

## SMART BIN

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### ABSTRACT

*Solid waste management is a big challenge in urban areas for most of the countries throughout the world. An efficient waste management is a pre requisition for maintain a safe and green environment as there are increasing all kinds of waste disposal. Many technologies are used for waste collection as well as for well managed recycling. The Information gathering is cumbersome. The sensor capable of detecting the object in the random movement after detecting the object are senses by sensor , after the segmentation process it will be collected separately in the smart bin, classifies the waste into de gradable and non-degradable waste.*

**Keywords:** *Arduino, sensors, organic waste, segregate.*

### I. INTRODUCTION

Garbage disposal has become a major concern because convectional method of dumping the garbage in to open fields, had an adverse effect on human health. The economic value of the waste generated is not realized unless it is recycled completely. Several advancements in technology has also allowed the refuse to be processed into useful entities such as Waste to Energy, where the waste can be used to generate synthetic gas (syngas) made up of carbon monoxide and hydrogen. The gas is then burnt to produce electricity and steam; Waste to Fuel, where the waste can be utilized to generate bio fuels. When the waste is segregated into basic streams such as wet, dry and metallic, the waste has a higher potential of recovery, and consequently, recycled and reused. Compost can replace demand for chemical fertilizers, and biogas can be used as a source of energy. The metallic waste could be reused or recycled. Even though there are large scale industrial waste segregators present, it is always much better to segregate the waste at the source itself. The benefits of doing so are that a higher quality of the material is retained for recycling which means that more value could be recovered from the waste. The occupational hazard for waste workers is reduced. Also, the segregated waste could be directly sent to the recycling and processing plant instead of sending it to the segregation plant then to the recycling plant.

### II. RELATED WORK

Through research of a bunch of IEEE papers and a few other articles makes it evident that autonomous drones system has a great potential in robotics research and it is used in industrial applications.

- J.S. Bajaj, "Urban Solid Waste management in India", Planning Commission Government of India, NEW DELHI, 1995.
- Currently there is no system of segregation of dry, wet and metallic wastes at a household level.
- J.S. Bajaj has recommended that a least cost, most appropriate technological option for safe management should be developed.
- The purpose of this project is the realization of a compact, low cost and user friendly segregation system to streamline the waste management process. Proposes an advanced method in which waste management is automated.
- Major drawback in this method was found to be, larger items are removed by manual sorting. Then the refuse is sorted based on its size by using large rotating drums. So we are trying to introduce a device which would be able to sort the metallic and plastic wastes using sensors.

### III. PROPOSED WORK

To lead healthy lifestyle, cleanliness of environment is very important. Since everything in this era is based on smart works, we have come up with implementation of smart bin. The main purpose of this project is to limit the trash transfer issue. The hardware components used are Arduino(NodeMcu, Wi-Fi module), IR sensor, Inductor sensor, capacitor sensor, motor drivers.

#### 3.1 Working principle

The smart dustbin is based on the simple principle that the different sensors detect different objects like Inductive sensor can detect metals, capacitive sensor detect plastic wastes, So depending on the sensor output the trash(waste) can be segregated[1].

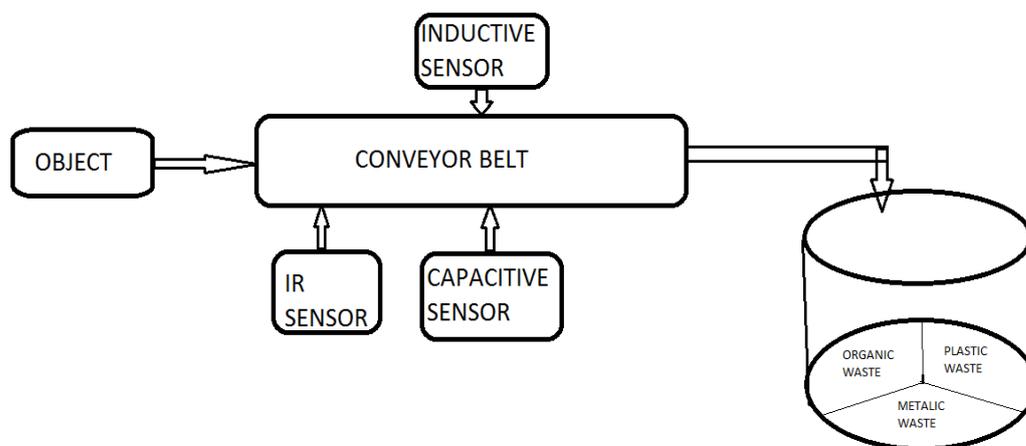


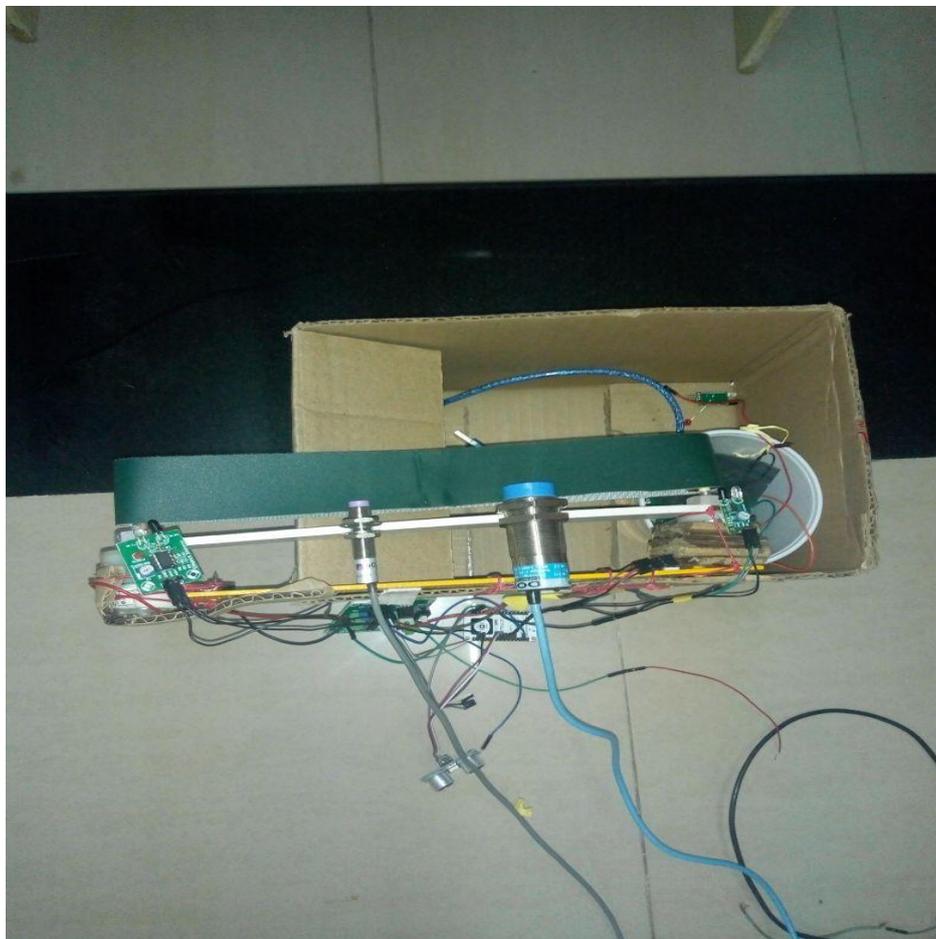
Fig 3.1 Block diagram

### 3.2 Working of smart bin

The outline of the smartbin is demonstrated in fig 3.1 which for the most part comprises of sensors like IR sensor, capacitive sensor, Inductor sensor, stepper motor, Wi-Fi module and driver. Here Inductive sensor senses metals, Capacitive sensor senses plastic and IR sensor detects the proximity of objects. Wi-Fi module helps us to send the details of the dustbin to receiver side. Here the smartbin is divided into three sections, one for metallic waste collection, and another for plastic waste collection and one more for organic waste collection. When the metallic waste is detected the dustbin turns 120 °

And it turns 240 ° when it detects plastic and there will be no rotation when neither metal nor plastic is detected.

### 3.3 THE HARDWARE SETUP



#### IV. HARDWARE AND SOFTWARE REQUIREMENTS

Table: 4.1 Hardware and Software requirements

HARDWARE REQUIREMENT	SOFTWARE REQUIREMENT
<ol style="list-style-type: none"><li>1. IR sensor module.</li><li>2. Capacitive sensor</li><li>3. Inductive sensor.</li><li>4. NodeMCU Wi-Fi module.</li><li>5. Motor driver.</li><li>6. Plastic box.</li><li>7. DC motors.</li><li>8. Servo motor.</li><li>9. Conveyor belt.</li></ol>	<ol style="list-style-type: none"><li>10. C language.</li><li>11. Arduino 1.8.5.</li><li>12. Arduino libraries.</li></ol>

#### VI. CONCLUSION

Proper waste disposal is of great importance to both rural and urban areas. Not doing this may bring us to danger in many ways. The best way to discover where we can reduce waste is segregation and this segregation can be done using our project called as SMART DUSTBIN .It not only saves time but also lives too. At the end stage of segregation we can find all metallic, plastic and organic wastes collected separately.

Advantages of smart dustbin: The final product can be processed into useful resource or disposed without generating any pollutants. Reduces pollution, and keeps the nation clean. Reduces human intervention in segregation thereby reducing the health hazards caused by radioactive wastes.

Limitations of smart dustbin: Bulk objects cannot be segregated. Failure of any one sensor leads to improper segregation. Segregation of the waste consumes time. Size of the waste must be less than or equal to dimension of the conveyor belt.

Applications: used in Home applications, Industry applications, Sewage applications, Domestic applications, Industrial applications, Recycling plants, Hospitals, Airports, Bus stands, Public places etc.

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