

# INTELLIGENT WASTE MANAGEMENT SYSTEM USING IOT

N.Tejaswini<sup>1</sup>, M.Satish Kumar<sup>2</sup>, M.Pavan Kumar<sup>3</sup>, K.Pradeep<sup>4</sup>

*N.Tejaswini B.Tech (IT) Seshadri Rao Gudlavalleru Engineering College,  
M.Satish Kumar B.Tech (IT) Seshadri Rao Gudlavalleru Engineering College,  
M.Pavan Kumar B.Tech (IT) Seshadri Rao Gudlavalleru Engineering College,  
K.Pradeep B.Tech (IT) Seshadri Rao Gudlavalleru Engineering College,  
Y.K.Viswanadham Dept of IT Seshadri Rao Gudlavalleru Engineering College, Gudlavalleru, India.*

\*\*\*

**Abstract** - Waste management and segregation is a much-wished procedure in metro cities and concrete regions due to the spreading of diseases. It is envisioned that India produces forty-two million lots of municipal stable waste annually at present. Segregation makes it possible to make use of and recycle the waste efficiently. This waste segregator machine can without difficulty segregate waste. While waste is thrown within the pipe, the IR sensor will sense the waste. Waste is split into three classes, particularly wet, Dry, and metallic. Some other sensors will experience the garbage category. As in keeping with the algorithm used, if the waste is steel then the mechanism will carry the metallic gathering bin below the pipe. With the assistance of a servo motor, the waste will fall into the metallic bin. In addition, the method will repeat if wet waste is sensed. If the sensor doesn't prompt each of the sensor categories, then the waste may be taken into consideration to be dry waste. As the arena is in the stage of upgradation, there is one stinking trouble we have to address rubbish. Waste segregation and recycling are effective methods of decreasing dumped trash. Recycling is carried out manually with the aid of sorting the waste with the aid of the human interface. To lessen human interface and to make structures smarter. We carried out a machine for accumulating and segregating waste into dry and moist and not using a human interface. The system is designed with built-in sensors to locate and segregate the waste, in conjunction with an arm to select and region the waste into separate bins designed for dry, wet, and metal waste.

**Key Words:** Internet of Things (IoT), Arduino Uno, servo motor, LCD Display, Metal Detector Sensor, Moisture Sensor

## 1. INTRODUCTION

As the world population grows, the problem of waste management will become more serious. Proper waste separation at source is now essential to encourage sustainable practices as it facilitates recycling and reduces environmental impact. Activity aims to develop an Arduino-based system for wirelessly separating dry, wet, and metallic waste into dry, wet, and metallic waste using sensors, servo motors and LCDs. The use of an Arduino, a flexible, accessible microcontroller, provides a practical approach to garbage sorting automation. This project uses an Arduino

platform that interfaces with sensors, including infrared and ultrasonic, to determine the type and quantity of waste

Servomotors are necessary for the physical separation of waste products. The Arduino microcontroller instructs the servo motors to operate, sending the waste to the appropriate bin, based on the data collected from the sensor.

In the end, this challenge aims to create a waste segregation device that is both flexible and clean to apply with the aid of utilizing Arduino, servo vehicles, sensors, and an LCD show. The gadget supports ecologically friendly waste management practices by presenting a Wi-Fi and automated answer, that's in line with the global trend in the direction of environmentally friendly generation

## 1.1. LITERATURE SURVEY

Tejaswini and coauthors used IOT to create a smart waste management system and they have proposed a system which functions on client-server model.[1]

Exploring waste segregation methods is critical while doing a literature survey for project documentation. This includes analyzing existing systems used in various sectors and research fields, as well as reviewing academic papers, articles, and case studies to better understand the relevance of waste segregation, its environmental advantages, and the methodology used. Furthermore, it is critical to research any applicable standards and laws controlling waste management techniques, such as segregation and disposal processes. This core understanding will guide the design and implementation of your project's waste segregation process.

## 2. EXISTING SYSTEM

Current waste segregation systems frequently miss the opportunity for thorough waste management and resource recovery, especially those that are restricted to separating garbage into dry and wet categories. These systems lose out on chances for recycling and the appropriate disposal of precious resources when they fail to separate other waste streams beyond dry and wet materials, such as organic trash, electronic waste, or building debris. Consequently, the promise to decrease landfill waste and conserve resources is

not completely realized, and overall recycling rates continue to be below optimal levels. The quality and value of recovered materials may also be compromised by inadequate segregation, which can cause contamination problems during the recycling process. In addition to decreasing recycling effectiveness, this contamination worsens environmental effects and calls for more processing or disposal procedures, which exacerbates environmental deterioration.

Furthermore, it is impossible to ignore the financial effects of inadequate waste segregation. Recyclable or repurposed valuable materials may wind up in landfills, resulting in missed opportunities to generate cash and ultimately raising waste management expenses. Inadequate segregation can also result in cost inefficiencies since more landfill space and waste management facilities are required to handle the increasing amount of incorrectly segregated garbage. These financial difficulties highlight how crucial it is to implement thorough waste segregation procedures that give resource recovery, environmental sustainability, and regulatory compliance first priority in order to successfully handle the varied and complicated nature of waste streams.

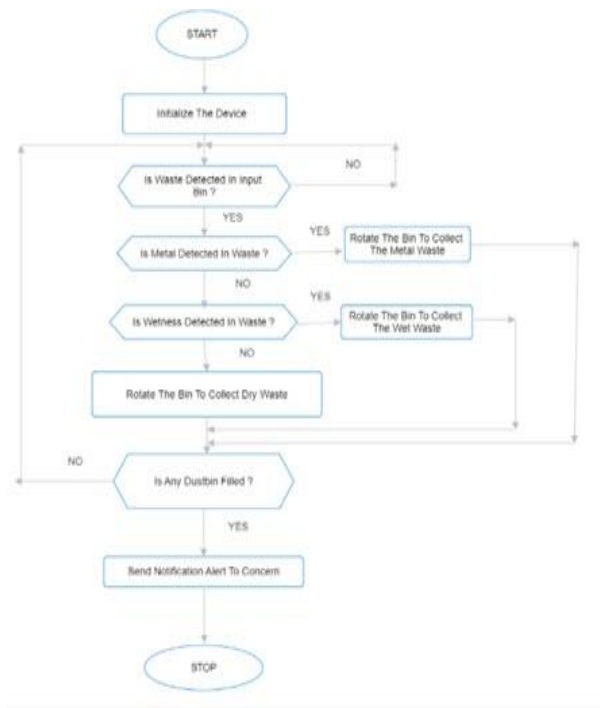
### 2.1 PROPOSED SYSTEM

The proposed dry-wet metal waste separation device is an intelligent waste solution that uses Arduino microcontrollers, servomotor sensors, and Wi-Fi communication for efficient waste separation. This device pursues to provide the process of eliminating waste at source has been automated so that recycling efforts promote environmental sustainability. The essential additives of the device are Arduino microcontrollers, which act as the brains of the operation. Various sensors inclusive of ultrasonic and infrared sensors are used to detect the quantity of waste tanks filled and decide the order of waste arrival. Servomotors are used to automate waste operation, directing waste to the right container in based on its distribution.

**Table -1:** Detection Status

TEST	MATERIALS	DETECTED	NOT DETECTED
1	Metal Waste	Detected	-
2	Wet Waste	Detected	-
3	Dry Waste	Detected	-

The reading for results is determined and object for metal, dry, wet detected on conveyor is shown in Table 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, nuts, 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.



**Chart -1:** Flow Chart for the process of collecting waste.

The process starts with starting and beginning the system. After initialization, the device tests to look if rubbish has been detected inside the enter bin. When rubbish is detected, the system continues to analyze the garbage with sensors. Metal detectors suggest the presence of metallic substances, whilst damp detectors discover water or faeces in rubbish. Based on regarded characteristics, the system triggers the corresponding servo motor to rotate the bin to the precise series chamber. For example, whilst metal is detected, the servo motor switches the bin to the metallic waste series chamber. Similarly, if water leakage is detected, the luggage is diverted to the moist waste series chamber. If no specifics are known, the system transfers the waste to a dry waste series chamber.

Throughout the technique, the gadget continuously monitors the quantity of waste within the collection chambers. When a compartment is filled, the gadget sends a records alert to the applicable authority and suspends the separation manner till the crammed compartment is emptied. In addition, if no waste is detected in shipment input, the gadget resumes the manner, making sure continued operation.

Overall, the operating ideas of our venture encompass automatic detection of waste types, accurate separation with servomotors, and efficient control of waste series units to permit recovery and effort may be reused in waste control.



**Fig -1:** Waste dumped into corresponding bins.

Conference (TENCON) Author: Dr.N.SATHISH Kumar(S.R.M., Coimbatore, INDIA)

- [4] Solid waste management based upon IoT or Smart city  
Date and Journal: ICICCS 2017 Author: Krishna Nirde, Prashant S. Mulay, UttamM.Chaskar (C.O.E. Pune).

### 3. CONCLUSION

The proposed method is an efficient solution to the current waste management problem which effectively segregates metal, dry and wet waste. This system can be effectively deployed in industrial material segregation, scrap shops etc. The IOT based Smart Dustbin effectively employs moisture sensors to segregate. Our proposed work aims at segregation of waste materials in particular metal, wet and dry waste. It is the first step towards recycling. Recycling the waste materials has a huge impact on the economic condition of the country since recycling of plastic can reduce the manufacture of plastic using renewable resources and it also has an immense effect on the environment by effectively managing the solid waste.

### FUTURE SCOPE

There is always room for improvement in any project, but the most urgent problem with waste separation is probably when it comes to simultaneous disposal. The waste segregator can be modified to safely separate biomedical waste produced at home, separate paper and plastic, and have a small, aesthetically pleasing mechanical design.

### REFERENCES

- [1] Kadus, T. (n.d.). Smart Waste Management System using IOT. International Journal of Engineering Research & Technology (IJERT).
- [2] 2017 5th International Conference on Instrumentation, Control, and Automation (ICA) Yogyakarta, Indonesia, August 9-11
- [3] IOT Based Smart Garbage alert system using Arduino UNO Date and journal: 2016 IEEE Region 10