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Smart Interactive Sagregative Bin

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Abstract—   As the population is increasing day by day, the amount of waste is being produced is also increasing at faster rate. managing the waste at the municipal level is causing serious problem, so there is a need of some system to manage the waste automatically .This paper proposes a system where the provision is given to separate out the dry and wet waste into respective bins by different sensors incorporated along the conveyor belt on which waste is moving .The dry waste is further separated into different categories like glass, plastic, paper. Dry waste can be use for recycling purpose. By segregating the waste into different categories the economic value of the waste also increases to its best.

Keywords— *Arduino, conveyor belt, sensors, hydraulic cylinder, smart bin*

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I. INTRODUCTION

Using dustbin is good thing but using it right way is important. In day to day life the waste which is thrown by the people can be of different types such as biodegradable,non-biodegradable[1]. Uncontrolled dumping of waste onthe lands of towns and cities has created overflowing landfills. Improper segregation may cause   mixing   in landfills and in turn it may release methane gas which is more harmful gas[2].
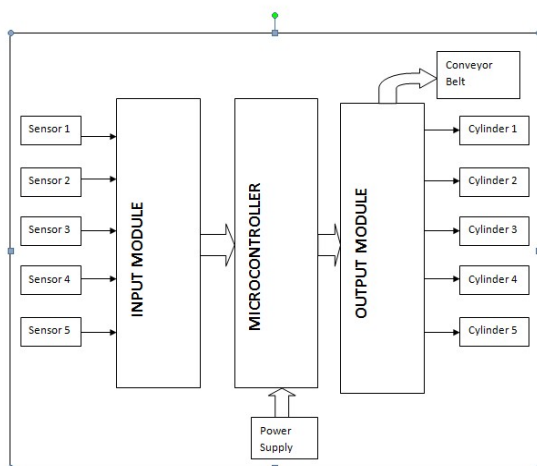
It is very time consuming to separate the waste manually also it cause cuts and bruises due to glassy objects. The fact is that efficient waste management is the major problem because we are still using traditional methods to manage waste[3]. To overcome the drawbacks for this traditional methods we are inventing the smart interactive segregativebin[5].

II. PROPOSED WORK

A. Proposed design

The main concept of smart interactive segregative bin system is to handle all waste in the city and monitoring all the process. Fig. 1 Explain the proposed system architecture. A smart waste bin consist of smart sensors and smart communication.

Fig. 1 Proposed System Architecture.

B. General System

In this section, we describe the block diagram of the system. Fig 1. Shows the proposed block diagram based on which the interfacing of various inputs and outputs is done with the microcontroller.

In our proposed architecture there are three main systems involved.

i) Input Module :We used it for the wet waste detecting, metal, plastic, glass and paper detecting sensors are interfaced with this input module.

Along the conveyor belt all these sensors are properly arranged with the respective hydraulic cylinder below them and trash bin in front.

ii) Microcontroller Module :It works as the core of the bin. It has control over all other elements. The main function of microcontroller is to receive signals from input and perform certain action as output.

iii) Output Module :In the output module the conveyor belt along with the sensors and hydraulic cylinder starts running as soon as the IR sensor activated and cylinders will expand to acts as flap to push waste into respective bin.
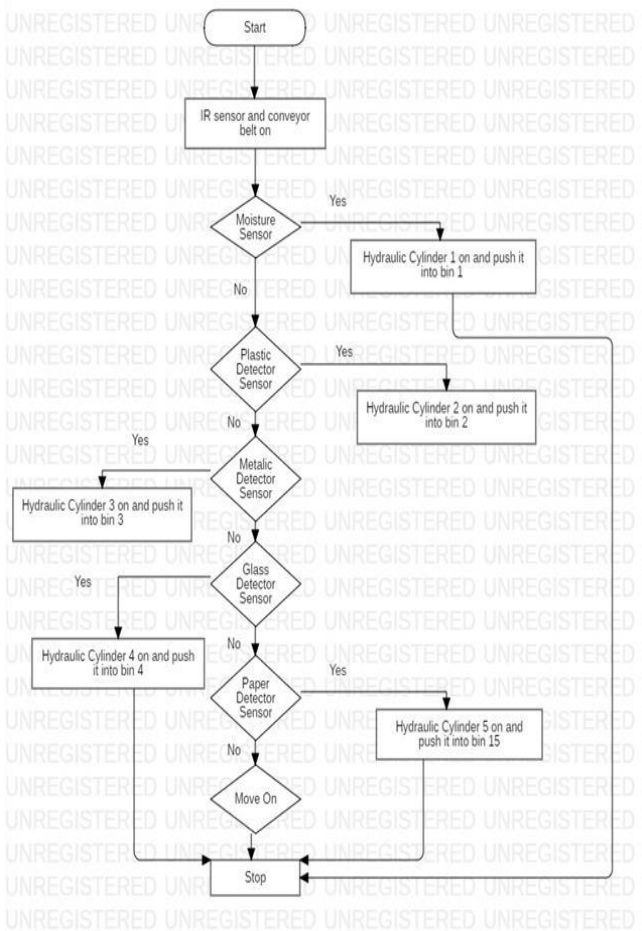
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Fig.2.Flowchart of waste bin

C. Components

The main components used in the proposed system are discussed below:

(a) IR sensor : The main aim of this sensor is used to detect the presence of any object on the conveyor belt by emitting the infrared radiations.

Fig.3.IR Sensor.

(b) Moisture sensor :This sensor is used basically to separate the wet waste from dry waste.
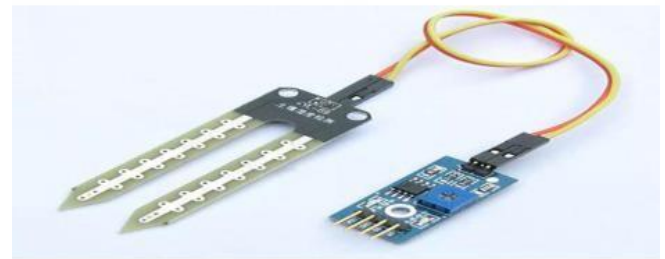

Fig.4.Ultrasonic Sensor

(c) Metal detection sensor : Inductive proximity sensors operate on the principle that the inductance of a coil and the power losses in the coil vary as a metallic (or conductive) object is passed near to it[4]. Thus, is used to sense the metallic wastes and is insensitive to non-metallic wastes.
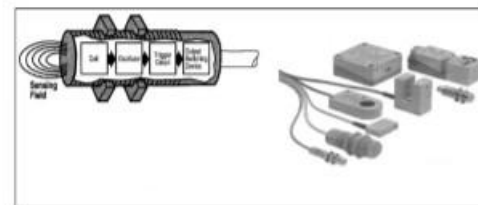

Fig.5. Metal detection sensor

(d) Plastic detection sensor: Use is made of photoelectric sensor Built-in Amplifier for Detecting Clear, Plastic Bottles. Different sized bottles upto 2-l can be sorted.

(e) Proximity Capacitive sensor : To detect glass and paper: The principle of operation of the sensor is that an internal oscillator will not oscillate until a target material is moved close to the sensor face. The target material varies the capacitance of a capacitor in the face of the sensor that is part of the oscillator circuit.
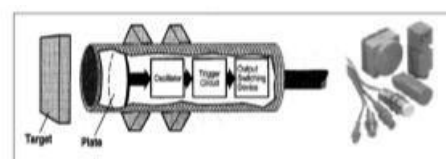

Fig.6. Proximity Capacitive sensor

(f) Conveyor belt : A continuously moving conveyor belt is used to which the different object detecting sensors are attached[1]. The materials move over this and are put into respective bins after the sensing mechanism is over with the help of hydraulic cylinders.

(g) Hydualic cylinders : Spring return type single acting cylinder is used in which cylinder is pressurized from only one

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side due to high force being exerted by fluid during both the extension as well as the retraction process.

Fig.7. Hydraualic cylinders

III. DISCUSSION

Sr.no	Author name	Title	year	description	Dis-advantages
1.	Nimmi Pandey et.all	Garbage Monitoring and Management using Sensors, RF- ID and GSM	Feb 2015	A garbage monitoring System is implemented using RF- ID and GSM	Cost of RFID and hardware maintainance cost is more
2.	Monika K A et. all	Smart Dustbin-An Efficient Garbage Monitoring System	June 2016	A Smart Garbage Monitoring System is implemented using Aurdino Uno, GSM Modem, Ultrasonic sensor	Major drawbacks of GSM module i.e., must recharge the sim, network issue, etc.
3.	Shriram Dighe et. all	Smart Garbage Monitoring System using Internet of Things (IOT)	January 2017	A Smart Garbage Monitoring System is implemented using Wi-Fi modem, Arduino microcontroller, Application Resource Manager (ARM)	ARM is not binary compatible with x86, which means you cannot run windows on it very soon. Some ARM processors clock frequencies, which is why speeds and memory bandwidths are limited
4.	Benish I. Shaikh et.all	A Review: Multipurpose Garbage Monitoring System Using IoT	February 2017	A garbage monitoring System is implemented using Arduino,Temp Sensor,and GSM module	Major drawbacks of GSM module i.e., must recharge the sim, network issue, temperature sensor are not stable and difficult to verify.

Fig.8 comparison table

In our Smart Garbage Monitoring System is implemented usingArduino microcontroller, hydraulic cylinder and sensors.

IV.Conclusion

Population is increasing day by day and waste is also generating at the same pace but the waste management system has not improved comparing to the waste production. As a result, environment is getting polluted due to unarranged and unevolved management system. Besides, utilization of waste is very improper whereas waste can be the precious wealth of a country.

Therefore, above smart waste management system using IoT can be very effective process in terms ofmanipulating waste . This model will digitalize and modernize the cities by applying IoT in waste management system.

V. FUTURE WORK

In Future, the work can be implemented by making use of a robotic arm to pick and place certain materials which can be re-used. Also, limit sensors can be placed at the top of each of the collecting bins to unload them when they are full.

VI. ACKNOWLEDGEMENT

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