

# Wireless Communication Based Garbage Collection Robot on the Beach

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**Abstract:** At present the world advancement depends on its technology. IoT (Internet of Things) is the latest technology which connects the devices over a network using cloud computing and web applications to for efficient operation. We know that Smart cities are facing a serious garbage problem. This project is a very innovative system which will help to keep the cities clean. A pick and place robot will be used to collect the trash in the parks, roads, parking places etc. Non-Governmental Organizations have made efforts to clean public spaces. Collection of the unorganized and scattered garbage is the preliminary and most vital step of waste management, following proper segregation and disposal. This paper proposes, explains, and implements an original concept of making a modular, scalable and cost effective system for garbage collection. Making an efficient use of Internet of Things to maintain a constant connection between a central server and a network of garbage processing and collecting, independent, autonomous robots, we rely upon such a system to produce accurate results, as well as considerably reduce the cost, hence providing a feasible solution to minimize human effort and costs during waste collection. It provides a gateway towards implementing garbage collecting robots in smart cities. Rather than describing the design of a single robot, we propose an entire system of robots interconnected in a network, to optimize time, energy and overall speed. There is always a tradeoff between accuracy, efficiency and cost of garbage collection, especially when robots get into the picture. Our purpose is to find the perfect balance between these factors.

**Keywords:** IoT, Garbage Collection, Robot, Wireless Connection

## I. INTRODUCTION

To make the cities greener, safer, and more efficient, Internet of Things (IoT) can play an important role. The implementation of proper waste management system will avoid the spreading of such disease. In project we propose a smart mechanism for improving the management of wastes in cities. Things that are connected to the Internet and those devices controlled from the Internet is called Internet of Things. Garbage generation is an issue of worldwide importance, requiring global attention. Improper management of waste and garbage is the root cause of several hindrances and issues that we face today such as health and hygiene, transport safety, wildlife endangerment and environmental aestheticism. At present, the method of cleaning up is majorly manual. With trends in industries shifting towards automation, it should also be efficiently applied towards waste management. While manual labor to clean up garbage is a good source of employment, there are several problems that are associated with cleaning up of garbage manually:

- Too much land pollution/garbage and inconvenient availability (unavailability) of sufficient workforce under all circumstances.
- Unavailability of manual labor in several remote areas (such as railway tracks)
- Safety concerns of humans in hostile work environments
- Lack of resources for hazard proof collection of nuclear waste

An autonomous garbage collection system may have a high manufacturing cost, but has negligible maintenance costs. Autonomous bots are a far better option when it comes to abolishing the monotony of tasks, overcoming safety issues during manual labor and reaching remote areas. In some cases, efficiency may also be better (1 robot can do the work of several men). The only drawback is that the production costs of the robots are high. Our aim is to substantially reduce the cost, so as to make the implementation on a large scale feasible, including implementation through government bodies.

### **Problem Definition:**

In today's era as we know that where countries are developing at a rapid rate a lot of unwanted waste is being generated like electronics, plastics and many biodegradable products. Waste management being the utmost spurned factors in developing countries creates an urgency to address this problem. In metropolitan or city areas, the clearance of waste management has been a grind task for the majority of the country all over the world.

## II. LITERATURE SURVEY

[1] Automatic BinBot - Garbage Collecting System using IoT Bharathi V Asst prof, Gayathri K, Jayashree S, Kiruthika D, Maheswari P Department of Electronics and Communication Engineering The world today faces major garbage crisis-the product of rapid economic growth, poor urban planning, overcrowding, corrosive corruption and political dysfunction. The present tried and tested methods of garbage collection in residential areas have so far been done with Municipal solid waste workers (MSWWs). MSWWs universally expose too many work related health hazards and safety risks, notably allergic and other diseases of the respiratory system. Hence to overcome this major problem of waste collection, BinBot (Automatic Garbage Collecting robot) is developed. It facilitates the smarter way for garbage collection automatically from houses in the Residential areas and intimates the municipality about the BinBot status to collect the garbage when it is filled. This would be helpful for the “Swachh Bharat” (clean India) by 2019, India’s real garbage challenge.

[2] Deep Learning Based Robot for Automatically Picking up Garbage on the Grass Jinqiang Bai, Shiguo Lian, Member, IEEE, Zhaoxiang Liu, Kai Wang, Dijun Liu, This paper presents a novel garbage pickup robot which operates on the grass. The robot is able to detect the garbage accurately and autonomously by using a deep neural network for garbage recognition. In addition, with the ground segmentation using a deep neural network, a novel navigation strategy is proposed to guide the robot to move around. With the garbage recognition and automatic navigation functions, the robot can clean garbage on the ground in places like parks or schools efficiently and autonomously. Experimental results show that the garbage recognition accuracy can reach as high as 95%, and even without path planning, the navigation strategy can reach almost the same cleaning efficiency with traditional methods. Thus, the proposed robot can serve as a good assistance to relieve dustman’s physical labor on garbage cleaning tasks.

[3] Automatic Bin Bot- Garbage Collecting System in Residential Areas and Enlightening Disposal Mechanism, Asst.Prof (Department of ECE) J.J College of Engineering and Technology, Trichy, Tamilnadu. Asst.Prof (Department of ECE) Kongunadu College of Engineering and Technology, Thottiam, Trichy, Tamilnadu The world today faces major garbage crisis-the product of rapid economic growth, poor urban planning, overcrowding, corrosive corruption and political dysfunction. The present tried and tested methods of garbage collection in residential areas have so far been done with Municipal solid waste workers (MSWWs) where they expose too many work related health hazards and safety risks, notably allergic and other diseases of the respiratory system. Hence to overcome this major problem of waste collection, BinBot (Automatic Garbage collecting robot) is developed. It facilitates the smarter way for garbage collection automatically from houses in the Residential areas and intimates the municipality about the BinBot status through IoT to collect the garbage when it is filled. This would be helpful for the “Swachh Bharat” (clean India) by 2019, India’s real garbage challenge.

[4] GARBAGE COLLECTING ROBOT USING IOT Kavya.C, Kokila.C, Kowsalya.M, Maha.A, MUTHARASU.S, Waste collection and management is a subject undergoing extensive study, and solutions are being proposed meticulously. Thanks to an exponential rise in population, there is an increased production of waste, and also a significant amount of litter consisting of plastic, paper, and other such products carelessly thrown about and scattered in public. Thus, the need for a more robust waste management strategy is essential. Presently, waste management techniques either lack efficiency, or incur high costs. Collection of the unorganized and scattered garbage is the preliminary and most vital step of waste management, following proper segregation and disposal. This paper proposes, explains, and implements an original concept of making a modular, scalable and cost effective system for garbage collection.

[5] Waste Management by a Robot- A Smart and Autonomous Technique Shikha Parashar<sup>1</sup>, Pankaj Tomar<sup>2</sup> M.Tech Student (Robotics and Automation), IGDTUW, Delhi, India Now-a-days, management of waste from its collection to dumping and disruption has become one of the greatest challenging and arduous chore for municipal corporations, all around the globe. To make this tedious job facile, a new concept of Smart Dustbin has been taken into consideration for Smart buildings, hospitals, schools and railway stations. The Smart garbage collector thought is an advancement of traditional garbage collector by levitating it to become smart inculcating sensors and some form of logics. This smart collector is a revolutionary idea of application of line following garbage car and pole fixed garbage part on pre-designed locomotive path. The fixed bin makes use of ultrasonic sensors for level of garbage detection and updates the coeval level of the bin to the garbage car, using RF Module. This is thereby a fully automated system, making small contribution towards the theme of Clean India Green India.

[6] AUTONOMOUS GARBAGE COLLECTOR – ROBODUMPSTER Rama Prabha D, Sagar Mahindru, Akshat Srivastava and Nilalohita P School of Electrical Engineering, VIT, Vellore-632 014, Tamilnadu, India. A robotic arm has anatomy similar to the human arm. They are becoming very popular as research platforms. This technology is well

suitable for real time applications, due to the ease with which humans perform different tasks in different environments. Progress of robotic arm is, however, inhibited due to a shortage of affordable platforms with wide capabilities. In this work, we present infrared based autonomous robotic arm. This robotic arm has been developed with sufficient power and capabilities so as to be employed for various applications. It has autonomous capabilities and can effectively work in different environment by employing an infra based servo motor module. The function which we have implemented is of an autonomous garbage collector. It measures breadth of the object and correspondingly grab or avoid it.

### III. BLOCK DIAGRAM

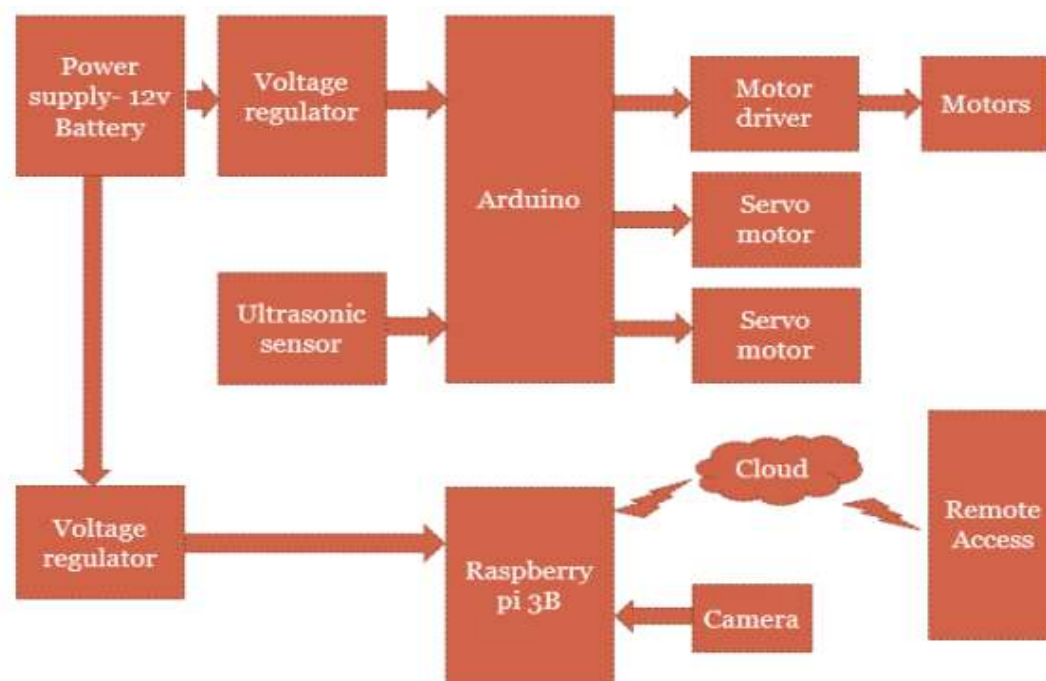


Fig 1. Block diagram

In this paper, the design of BinBot uses engineering method. In sequence, the method is identification of the needs required. Then these needs are analyzed to get specific components.

These above block diagram components are later integrated to get the desired output. Structure categorized into two types

- i) IOT control
- ii) Movement control

The operation of the robot can be classified into two main Categories:

- 1) Live video streaming
- 2) Garbage collection through remote access

Stages are:

- 1) To make connection with internet.
- 2) Start live streaming of video.
- 3) Control the robot and garbage collector jaw with remote access.

#### IV. RESULT

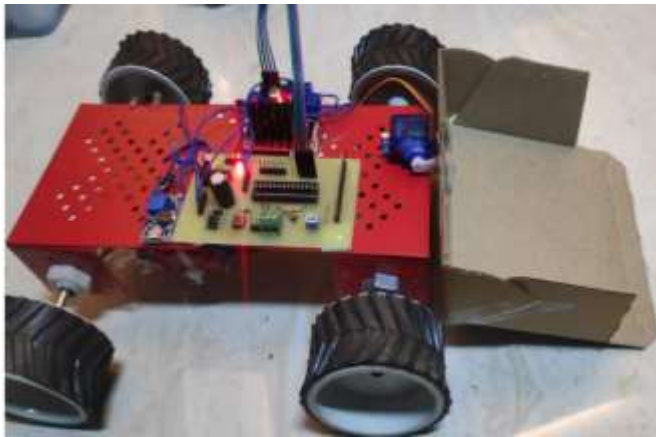


Fig 2. Side View

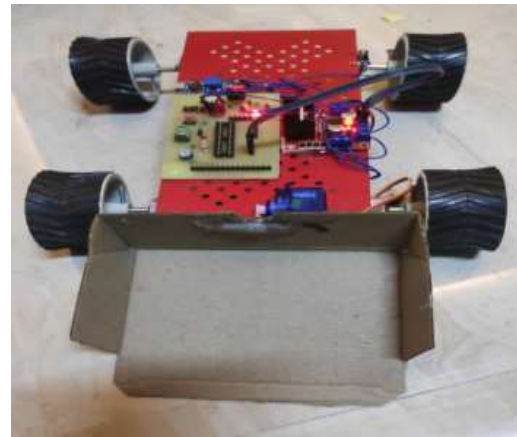


Fig 3. Top View

#### V. CONCLUSION

In this project, an integrated system of IoT and battery operated system is introduced for efficient and economic garbage collection. This project analyzed the solutions currently available for the implementation of IoT. With this work we can avoid over flowing of garbage in the public places. It can monitor the garbage collection at live video footage. The technologies which are used in the proposed system are good enough to ensure the practical and perfect for garbage collection process monitoring and management for green environment.

#### VI. REFERENCES

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