



# INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

## Dry And Wet Waste Segregator

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**Abstract:** Effective waste management plays a key role in sustainable urban growth, and an important initial step in this journey is separating dry and wet waste right at the source. This document examines a thorough strategy for the segregation of these waste types, underscoring its benefits for the environment, economy, and society. The initiative concentrates on creating an organized system for waste separation at both household and community levels, backed by awareness initiatives, straightforward technological solutions, and policy suggestions. By analyzing case studies, this project illustrates how appropriate waste segregation can substantially lessen the load on landfills, boost recycling effectiveness, and enhance overall cleanliness. Additionally, it draws attention to the necessity of community engagement and local governance in forming a successful and scalable framework. The document wraps up with practical recommendations and the potential for application in urban and semi-urban areas, with the goal of fostering a cleaner and greener future.

**Index Terms -** Sensors, Servo motor, Audino uno, Buzzer, formatting, style, styling, insert.

### I. INTRODUCTION

Waste control has developed into an increasing issue in our swiftly urbanizing society. A crucial practice in efficient waste control is to separate it at its source. Sorting dry and wet waste is crucial for minimizing environmental impacts, enhancing recycling methods, and boosting public health and cleanliness. Dry waste includes items like paper, plastic, and metal, can frequently be recycled or repurposed, whereas wet waste, mainly composed of organic materials, is ideal for composting and generating biogas. Although the idea is straightforward, numerous communities face challenges in execution due to insufficient awareness, inadequate infrastructure, and irregular adherence to policies. This project seeks to tackle these obstacles by suggesting a practical and sustainable approach for proper dry and wet waste separation. Through research, community involvement, and actionable strategies, the project highlights the significance of personal accountability and collaborative efforts in creating a cleaner and healthier environment.

### II. OBJECTIVES

This project primarily aims to encourage and implement an effective system for dry and wet waste segregation at the source. The objective is to minimize environmental pollution, enhance recycling efficiency, and advance the use of long-term, sustainable waste solutions within communities. By fostering awareness and providing practical solutions, the project aims to create a model that can be adopted at both household and institutional levels for long-term ecological benefits.

### III. BLOCK DIAGRAM REPRESENTATION

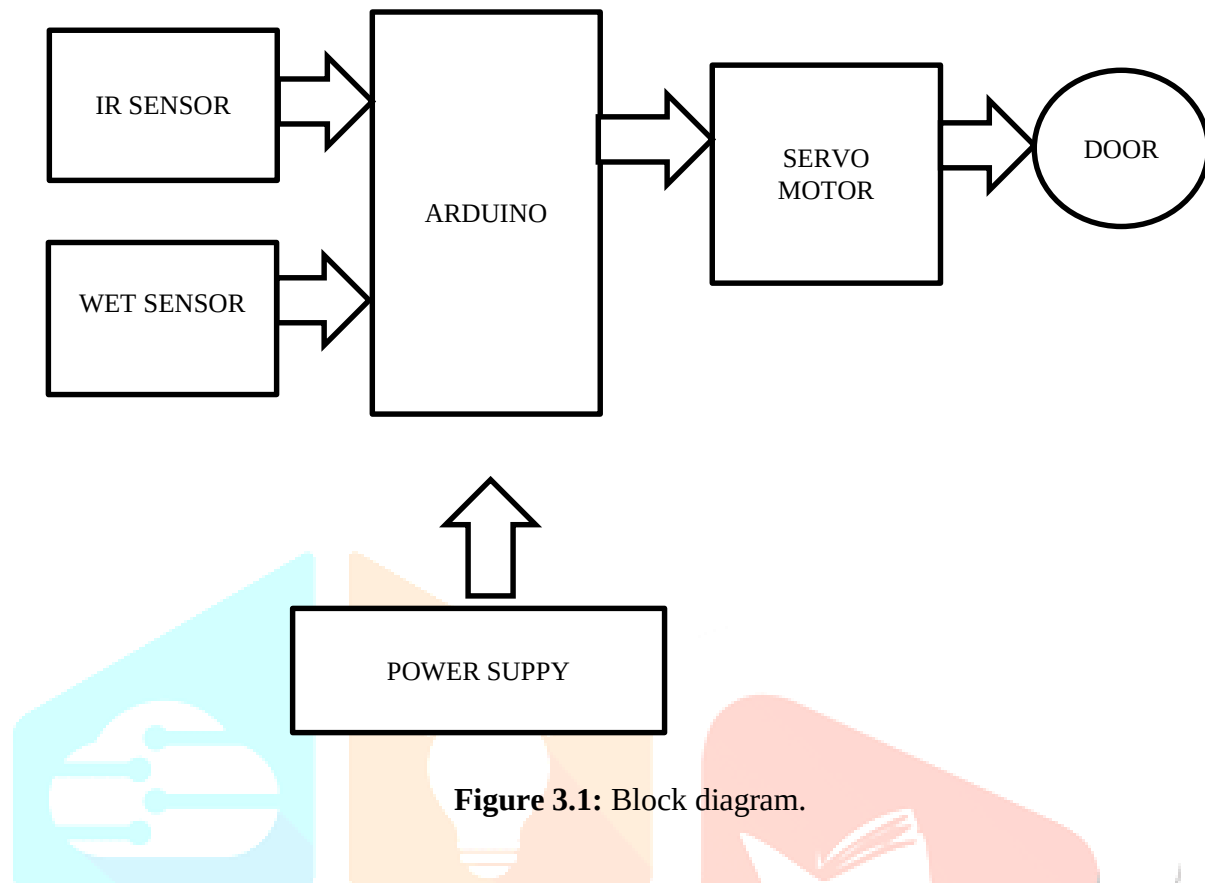


**Figure 3.1:** Block diagram.

This block diagram (figure 1) illustrates a smart segregation system designed using an Arduino microcontroller. This system classifies waste into dry and wet categories with the help of sensors and performs automatic sorting using a servo motor mechanism. IR sensor is the sensor used to detect the presence of waste material as it enters the system. It triggers the rest of the circuit to analyze the type of waste detected. Wet sensor identifies whether the detected waste is dry or wet. Arduino accepts input signals from both source IR sensor and rain sensor. The door is linked to the servo motor and opens in the direction. Power supply is power the entire system by an external power source.

### IV. COMPONENTS

**4.1 Arduino Uno:** A power supply refers to the source that delivers electrical energy. A power supply unit (PSU) is any device or system that provides electrical or other forms of energy to a load or multiple loads. In this project, a regulated +5V DC power source is obtained from a specifically designed and implemented PSU.

The figure illustrates the circuit layout used to generate the regulated +5V DC supply required for the project. A full-wave rectifier, consisting of two or more diodes, is arranged to ensure that the current moves in a consistent direction through the load during both halves of the AC cycle. The 7805 is a fixed positive voltage regulator IC that delivers a constant 5V output.

It belongs to the 78xx series of positive voltage regulators, while its counterpart, the 79xx series, handles negative voltage regulation.

These regulator ICs typically feature built-in protections, such as thermal shutdown and foldback current limiting. The specific voltage and current ratings are indicated by the numbers in their part codes—where "xx" represents the output voltage.

For instance, a 7805 provides a 5V output at up to 1A, while a 79L15 offers a -15V output with a maximum current of 100mA.

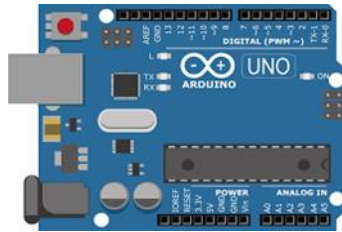


**Figure 4.1.1:** Arduino Uno.

**4.2 IR Sensor:** The IR sensor is a passive device that detects thermal radiation and movement. It consists of five main components an infrared source, a transmission medium, optical components, infrared detectors

/receivers, and a signal processing unit. IR sensors can measure heat emitted by items, which makes them perfect for tracking object movement, such an object is placed then it detects and then senses the object.



**Figure 4.2.1:** IR sensor

**4.3 Rain Sensor:** A Rain sensor is essential for differentiating between dry and wet waste by measuring the moisture levels in the materials. It generally functions through two probes that evaluate the resistance or conductivity between them. Wet waste, which contains more moisture, conducts electricity more effectively than dry waste, leading to a marked difference in the sensor's readings.

In a waste sorting system, the moisture sensor aids in automating the separation process. Once waste touches the sensor, it quickly determines the moisture content and sends a signal to the microcontroller, which sorts the waste into appropriate categories. This enables efficient, real-time separation of organic (wet) waste from inorganic (dry) waste, enhancing waste management and recycling initiatives. The sensor is small, energy-efficient, and easily incorporated into automated systems, making it a suitable choice for advanced waste management solutions.



**Figure 4.3.1:** Rain sensor

**4.4 Servo Motor:** Servos primarily function in controlling angular or linear positions, as well as managing specific velocity and acceleration. Many companies rely on servo motors for their compact design and impressive power. In spite being little, these motors produce significant energy and are celebrated for their remarkable efficiency. Servo motors are found in a mix of everyday products. Household electronics, such as DVD and Blu-ray players, utilize servos to manage the opening and closing of disc trays. Additionally, servos are ideal for electrically driven machinery like elevators, rudders, walking robots, and grippers. In this project the servo motor rotates left and right after detection of the object.



**Figure 4.4.1:** Servo motor

**4.5 Power supply:** A power supply is an electrical device refers to the source that delivers electrical energy. An electrical device unit (PSU) is any device or system that provides electrical or other forms of energy to a load or multiple loads. In this project, a regulated +5V DC power source is obtained from a specifically designed and implemented PSU. The figure illustrates the circuit layout used to generate the regulated +5V DC supply required for the project. A full-wave rectifier, consisting of two or more diodes, is arranged to ensure that the current passing through the load maintains the same direction during both halves of the AC cycle. The 7805 is a fixed positive voltage regulator IC that delivers a constant 5V output. It belongs to the 78xx series of positive voltage regulators, while its counterpart, the 79xx series, handles negative voltage regulation. These regulator ICs typically feature built-in protections, such as thermal shutdown and foldback current limiting. The specific voltage and current ratings are indicated by the numbers in their part codes—where "xx" represents the output voltage. For instance, a 7805 provides a 5V output at up to 1A, while a 79L15 offers a -15V output with a maximum current of 100mA.

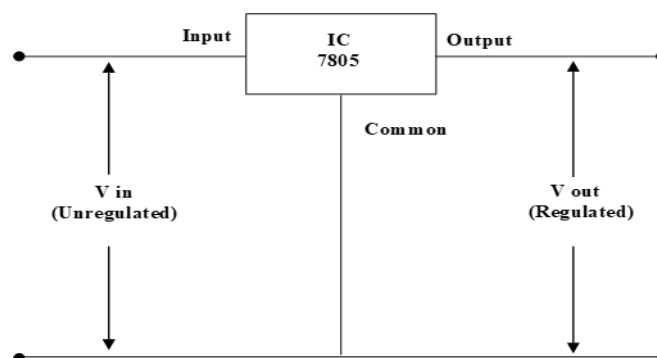


**Figure 4.5.1:** Power supply circuit

## V. WORKING

The approach taken in this project is to separate waste in two main categories, one is dry and another is wet waste. The goal is to maintain monitor and manage garbage in a better way and promote recycling and composting. Firstly, debris is picked up, people often throw the garbage is transformed into common bin, secondly the garbage is sensed and sorted either wet or dry, third comes waste separation where the waste is separated and fell into their compartment either waste is dry or wet.

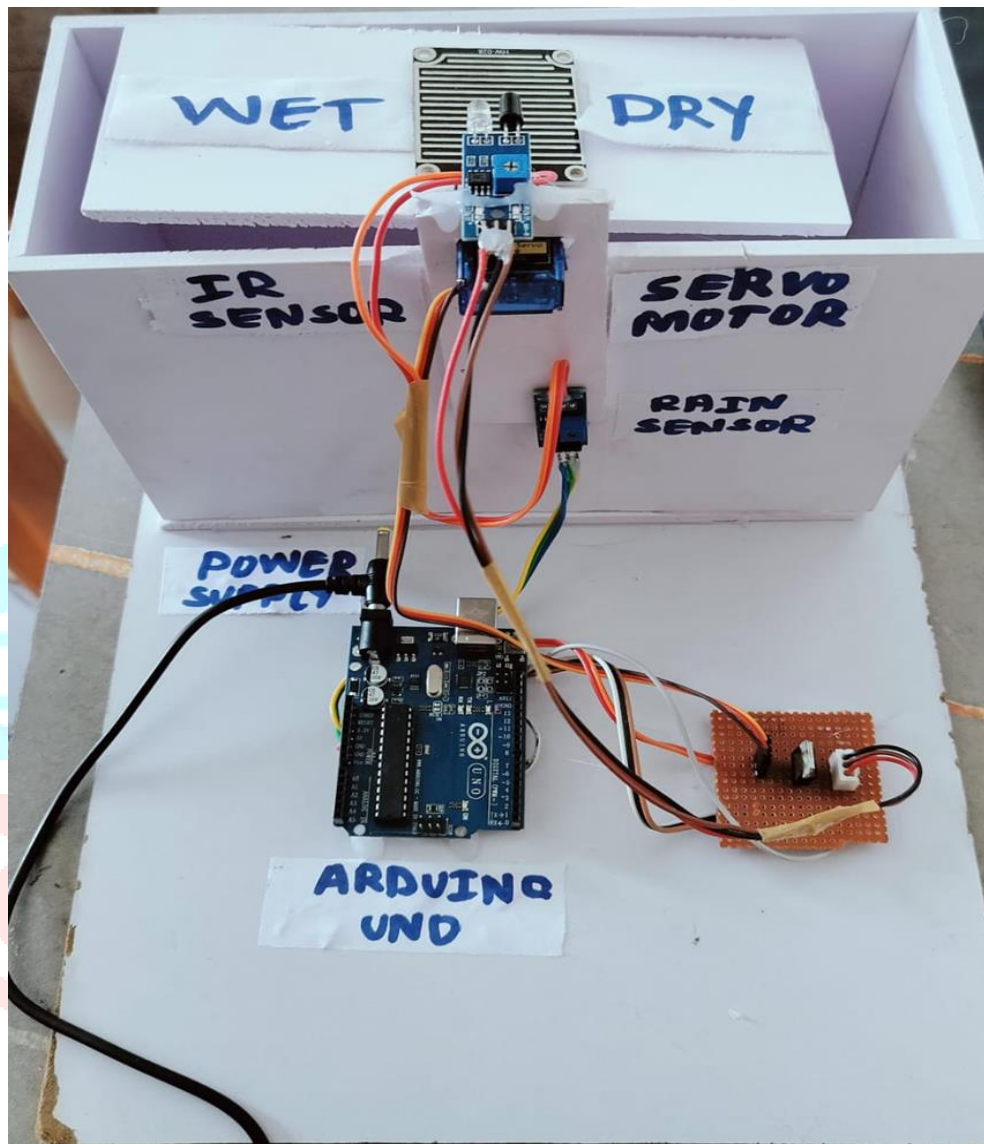


**Figure 5.1:** Working system.

## VI. RESULT

The rain sensor responded instantly upon the presence of water, allowing the system to notify about wet waste. Upon detection by either sensor, the Arduino Uno processed the data and waste is identified whether the waste is wet or dry. The power is required for the identifying IR sensor is used to identify the object in dry or wet state.

## VII. FUTURE SCOPE

Though this version offers itself as highly effective, real-world conditions may present additional challenges. A moisture sensor is essential for differentiating between dry and wet waste by measuring the moisture levels in various materials. It usually functions using two probes that assess the resistance or conductivity of the material in between. Wet waste, which retains more moisture, performs better in conducting electricity than dry waste, leading to a significant change in the readings from the sensor.

Separating dry and wet waste provides meaningful chance to enhance sustainable waste management systems. As urban development accelerates and waste production rises, efficient waste management becomes increasingly important, this device could significantly contribute to maintaining cleanliness.

## VIII. CONCLUSION

The development of a dry and wet waste segregation system presents an innovative and cost-effective solution to maintain hygiene. The segregation of dry and wet waste at the source represents a crucial move toward achieving effective and waste that is sustainable management. This project emphasizes the role of separating waste streams to simplify recycling processes, reduce environmental pollution, and promote healthier living conditions. By introducing a structured and potentially automated method of segregation, the burden on landfills can be significantly reduced while enabling efficient resource recovery. As urban populations grow and waste generation increases, such systems offer a practical solution to one of the most pressing environmental challenges. With continued innovation, awareness, and integration into public policies, dry and wet waste segregation has the potential to transform how communities manage their waste and move toward a cleaner, greener.

## IX. ADVANTAGES

- Maintain hygiene.
- Easy to use and efficient.
- Affordable and portable, making it accessible to a wider audience
- Facilitates efficient waste collection.
- Encourages responsible behavior.

## X. REFERENCES

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