

# Smart Wastage Segregation using Arduino UNO

E. Malleswari, S. Nanda Kishore

**Abstract:** The rates of waste generation in India are increasing with population and urbanization. For reducing pollution levels within the atmosphere it's terribly helpful. The most aim of this project is to segregate the various forms of wastage from the rubbish. This technique uses metal detector and soil wetness detector to separate the metal waste, dry waste and wet waste from the waste within the mud bin. The complete mud passes through the belt. This method uses a metal detector to find the metal elements within the garbage. Once it detects the metal, the system can open the corresponding gate else it'll open other gate. The soil wetness detector can find the presence of the dry waste or wet waste. The system encompasses a dc motors interfaced with the small controller that rotates the belt.

**Index terms:** Arduino UNO, ATmega328P microcontroller, CPU[Central process Unit], EEPROM, Metal detection sensor, Soil wetness detector, Servo motor, SRAM.

## I. INTRODUCTION

India's garbage generation stands 0.6 kilograms of garbage per head per day. Segregation at supply is crucial for clean cities. India's per capita waste generation is so high. Improper waste disposal causes problems that cause degradation of the atmosphere.

Waste has been piling up in several dumping grounds all over India. Most of this waste is in mixed form and thus cannot be disposed off effectively. Poor waste management leads littering and therefore unhealthful living conditions. The most commonly used waste handling techniques area unit burning of waste or using it as landfill. The waste is not subjected to recycling, composting, or any other form of environmental treatment. Hazardous toxic wastes lie side by side with the organic wastes in landfill. It should be imperative on the municipalities to separate the biodegradable from non-biodegradable waste. Biodegradable wastes will then be subjected to composting. Wastes like plastic, metal, paper etc may also be subjected to recycling. In some ways in which, the waste will really function a resource.

By separating waste into totally different classes we will implement processes which will cause effective resource utilization. This is utilized at individual as well as society level. Waste management is the one in every of the core considerations of contemporary age. As nations round the world area unit developing, their considerations and responsibility for a healthier atmosphere is additionally increasing. During this project, implement an efficient good waste management system.

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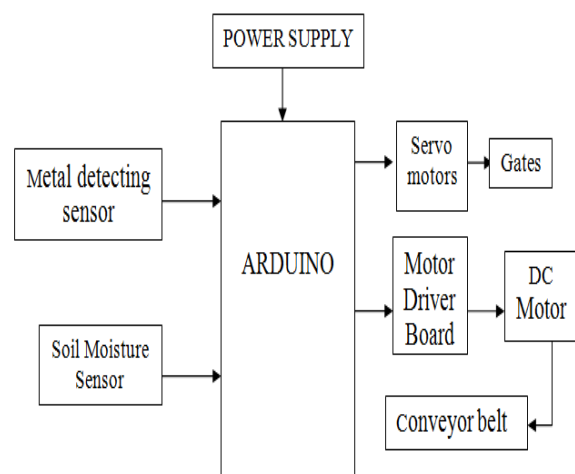
## II. EXISTING SYSTEM

In existing system, there's solely risk to notice the various type's wastage. Then, we'll divide the waste from the dustbins.

## III. PROPOSED SYSTEM

The dc motor drives the belt that is employed to carrying the wastage through the sensors to the dustbins. The metal detection device detects the metal wastage and so corresponding gate can open. Then that wastage is falls to the corresponding wastebin. If the dry wastage comes, then it falls to the corresponding wastebin. Similarly, the soil wetness device detects the wet wastage, and so it falls to the corresponding wastebin.

## IV. BLOCK DIAGRAM



### A. Power Supply:

Transformer:



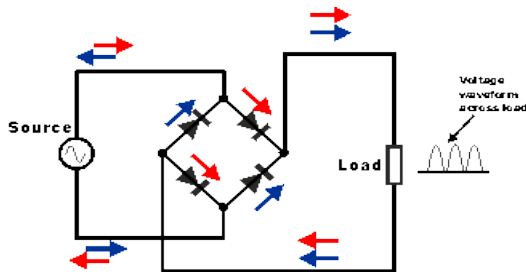
Fig 1.1:Transformer

Transformer could be a device that is employed to step downs the input ac voltage.

**B. Bridge Rectifier:**



**Fig: Bridge rectifier**



**Fig1: Bridge rectifier circuit**

Bridge rectifier circuit is employed to convert the AC voltage to pulsing DC voltage.

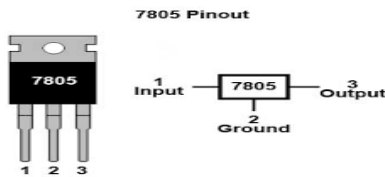
**C. Filter:**



**FIG 1.1: Capacitor**

Filters can be many sorts i.e., inductive, capacitive, RL, LC, pi filters etc., Here, the filter to removes the ripples of AC elements.

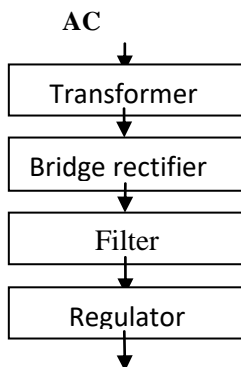
**D. Regulator:**



**Fig 1.2: Regulator**

It is a electronic element that is employed to convert the AC voltage to straightforward DC voltage.

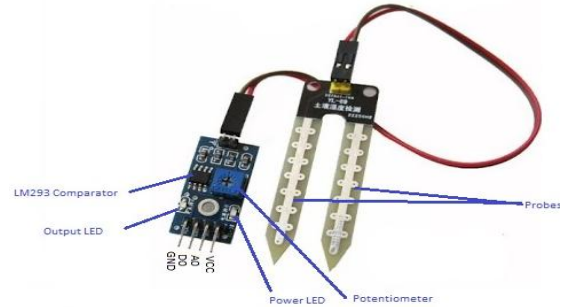
**V. FLOW CHART OF POWER SUPPLY**



All the above components are used to convert AC voltage to DC voltage.

**E. Soil moisture sensor:**

This sensing element measures the volumetric content of water inside the soil and gives the moisture level as output. The sensing element is equipped with each analog and digital output, thus it are often used in each analog and digital mode.



**Figure 2: Soil moisture sensor**

**F. Metal Detecting sensor:**

A detector is associate electronic which detects the presence of metal close. Metal detectors square measure helpful for locating metal inclusions hidden at intervals objects, or metal objects buried underground. They typically include a hand-held unit with a device probe which are often swept over the bottom or alternative objects

**G. Motor Driver Board:**

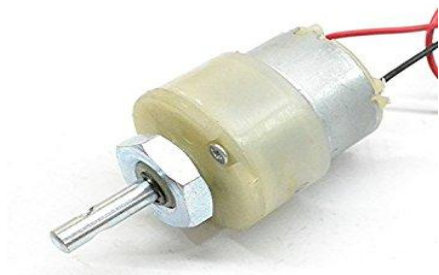
Motor driver board used to controlling the motor. It will control the clockwise and anticlockwise direction of the motor by using L293D IC.



**Fig 1.6: Motor Drier Board**

**F. DC Motor:**

Electromagnetic direct current (DC) engines are normally runs fast and low torque (Gear down) Electromagnetic substituting current (AC) engines.



Seldom used in Robots because power supply is battery.

### G. Servo Motor:

The servo motor is assembly of 4 things: A traditional DC motor, a gear reduction unit, a position-sensing device and a bearing circuit. The DC motor is connected with a gear mechanism which provides feedback to a position sensor which is mostly a potentiometer. From the gear box, the output of the motor is delivered via servo spine to the servo arm.



FIG 5: Servo motor

For normal servo motors, the gear is normally created up of plastic whereas for high power servos, the gear is created up of metal.

### H. Conveyor Belt:

The conveyer belt is employed to hold the wastage towards the dustbins.



Fig 6: conveyor belt

## VI. ARDUINO UNO

Arduino UNO is ATMEGA328 controller has fourteen for computerized accessibility, six straightforward pins for easy interface, a sixteen uber fence gem oscillator repeat, USB network, a power connector.

The Arduino board has input/output pins. It's pins from zero to thirteen that may be used as digital input from Switches A0-A6 as analog pins. During this PWM pins are there three, 5, 6, 9, 10, & 11.

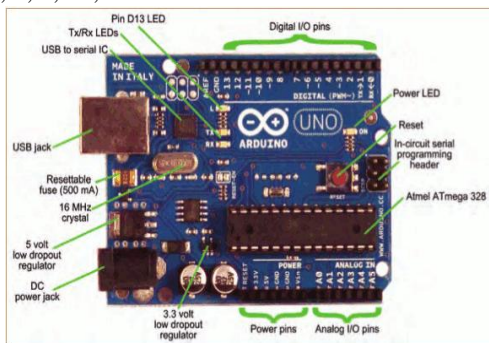


Fig 7: Arduino Board

## VII. FEATURES OF ARDUINO MICRO CONTROLLER

Most executable guideline is single clock cycle

- At 20 Mega hedges it has this throughput up to 20 Million Instructions/Second.
- It will get reset when power on.
- It internal Oscillator.

For serial communication here in this Arduino Board has pins 0, 1 are serial communication port pins.

## VIII. SOFTWARE REQUIREMENTS:

To program the Arduino (influence it to do what you want it to) you likewise utilize the Arduino IDE (Integrated Development Environment), that could be a bit free programming, that empowers the program within the language that the Arduino gets it. If there should be associate occurrence of the Arduino language is C.

## IX. WORKING OF THE PROJECT:

The conveyer belt is employed to carrying the wastage by utilizing dc motor through the sensors to the dustbins. The metal detection sensing element detects the metal wastage so corresponding gate can open. Then that wastage is falls to the corresponding wastebin. If the dry wastage comes, then it falls to the corresponding wastebin. Similarly, the soil wet sensing element detects the wet wastage, so it falls to the corresponding wastebin.

## X. APPLICATIONS:

- In underground cities.
- In municipalities.
- In clean India mission.

## XI. ADVANTAGES

- Easy to handle
- Smart Usage
- Safety

## XII. OUTPUT AND RESULTS

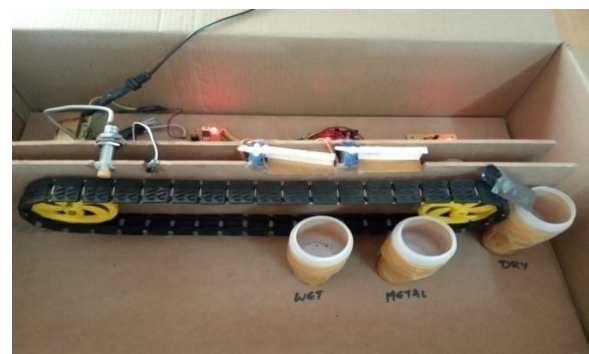


Figure 8: Dry waste going to the dustbin



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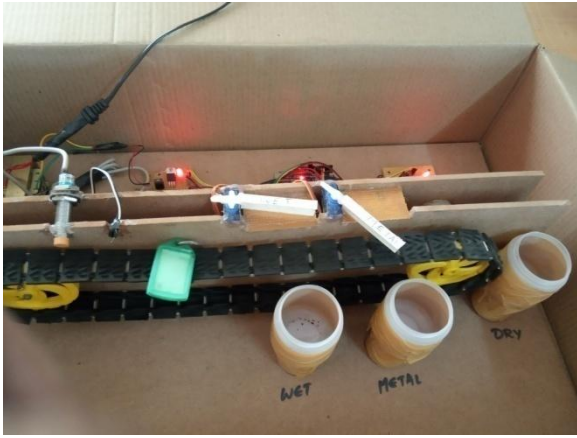


Figure 9: Metal detecting sensor activated, metal waste is segregating to the dustbin

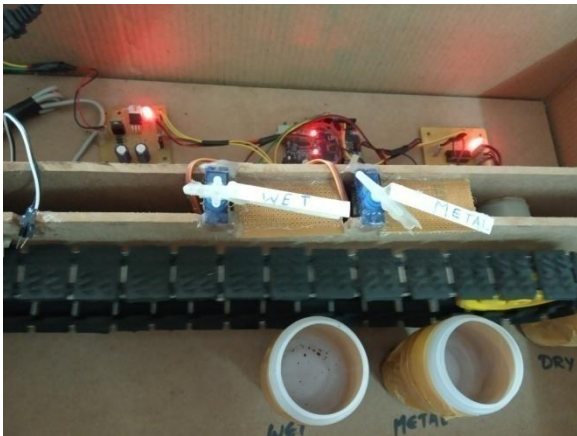


Figure 10: circuit arrangement

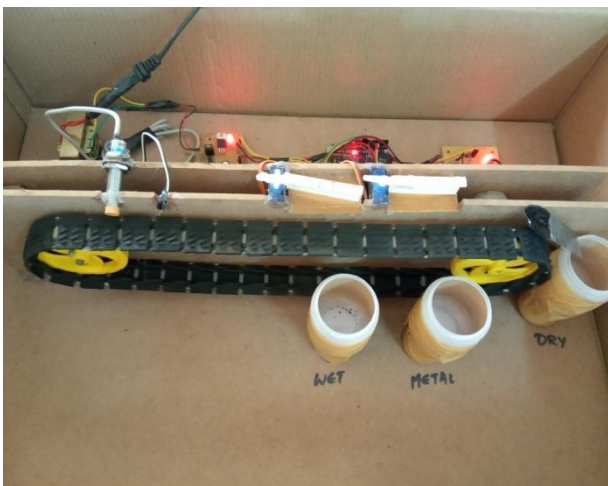


Figure 11: Hardware arrangement of the project

## XIII. RESULTS

Whole wastage is separated and falls into corresponding dustbins by sensors and gates through the wastebins.

## XIV. CONCLUSION

This system helps the native municipal administration in waste management system for segregating metal waste, dry waste, wet waste. It uses sensors for sensing metal, dry waste and wet waste. Sensors plays a vital role for sensing differing kinds of waste. For metal detection detector is

utilized for detection the metals. This project came in comfortable that a worthy elucidation for maintaining inexperienced atmosphere. The planned system is an endeavor to boost current waste assortment system in India for “Clean India mission”. Smart waste management system avoids human intervention, reducing human time and energy.

## ACKNOWLEDGEMENT

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