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[ijirset@gmail.com](mailto:ijirset@gmail.com)

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# Design of Garbage Monitoring System

Isha Agrawal<sup>1</sup>, Kunal Baniya<sup>2</sup>, Yash Jain<sup>3</sup>, Utkarsh Tyagi<sup>4</sup>

U.G. Student, Department of Computer, Sinhgad Academy of Engineering, Pune, Maharashtra, India <sup>1</sup>

U.G. Student, Department of Computer, Sinhgad Academy of Engineering, Pune, Maharashtra, India <sup>2</sup>

U.G. Student, Department of Computer, Sinhgad Academy of Engineering, Pune, Maharashtra, India <sup>3</sup>

U.G. Student, Department of Computer, Sinhgad Academy of Engineering, Pune, Maharashtra, India <sup>4</sup>

**ABSTRACT:** The rapid growth in the population has also led to the surge in the volume of waste being generated on a daily basis. This increase in the generation of waste due to continuous growth in the urbanization and industrialization has become a severe problem for the local and the national government. It is also posing a serious problem for the local authorities to manage the wastes being dumped everywhere as landfill. To ensure the minimal risk to the environment and human health, it is necessary to take meticulous measures when segregating and transporting waste. Segregation of waste in a proper manner brings to the limelight actual economic value of the waste. The traditional method used for segregating of waste in India is through rag pickers which are time-consuming and can have adverse effects on the health of the people who are exposed to such wastes. Here we propose the use of an Auto Waste Segregator(AWS) which is cheap and also an easy to use solution for segregation of household waste. It is designed to segregate the waste into two categories viz. dry and wet waste. The system makes use of Wet sensor for the segregation of wet and dry waste and Moisture sensor for the detection of dry waste and an LCD display for displaying the result of segregation.

**KEYWORDS:** Garbage, Internet of Thing, Monitoring, Robot, Warning.

## I. INTRODUCTION

Waste disposal is a huge cause for concern in the present world. The disposal method of a voluminous amount of generated waste has had an adverse effect on the environment. Unplanned open dumping at landfill sites made by municipal is a common method of disposal of waste. Human health, plant and animal life are affected due to this method.

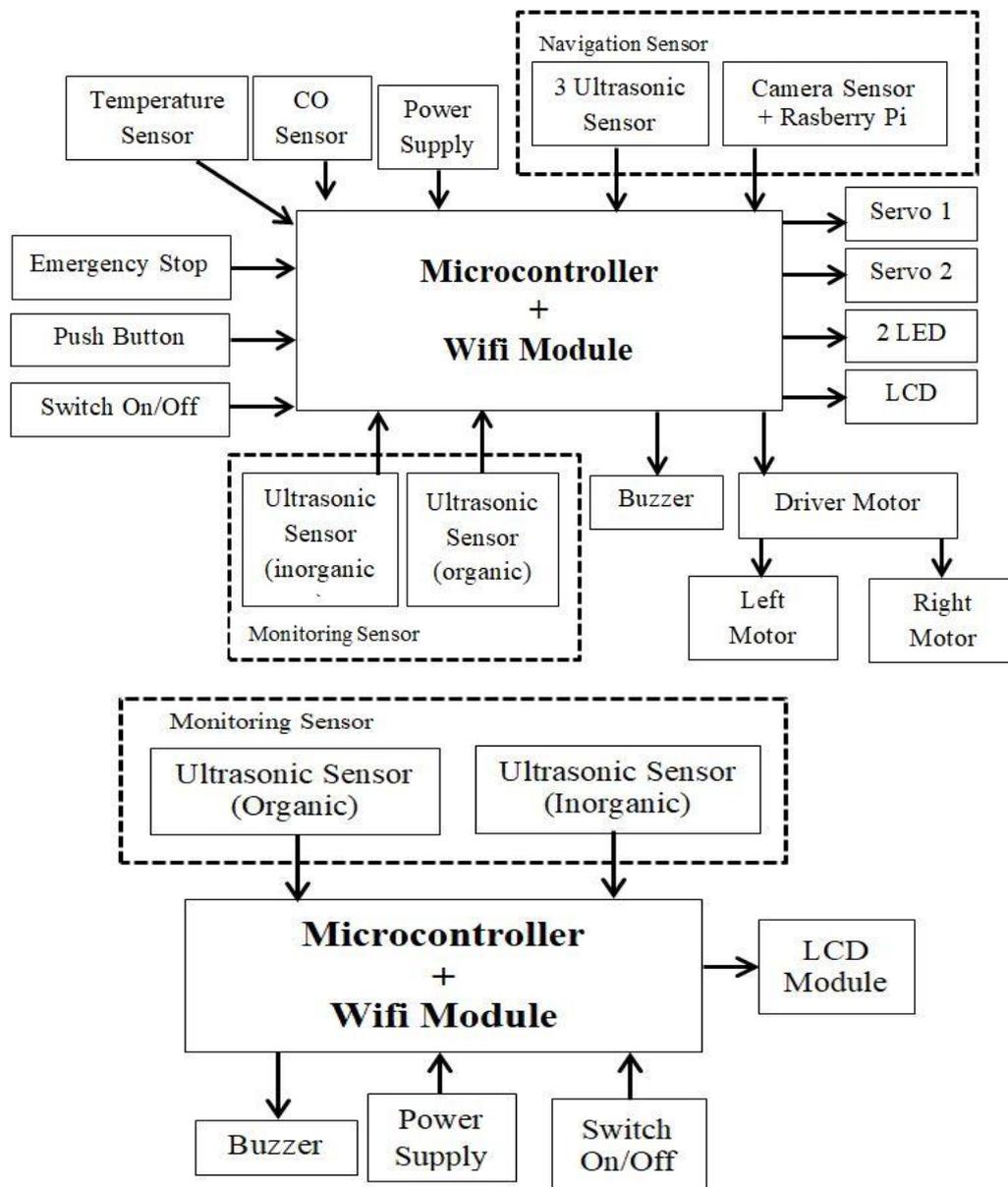
The harmful method used for waste disposal generates harmful chemicals which contaminate surface and groundwater. It can give rise to disease vectors which spread harmful diseases. This also degrades the aesthetic value of natural environment can degrade the aesthetic value of the natural environment and it is an unavailing use of land resources. In India, rag pickers play an important role in the recycling of urban solid waste. Rag pickers and conservancy staff have higher morbidity due to infections of the skin, respiratory, gastrointestinal tract and multi-system allergic disorders, in addition to a high prevalence of bites of rodents, dogs and other vermin. Dependency on the rag-pickers can be diminished if segregation takes place at the source of municipal waste generation.

The economic value of the waste generated is not realized unless it is recycled completely. Several advancements in technology have also allowed the refuse to be processed into useful entities such as Waste to Energy, where the waste can be used to generate synthetic gas (syngas) made up of carbon monoxide and hydrogen. The gas is then burnt to produce electricity and steam; Waste to Fuel, where the waste can be utilized to generate biofuels.

When the waste is segregated into basic streams such as wet and dry the waste has a higher potential of recovery and consequently recycled and reused. The wet waste fraction is often converted either into compost or methane-gas or both. Compost can replace demand for chemical fertilizers, and biogas can be used as a source of energy. The metallic waste could be reused or recycled.

II. METHODOLOGY

The complete block diagram of Garbage Robot (G-Bot) of this research was composed of two parts, i.e. navigation and monitoring, as shown in Fig. 1 (a)



In this paper, the Navigation is not really essential as in the authors previous work [33]–[35] The focus of the research in this paper is only in the monitoring part as shown in Fig.1 (b).

The concept of the G-Bot in this study is different with the authors’ previous work[36]. The G-Bot concept is presented in Fig. 2. All mobile phones can communicate with the G-Bot by downloading the blynk application that has been designed in this research. The barcode of the application can be seen in Fig. 3. The G-Bot application can be installed easily through the following steps:

1. Download Blynk App through these following link:  
[http://j.mp/blynk\\_Android](http://j.mp/blynk_Android) or [http://j.mp/blynk\\_iOS](http://j.mp/blynk_iOS).
2. Touch the QR-code icon and point the camera to the code (Fig. 4).
3. Enjoy the app.



Fig. 2. G-Bot Concept



Fig. 3. Barcode of the G-Bot application

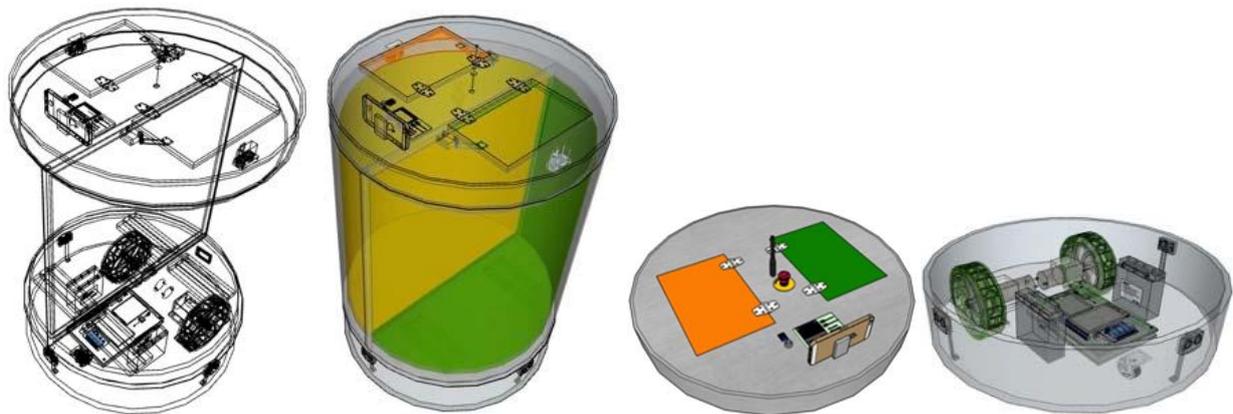


Fig. 4. Designs of G\_Bot One (a) The construction, (b) The Inner container display , (c) The top and the bottom.

The mechanical design of the G-Bot is presented in Fig.4. The ultrasonic sensors that were placed under the cover at the top of the G-Bot act as the distance sensors for detecting every level of the garbage changing. The height of the organic and inorganic container in the G-Bot is 58 cm. The ultrasonic sensors were placed in the 60 cm away from the base of the containers.

When the distance of the ultrasonic sensor and the height level of the garbage is 60 cm away, the capacity of the garbage is 0%. In this condition, the sensor detects no garbage appears in the container of the G-Bot. On the other hand, when the distance of the ultrasonic sensor and the height level of the garbage is 6 cm away, the capacity of the garbage is 90%. The fullness of the garbage is set only 90 %. It is meant to give space of the G-Bot, so that the top of the G-Bot not to be exposed to the garbage directly. Thus, the cleanliness of the cover can be achieved. The G-Bot worked based on the flowchart in Fig.5. The wifi should be connected at the beginning of the process.

The ultrasonic sensors detected the garbage and send the data to the application every 5 seconds. When the garbage is full, the alarm in the G-Bot will be active, and the Blynk application will send the notification to the user that indicate the garbage is full. However, when there is no internet connection, the system will not run, and of course send no data to the smart phones. Some of the data that can be displayed in the mobile phones (when there is internet connection) are presented in Fig. 6. Three of the G-Bots were monitored in the mobile phone. The organic and inorganic data from each of the G-Bots are presented in one screen. This information make the human to be easy to monitor and to make decision which GBot that can be used to throw the garbage and which of the G-Bot should be taken care (should be depleted and cleaned). Each of the data in Fig. 6 was taken from the smart phone displays. The different condition of G-Bot was presented in that figure. In Fig. 6 (a) Only the organic of GBot 01 was filled of garbage (90%). In Fig 6 (b), all of

inorganic of G Bot was filled 25% of Garbage. In Fig 6 (c) and (d), The inorganic of G-Bot 01, and organic of G- Bot 02 were empty. There was no garbage detected by the sensors.

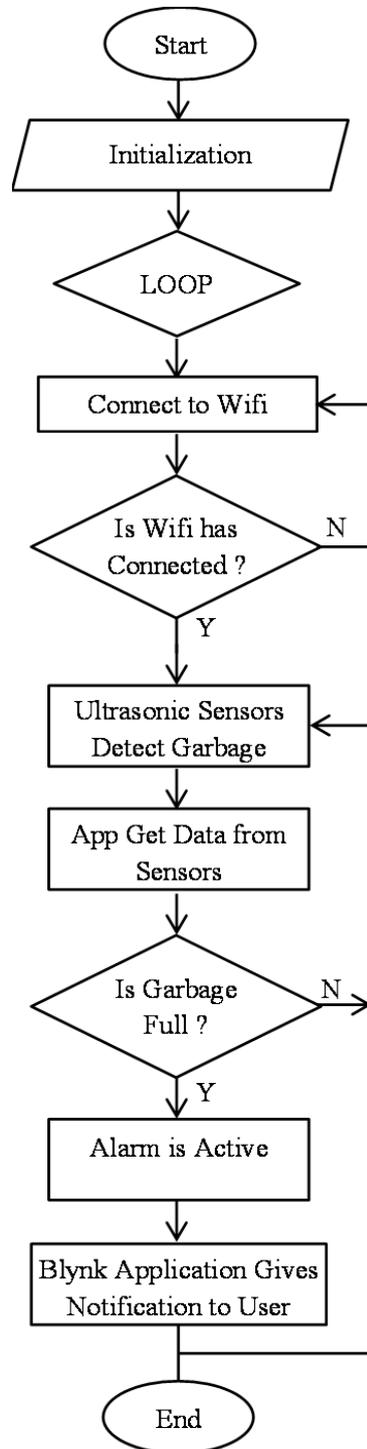


Fig. 5. Flowchart of the G-Bot



### III. CONCLUSION

Implementation of this system at a local level like societies, educational institutes, etc. can reduce the burden on the local authorities. The automatic waste segregator is one small step towards building an efficient and economic waste collection system with a minimum amount of human intervention and also no hazard to human life. Using a conveyor belt makes the system far more accurate, cost-effective and also easier to install and use at a domestic level. Segregating all these wastes at a domestic level will also be time-saving. While implementing our system we came across many problems like the sensing range of inductive proximity sensor, the accuracy of the moisture sensor, adjusting the range of IR sensors and some more, but using some modifications we tried to make the system as reliable as possible but not completely perfect.

### REFERENCES

1. C. B. Teo, "Recycling Behaviour of Malaysian Urban Households and Upcycling Prospects," vol. I, no. 1, 2016.
2. E. Damanhuri, W. Handoko, and T. Padi. 2013. Municipal Solid Garbage Management in Indonesia, in Municipal Solid Garbage Management in Asia and the Pacific Islands-Editors: Agamuthu P, Masaru Tanaka, Penerbit ITB.
3. M. Treiber. 2010. "An Introduction to Object Recognition: Selected Algorithms for a Wide Variety of Applications". Springer.
4. D. Lowe. 2004. "Distinctive Image Features from Scale-Invariant Keypoints", Computer Science Department, University of British Columbia, Vancouver, B.C., Canada.
5. R. Munir. 2004. "Pengolahan Citra Digital". Bandung: Informatika.
6. W. Setiawan, 2014. "Pengolahan Citra Penginderaan Jauh" UPI Press. Bandung
7. H. Mehrorta, B. Majhi, and P. Gupta, 2009. "Robust Iris Indexing Scheme Using Geometric Hashing of SIFT Keypoints". Department of Computer Science and Engineering, National Institute of Technology, Pune 38 Dept of IT Engg Seminar "Image Segmentation Using Artificial Bee Colony Optimization and Artificial Fish Swarm Optimization" Institute of Technology Rourkela, Indian Institute of Technology Kanpur, India.
8. J. S. E. Agustina, and I. Mukhlash. 2012. "Implementasi Metode Scale Invariant Feature Transform (SIFT) dan Metode Continuously Adaptive Mean-Shift (Camshift) pada Penjejakan Objek Bergerak". Jurnal Sains dan Seni Vol. 1 No. 1, 1-6.
9. A. G. Hapsani, I. Cholissodin, and A. A. Supianto. 2014. "Implementasi Metode Scale Invariant Feature Transform (SIFT) untuk Multiple Object Tracking pada Video CCTV". Program Studi Ilmu Komputer, Universitas Brawijaya, Malang.
10. Recycle.io, The Smart Way of Managing Contaminants in Recycle Bins, <https://devpost.com/sio-ek4pxz>, Winner of Microsoft Azure IoT Serverless Hackathon (3rd Place),



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