

# **Review on Development of Smart Waste Management Dustbin**

**Atul Wagh, Pravin Koyakade, Sajid Baig, Komal Battulwar, Shweta Virokar, Prof. R. M. Patil**

Department of Electronics and Telecommunication Engineering

Mauli Group of Institution's College of Engineering & Technology, Shegaon, Maharashtra

**Abstract:** *This design smart scrap tip system is a veritably smart system which will help to keep our metropolises clean. This design can reduce their time and trouble in an effective manner. robotization is that the most demand suitable point presently daily. For this purpose, smart sites are a important suitable approach. It'll be helpful to develop a green and smart megacity. For this, we've to develop an automatic smart tip which will first be suitable to descry the current status of the scrap caddy shoot the information to the scrap collection vehicle hand. They can incontinently take action to empty. It ultimate helps to keeping scrap in the society and hence the expansion of conditions caused by waste material is reduced. This paper gives an inclusive and detailed check of waste operation models. Entirely, this paper suggests the topology of the waste operation system which is the smart procedure as crucial enabling moxie in being waste operation system*

**Keywords:** *smart scrap tip*

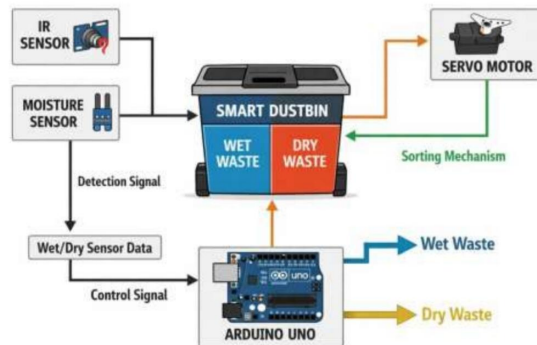
## **I. INTRODUCTION**

The rapid increase in population and daily waste generation has created serious challenges in waste management and environmental sustainability. One of the major problems is the lack of proper segregation of waste into wet and dry categories at the source. Conventional waste disposal methods rely heavily on manual sorting, which is time-consuming, inefficient, and often leads to mixing of waste, making recycling and disposal more difficult. To overcome these issues, smart and automated waste management systems have gained significant importance. The Smart Dustbin System is an innovative solution that uses sensors and a micro-controller- based control unit to automatically identify and separate waste. The system works using an IR sensor to detect the presence of waste and a moisture sensor to determine whether the waste is wet or dry. Based on this data, an Arduino Uno processes the signals and controls a servo motor that directs the waste into the appropriate compartment. This automated approach reduces human effort, improves segregation accuracy, and promotes hygienic waste handling This system enhances efficiency, minimizes human error, and contributes to a cleaner and healthier environment. It is especially useful in places such as homes, offices, public areas, and institutions where proper waste management is essential. By implementing such smart solutions, society can move towards more sustainable and eco-friendly waste management practices.

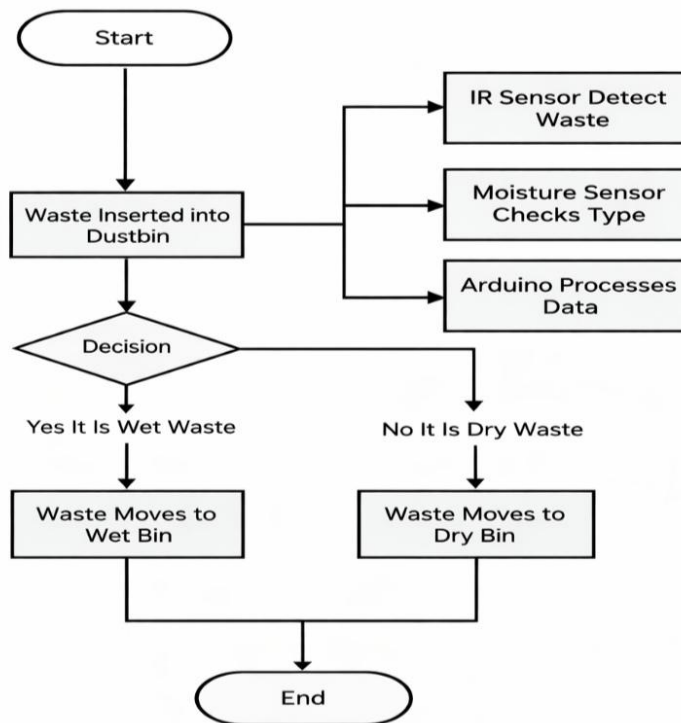
## **II. SYSTEM MODEL**

The Smart Waste Management Dustbin is an Arduino-based system designed to automatically segregate waste into wet and dry categories using sensors and a servo motor mechanism. It helps in improving waste management by reducing manual effort and ensuring proper segregation at the source. The system uses an IR sensor to detect the presence of waste and a moisture sensor to identify whether the waste is wet or dry. When the system is powered on, the Arduino initializes all connected components including sensors and the servo motor, ensuring that the system is ready for operation.





**III. FLOWCHART**



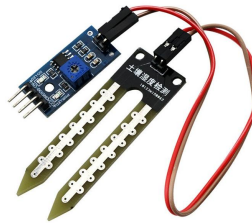
#### **IV. COMPONENTS**

##### **[1] Arduino Uno**



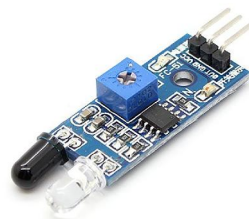
The Arduino Uno is one of the most popular and beginner-friendly microcontroller boards used for electronics and programming projects. The Arduino Uno is a microcontroller board based on the ATmega328P microcontroller. It's an open-source platform that combines hardware and software to help users create interactive projects. It's widely used due to its simplicity, versatility and affordability.

##### **[2] Moisture Sensor**



Moisture sensors are electronic devices used to detect the level of moisture in a substance. They work based on the principle of electrical conductivity, where higher moisture content increases conductivity. These sensors are commonly used in agriculture, environmental monitoring, and automation systems.

##### **[3] IR Sensor**



An IR (Infrared) Sensor is an important component used in the Smart Waste Management Dustbin. It helps in detecting the presence of waste when it is thrown into the dustbin, allowing the system to respond automatically and start the segregation process.



#### [4] Servo Motor



A Servo Motor is an important component used in the Smart Waste Management Dustbin to control the direction of waste. It rotates to a specific angle based on signals from the Arduino and helps in directing the waste into the correct compartment (wet or dry).

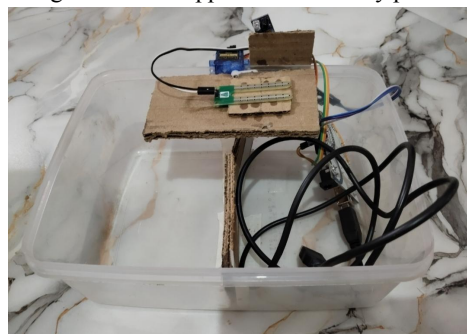
#### [5] Dustbin Cabinet



The Dustbin Cabinet is the physical structure of the Smart Waste Management Dustbin. It houses all the electronic components and provides separate compartments for wet and dry waste. It is designed to support proper waste segregation while ensuring durability and ease of use.

### V. RESULT

The Smart Waste Management Dustbin project was successfully implemented using Arduino UNO, IR sensor, moisture sensor, and servo motor for automatic waste segregation. The system efficiently detects the presence of waste and accurately classifies it as wet or dry using sensor inputs. Based on the detected type, the servo motor directs the waste into the appropriate compartment without any manual intervention. The entire process works in real-time and ensures smooth and hygienic waste disposal. The system demonstrates reliable performance in segregating waste, reducing human effort, and improving cleanliness. The use of simple and cost-effective components makes the project practical for real-world applications such as homes, schools, and public places. Overall, the project provides an effective solution for proper waste management and supports eco-friendly practices.



## VI. CONCLUSION

From this review paper check, it's concluded that smart tip system is a veritably innovative system which will help to keep the metropolises clean. This system makes sure that the clearing of tip soon when the scrap position reaches its threshold. In major metropolises, the scrap truck visits the area every day depending on the condition of each tip in real time. It helps to keep cleanliness in society. thus, the smart tip system makes the scrap collection more provident. This design will help to kill or minimize the scrap disposal problem. This system also helps to observe the pretend reports and thence will cut back the corruption within the overall operation system. thus, the good scrap operation system makes the rubbish multifariousness fresh provident. The enforced system was tested with five duplications of indispensable trash in the lockers the system was set up 100 accurate as it depicted the exact result of the trash can under test.

## REFERENCES

- [1] S. V. Bhonde et al., “ Smart Waste Segregation Dustbin Using Arduino, ” International Journal of Research in Applied Science and Engineering Technology( IJRASET), 2025
- [2] Chandani Sharma et al., “ Smart- caddy An Innovative Approach to Waste Management in Smart metropolises, ” International Journal of Technology Transfer and Commercialisation, 2025.
- [3] Anita S. Joshi et al., “ Smart Waste Management System Grounded on Arduino, ” IJRASET, 2024.
- [4] Venkadesh P. et al., “ Smart Dustbin Using ESP32 for Waste operation, ” IRO Journal on Sustainable Wireless Systems, 2024.
- [5] M. Jeyamurugan et al., “ Smart Waste Bin Monitoring System Using Arduino, ” ESP International Journal of Engineering & Technology, 2024.
- [6] T. Wu et al., “ Design of Fast Response Low- Energy Micro Igniter, ” IEEE Deals on Industrial Electronics, 2024.
- [7] H. Wang et al., “ tone- Powered Ignition System Grounded on Nanogenerator, ” Nano Energy( Elsevier), 2025.
- [8] Arduino, “ Arduino Uno Rev3 Datasheet, ” Arduino Official Attestation,( Online). Available [https:// www.arduino.cc](https://www.arduino.cc)
- [9] Electronics Hub, “ IR Sensor Working Principle and Applications, ” ( Online). Available [https:// www.electronicshub.org](https://www.electronicshub.org)
- [10] Circuit Digest, “ Soil humidity Sensor Interfacing with Arduino, ” ( Online). Available [https:// circuitdigest.com](https://circuitdigest.com)
- [11] GeeksforGeeks, “ preface to Servo Motor and Its Working, ”( Online). Available [https:// www.geeksforgeeks.org](https://www.geeksforgeeks.org)

