduino Nano.
- Bluetooth Module HC-05.
- Ultrasonic Sensor HC-SR04.
- Moisture Sensor.
- DC motors
- 9V Battery.
- 12V, 2A Adapter.

### Flow of the System:



## RESULTS AND DISCUSSION

In past few years, the growth of cities is rapidly going high. And in coming few years the cities would become developed and smart one. But the smart city is incomplete without a smart garbage management system. So, we have designing a system for proper management of garbage. The objective of the project is for the real time access of information about the dustbin. This IOT based management of waste is very useful for smart cities in many aspects. The embedded technique is enhancing the system to achieve the desired result. This system will prevent the overflow of dustbin and make the environment neat and clean. It will reduce the wastage of time, cost and energy of human. It will also prevent the occurrence of any disease. The truck drivers easily get the information about the clearing process and do their work immediately.

### Result of garbage level in dustbin:



Figure 5.1 Depth of dustbin shown in Bluetooth Electronic android application

- Ultrasonic sensor senses the depth very fast and efficiently if the surface is flat.
- It gives wrong reading whenever surface is not flat.

The reading for results is determined and object for dry & wet detected on conveyor is shown in Table 5.1. The experiment is carried out for small volume of the waste objects, and a minimum quantity of one object each for waste objects (wet, dry and metal) materials like key paper, plastic covers in small pieces, vegetable waste, etc. were used for the experiment. The proposed system is tested with diverse

materials each category has been considered with acceptance and rejection rate of the proposed system.

Table 5.2 details the results of different category of results with true, false acceptance and rejection rate. The Fig.5.1 shows the detection of metals with 86% Successful acceptance and 14% failed acceptance of metal type materials. The detection of wet waste as shown in Fig.5.2 with 76% Successful acceptance and 24% failed acceptance.

Table 5.1 Table of results

Test	Materials	Detected	Not Detected
1	Dry Waste	Yes	-
2	Wet Waste	Yes	-

Table 5.2 Table of Results

Materials Tested	True Acceptance	True Rejections	False Acceptance	False Rejections
Dry	76	79	87	85
Wet	74	77	80	90

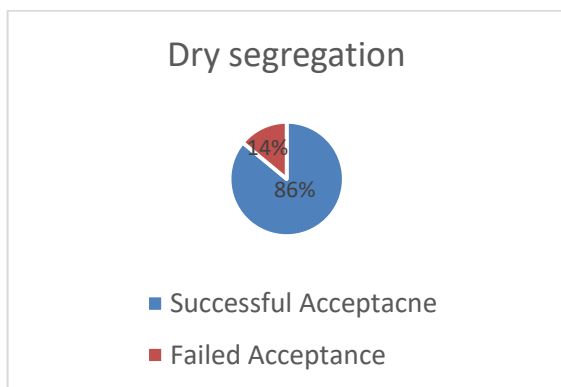


Figure 5.1 Pie Chart of Dry Segregation

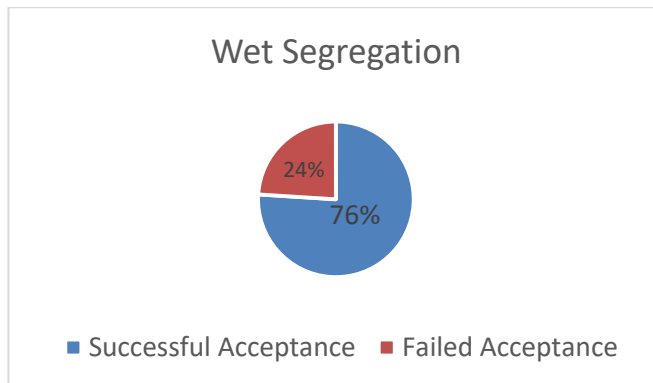


Figure 5.2 Pie Chart of Wet Segregation

## I. CONCLUSION

In conclusion we see the system working properly we can get the dry and wet garbage in two different dustbins. In our working system we get 86% successful acceptance of Dry waste and 76% successful acceptance of Wet waste. Also we get 90% accuracy in Dry segregation and 88% accuracy in Wet segregation. So in future the system can be designed for more type of garbage segregation like plastic wastage, metal scrap, rubber wastage, food wastage using advanced technology applying in it with more accuracy and better acceptance. This model can be implemented in large scale like industries, hospitals, government offices etc.

## REFERENCES

1. MinalPatil, SandeepkumarYadav,"Automated Waste Segregator At Household Level, 2016, Page No:5", Dept. of Electronic Engg. V.E.S.I.T. Mumbai.
2. Mustafa M.R, and Ku Azir K.N.F MATEC,"SMART TRASH CAN,2017, Page No:5", Web of Conferences 140, 01030.
3. Neetha, Sharma, S., Vaishnavi, V., &Bedhi, V,"Smart bin — An "Internet of Things,2017, Page No:6" approach to clean and safe public space", 2017 International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud).

4. Sivasankari, BhanuShri, Y. BevishJinila," Smart Waste Management Using WSN AND IOT,2017, Page No:6"
5. S.S. Navghane, M.S.Killendar, Dr. V.M. Rohokale,"IoT Based Smart Garbage and Waste Collection Bin,2016, Page No:7", International Journal Of Advance Research in electronics and communication engineering.
6. Sathish. A, Prakash. M,Jainulabudeen S.A.K, Sathishkumar R, 2017," Intellectual Trash Management using Internet of Things", Department of Computer Science Engineering, Panimalar Engineering College, Chennai, Tamilnadu, India. (ICCPEIC).
7. Keerthana B, Sonali M Raghavendran, Kalyani S, Suja P 5V.K.G. Kalaiselvi, 2017," INTERNET OF BINS-- Trash Management in India", Dept of Information Technology, Sri Sairam Engineering College, Chennai, India (IEEE).
8. N Shirisha, M Anila, 2017," Implementation of a Smart Waste Management system using IoT", Department of Computer Science and Engineering, MLR Institute of Technology. (ICISS)
9. Rashmi M. Kittali and Ashok Sutagundar, 2016, "Automation of Waste Segregation System using PLC", Department of Electronics and Communication Engineering, Basaveshwar Engineering College, Bagalkot-587102, INDIA. (ICRIET). Page 36 of 37
10. Minthu Ram Chiary, SripathiSaiCharan, Abdul Rashath. R, DhikhiT, "Dustbin Management System using IOT", Computer Science and Engineering, Saveetha school of Engineering, International Journal of Pure and Applied Mathematics.
11. D. D. &Kaddoum, G. (2017) "A waste city management system for smart cities applications" Advances in Wireless and Optical Communications (RTUWO).
12. Neetha, Sharma, S., Vaishnavi, V., &Bedhi, V (2017) Smart bin — An "Internet of Things approach to clean and safe public space", International Conference on I-SMAC (IoT in Social, Mobile, Analytics and Cloud).
13. Ravale, U., Khade, A., Patel, N., &Chaure, S. (2017), "Smart Trash: An Efficient Way for Monitoring Solid Waste Management", International Conference on Current Trends in Computer, Electrical, Electronics and Communication (CTCEEC).
14. Mustafa M.R, and Ku Azir K.N.F MATEC (2017) "SMART TRASH CAN", Web of Conferences.
15. AbhishekApte,DhirajGhadi, DevangDesai,Hiral (2015), "Waste Management System Using IOT", RaveshiyaNidhiSanghavi International Journal of Recent Trends in Engineering.
16. ShamleeRashinkar, SnehaGhatole, Swati Kadapatti, VarshaYadav, Chaitanyajambotkar (2017) "IOT Based Smart Trash Bins- A Step Towards Smart City" International Research Journal of Engineering and Technology
17. Maya Chavan, T.R. Pattanshetti(2016) "Survey on Municipal waste collection management in smart city" International Research Journal of Engineering and Technology.
18. SayaliSuryakantChalke, MohiniBhalerao, DhanashreeGaikwad (2017) "A survey on IoT Based Smart Garbage Monitoring System" International Journal of Advance Research, Ideas and Innvoattiin In Technology. Page 37 of 37
19. Sivasankari, BhanuShri, Y. BevishJinila (2017) "Smart Waste Management Using WSN AND IOT" Conference Paper.
20. S.S. Navghane, M.S.Killendar, Dr. V.M. Rohokale (2016) "IoT Based Smart Garbage

and Waste Collection Bin” International  
Journal Of Advance Research in electronics  
and communication engineering.