

# Smart Machine For Plastic Waste Disposal

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**Abstract-** Nowadays there is huge increase in the amount of plastic wastes generated by humans and have limited space for dumping the wastes. Plastic Waste Management has assumed great significance in present day context. To overcome this recycling plastic is necessary. Therefore a smart machine for plastic wastes disposal which accepts the plastic wastes for recycling and in return dispenses anything useful for the users like money, tickets, candies. After inserting the plastic the machine detects plastic with the help of sensor and rejects material other than plastic. It is also equipped with a weight calculator to determine the weight of the plastic and gives coins, candies, etc as rewards according to the weight of the plastic. This machine supports only plastic as input and coins, candies as outputs. The output of the bin can be used for recycling, road making, ensuring raw materials for the industries etc. The collected unwanted materials are turned into new products. Recycling of waste plastics is an efficient way to improve the environmental performance of the polymer industry.

This invention relates in general to waste management and recycling the plastic waste in the environment. The littering of plastic wastes in the environment and less willingness to recycle the plastic presents a continuing problem to environment and to all the living beings.

**Keywords-** Capacitive Proximity sensor, Inductive Proximity sensor, Servo motor

## I. INTRODUCTION

These days the increasing in amount of waste generated by human's and limited landfill sites for dumping waste, recycling it is one of the novel approaches to manage the waste effectively. Presently in India, about 960 million tonnes of solid waste is being generated annually as by-products during industrial, mining, municipal, agricultural and other processes.

However, it's not the amount of waste generated that's as much of an issue as the fact that more than 45 million tonnes of garbage is untreated and disposed of by municipal

authorities every day in an unhygienic manner leading to health issues and environmental degradation.

Reverse vending machine is the solution for recycling the waste. Reverse vending machine will be working by taking recyclable waste into the machine and gives useful thing as output. We all know that plastic is a good friend of human being a sit can be moulded to any shapes as desired.

The main problem found by us is difficulty in managing plastics. The environment is littered by plastic wastes and it causes pollution and health hazards. Main problems caused by plastic pollution are waste and environmental problem in our contemporary society.

During the recent time, use of Reverse Vending Machine (RVM) is increasing day by day. Reverse Vending Machine collect popularity in those country where recycling laws or legislation is required. It becomes a major problem to dumped waste because in most of the country where landfill sites are already on their limits or cross their limits. When the waste materials get disposed they released harmful gases. This emission of gases is very harmful for the Earth and for species living on it .The most important approaches for recycling the waste is to managing waste effectively.

**[1]Smart dustbin separation of metals and plastics by using IOT and Robotics**

**Authors: Sabari N, Venkatesh B, Vyshakh P, C Vishwanathan**

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This project presents smart dustbin separation of metals and non-metal by using IOT and ROBOTICS. In this project they are using conveyor belt along with the robotic arm assembly for separating the metal and non-metal wastes. The robot arm consists of capacitive proximity sensor which can detect the presence of plastics, wood..etc .On the other side a magnet is placed so that metals can be attracted. These wastes are stored in different bin.

**[2]Plastic recycling Vending Machine.**

**Authors:** Bebetto Sabu, Richard J Thottian, Edwin antoo  
**Published in:** IOSR Journal of Electrical & Electronics Engineering (IOSR-JEEE)

They design a plastic recycling vending machine .The device has a crushing system so plastic is crushed in to minute granules. The problem with this project is it accepts only the bottle not other forms of plastic. If it accepts other waste that damages the whole system.

**[3]A New approach in manufacturing of reverse vending machine.**

**Authors:** M Balubai, VamsikiranSure, V Manil reddy, Sai reddy Gowtham, Dr.Ram.subbiah

**Published:** July-2017 International Journal of Advanced Engineering, Management and Science

Reverse vending machine has been designed and manufactured for immediate segregation of recyclable waste. Gives a token as an appreciation. The machine is capable of collecting two kinds of trash i.e plastic bottles and tin cans which can store up to 100 In no's , 50 each.

### Motivation

Waste management is also a great problem in poor developing countries as waste is scattered all over roads due to improper methods of collection and dumping thus polluting the environment.

As there exists basic problems regarding the primary task of waste management like proper disposal, collection, sorting, recycling etc.

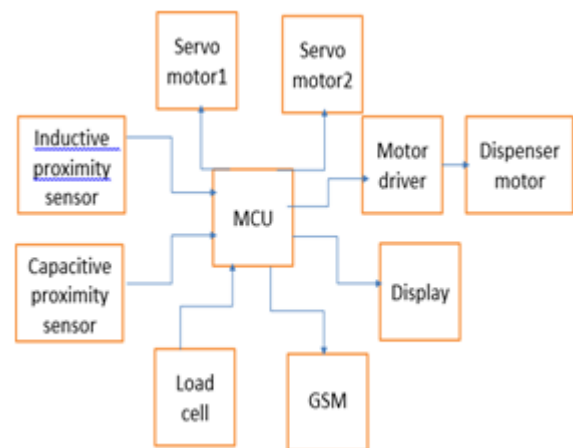
### Problem Statement

The greatest problem regarding waste management in developing countries begins at the very starting point of the process. Due to lack of proper systems for disposal and collections, around 30% of waste end up on the roads and public places due to ineffective disposing and collecting methods.

## II. METHODOLOGY

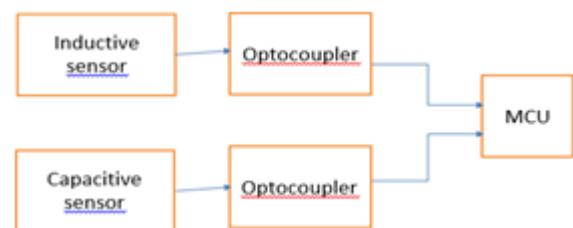
- The waste is placed on the weighing plate which is also acts as a sensor, by indicating the microcontroller when to activate the sensors and separation mechanism.
- The weight is measured and stored.
- The waste is scanned by the inductive and capacitive proximity sensors which is placed below the weighing plate.

- If the waste is sensed by the inductive sensor only, then it is considered as metal and is moved to the general bin by the robotic arm movement by a servo motor.
- If the waste is non-metal and non-plastic, then it is detected by the capacitive proximity sensor and it will be moved to the general bin in this case as well.
- If the waste is not detected by any of the sensors then it is considered as plastic and moved to the plastic waste bin by another robotic arm mechanism
- After successfully, segregating the plastic waste, gift/coins are dispensed to the user based on the weight of the waste collected



### Sensor Interfacing

- Inductive proximity sensor is npn type and gives output high(1) when object is detected
- Capacitive proximity sensor is pnp type and gives output low(0) when object is detected.
- Optocoupler change the voltage level and gives sensor output as input to microcontroller.



## III. ADVANTAGES, DISADVANTAGES AND APPLICATIONS

### ADVANTAGES

- The Machine is useful for waste management.
- The plastic collected are sent for recycling which is environment friendly.

- The individual recycling the waste is rewarded in the desired means.
- This system can be installed at various places just like ATMs.
- Also can be installed at places where high amount of plastic is disposed in environment.
- Can be installed at public transportation stations like railway stations and bus stops to issue tickets in return of plastic.

## DISADVANTAGES

- The system needs proper maintenance and care.
- Need to install the equipment in everyplace.
- Initial investment of system is high.

## APPLICATIONS

- Helpful for the plastic waste management.
- Provides raw materials for recycling.

## VI. CONCLUSION

This project aims at reducing the plastic wastes at public places by giving currency in return of plastic wastes. Today the plastic waste is increasing and is non-biodegradable. So this project aims at reducing the plastic waste by installing such vending machines at public places where people can dispose into such machines in exchange of coins.

The capacity of the machine can also be increased by various process such as increasing the container volume , increasing the number of intake ports .

## REFERENCES

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