IOT Based Low Cost Smart Dustbin

Nikhil Tripathi
Research Student
Department of Information Technology
B. K. Birla College of Arts, Science, and Commerce (Autonomous), Kalyan, India

Abstract— Aa we know our pm Narendra Modi told about "SWATCH BHARAT MISSION" and Swatch Bharat Mission is a national campaign by city and town to clean street and infrastructure of country. Continuous growth in technology and industrialization there is a rapid increase in the type of volume of garbage being generated. The increase in waste in India is very high. In a year the garbage is generate 65 million of tones of waste.as we know the garbage is generated is more but we can control our daily life wastage by recycling papers, metals and plastic etc. Wet waste can easily decompose. This dust bin is divided in two parts which are follow: One is sensor and Second part is mechanical part. the sensor is used to identify which garbage it is and the mechanical part is a main part because, that part has ton store all sorted garbage. In this paper a dust bin which can sort all the garbage using ultrasonic sensor using Arduino board and other components.

Keywords: Swatch Bharat Mission, growth, increase, recycling, decompose, sensor, mechanical, Arduino

I. INTRODUCTION

As we know the modern science is developing day by day, so we have to think about the waste which we throw daily.

In other country also the waste is generating more but they have think about that and put three dustbins with different color that is Blue for paper, Yellow for can and Red for plastic, but then also some people don't know about this bin. The just throw the waste in any bin without knowing about this bin.

And in India also there is two bin. One Blue is for dry garbage and another Green is for wet garbage then also the people having less awareness about this bin that people just threw that waste in any bin without deciding the garbage that where that garbage has to be thrown.

This recycle bin has a common mean for daily basis. when the waste is segregation the we realized the economic value and for segregation of garbage it takes lots of time with manpower.

So this work proposes an idea for smart dustbin which is very cheap and very useful for household. We didn't get realized about economic status until and unless when the recycle gets completed. So we have to thought about this dustbin.

The method for segregation is very less, so that large amount of garbage is dumped as landfill. The idea is that to make a smart dustbin which can sort all garbage and put that garbage in different dustbin automatically, this project has a better use for house old level.

As science is updated day by day. This idea will better investment to our country. We know a thought "Clean City Green City ". As we reduce the wastage of food, plastic, paper, metal etc. Automatically the city or country will be clean and from the wet waste we can make biogas which cannot harmful for nature because the nature is one which gives us all thing which we need. Indirectly we help the nature which can change our daily life.

II. OBJECTIVE

The project has a main moto of segregation of waste. A trend of segregation in municipal solid waste generation has been recorded in world wide.

As the population, industrialization, urbanization and economic is increase which has automatically increase the solid waste in most of urban city. In India the towns are dumped or landfill. This project will deal with the minimal use of manual labor which can sort the garbage automatically. The people need a satisfaction with a place to live. If this system is installed on apartment or small colony, then it will prove the benefits of segregation. This is a main objective of our project.
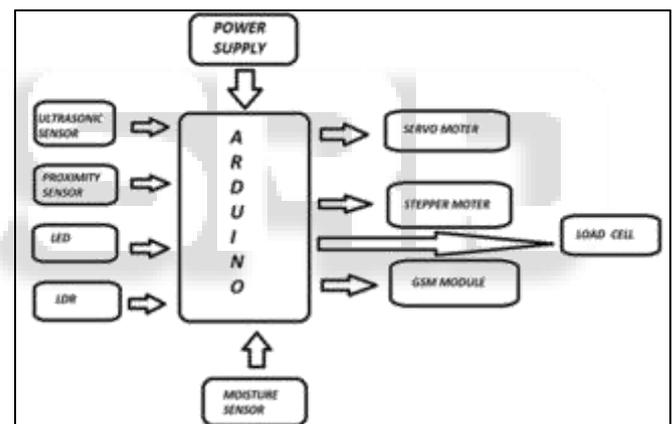
III. SYSTEM DESIGN

Fig. 1:

IV. METHODOLOGY

This recycle bin is designed with the help of some sensors, and actuator with Arduino board as the Arduino board is connected with ultrasonic sensor, proximity sensor, LED, LDR, moist sensor with GMS module. One proximity sensor is just to detect the metal, LED (Light emitting diode) is used to detect the paper, LDR (Light Dependent Resistor) is used to detect the plastic and the mist sensor is used to detect any wet waste and, GSM module is used for send the message to the owner of that dustbin, after the dustbin is full and if the weight is more than that weight which you need than also the GSM module will send the message to owner.

This project is divided into three part that are follows:

1) *Sensor –*
   – Ultrasonic sensor
   – Proximity sensor
   – LDR/LED
   – Moist sensor

2) Actuator –
– Servo motor
– Stepper motor

3) Module -
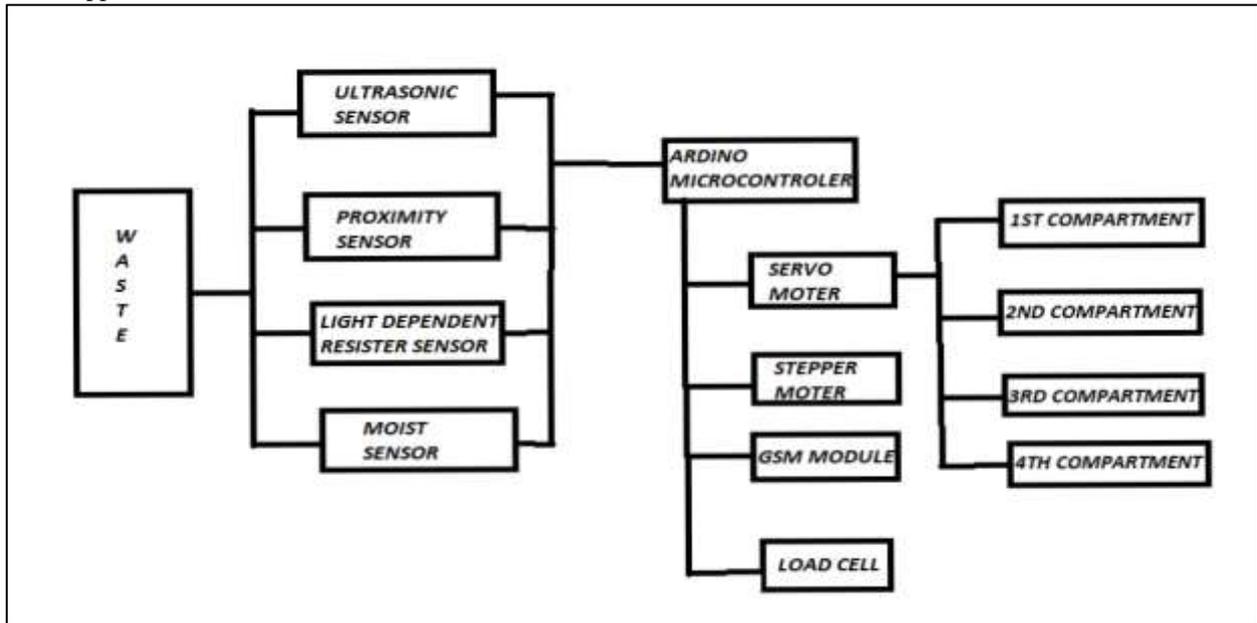– GSM module
– BLOCK DIAGRAM

Fig. 2

When the bin is started the ultrasonic sensor will detect the object if the object is in the distance of 30 cm only the object will detect after the detection of object then using proximity sensor it will check is the waste is metal or not, if the waste is metal it will give a command to Arduino board to open the servo motor on that time only the stepper motor will be take his place to catch the metal waste,

If the object is not a metal, then the LDR and LED will start if LDR detect low intensity of light then the object will be paper and if LDR detect the high intensity of light then the plastic will detect then the servo motor will open and stepper motor will take that place to catch the paper or plastic.
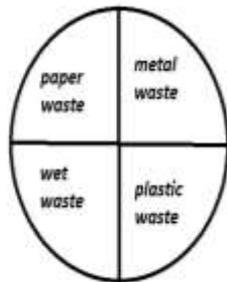

Fig. 3:

If the sensor is not detecting, then the moist sensor will get the chance to sense it and the servo motor and stepper motor will take the action if the moisture sensor not detect that object it will remain closed and blinking red LED bulb and it will be in a same process. If the garbage weight will more than we required, then the GSM module will give a message to owner of the dustbin or if the dustbin is full then also the owner will get a message on a mobile phone
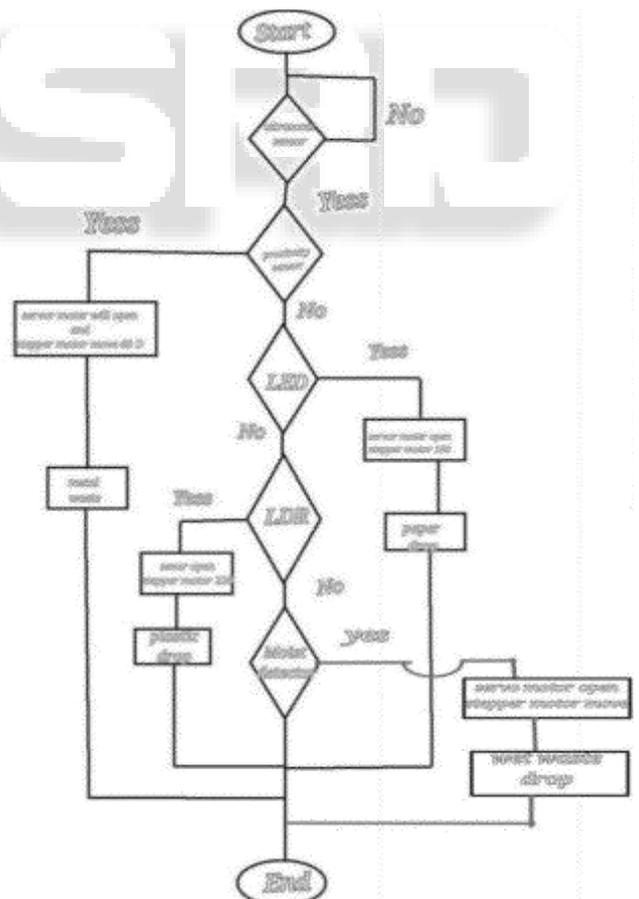
V. FLOW CHART

Fig. 4:

A. *Ultrasonic Sensor:*

And ultrasonic sensor is electronic device which is used to measure the distance between object and the ultrasonic sensor

produce ultrasonic wave and after hitting the object it gets converted into electrical wave. As we know the ultrasonic wave travelling fast then and the normal audio that means this sound it cannot be hear by human being.
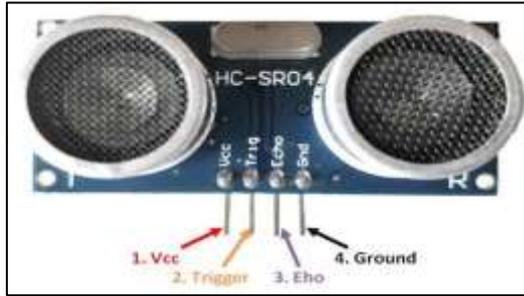

Fig. 5:

B. Proximity Sensor:

The sensor is used to determine the object is there is not. This sensor generates an electromagnetic field and it wait for changes in in electric field electric field. Inductive proximity sensor always detector always target to metal.

Fig. 6:

C. LDR/LED Sensor: -

Simple light detector register is light sensitive. LED is used to emitting intensity of light. Family stand for light emitting diode. The led will fit at the back side of the object and LDR will fit in front of side front of object as the intensity of light is low then its mean the object is paper or if the intensity of light is high then its mean the object is plastic.

Fig. 7:

Fig. 8:

D. GSM Module

GSM module is like a circuit which is used to communicate to mobile device or computer device. Earlier it was designed as a second generation (2G) for cellular phone the aim of this module is to give a greater capacity, to give more than first generation system.

Fig. 9:

E. Servo Motor

It is an electronic device or we can say it is a actuators. Servo motor is a linear motor, here the servo motor is used to drop down the waste in the bin. It is mainly used for angular and linear motion.

Fig. 10:

F. Stepper Motor

It is also known as the step motor, hear the step motor is used to rotate the bin as required, it cannot run at the high speed and it move step by step so that's why it is known as step motor.

Fig. 11:

VI. FUTURE & SCOPE

In future the idea will helpful for the separation of waste like both renewable and non-renewable waste can be separated are sorted. In future we can place this Bin in mall, railway station, airport and all the public places which will helpful for our environment. we can add the additional accessories like charger to charge the mobile phone or electrical devices. we can fix speaker to listen music or the speaker will play a music after the bin is full or the weight of waste will increase.

VII. CONCLUSION

This project will be helpful for house old. it can be fit or installed in mall, airport, railway station and bus stand and with added some new accessories like a charger and time display. If this idea will update then it is not necessary to the dustbin will sort only paper, plastic or metal it can sort anything. We can use this method in large scale, industry, to abstract, the metal from waste we have to take just a conveyor belt, which is connected to electromagnetic field, then the conveyor belt will be like a magnet so all the, method we attach to conveyor belt then at after the few sec. the electronic magnetic field will close. So this is only an idea to sorting the garbage.

REFERENCE

[1] Josephine Doriya J , Krithika B , Divyanshi Agarwal, Mahesh Kumar, Waste Sorting Dustbin with Arduino based Smart Motor Rotating Tray, Volume-8 Issue-6S, March 2020.

[2] Adekunle Oke 1,* and Joanneke Kruijsen 2, The Importance of Specific Recycling Information in Designing a Waste Management Scheme, Published: 7 September 2016.

[3] G. Aahash, V. Ajay Prasath, D. Gopinath, M. Gunasekaran, Automatic Waste Segregator using Arduino, Special Issue – 2018.

[4] Amrutha Chandramohan, Joyal Mendonca, Nikhil Ravi Shankar, Nikhil U Baheti, Nitin Kumar Krishnan* Suma M S, Automated Waste Segregator.

[5] Dr Naveen B*1, Kavya G K#2, Kruthika S N#3, Ranjitha K N#4, Sahana C N#5, AUTOMATED WASTE SEGREGATOR USING ARDUINO, Volume 5, Issue 05, May -2018.

[6] Heisnam Sursita Devi, Shruthi Shetty J, Ganesh Shrikant P, Mishra Himanshu U, Madhkara, Smart Trash Segregator Dustbin Monitoring System, Special Issue – 2019.

[7] S. Manimaran 1 , Dr. Azha. Periasamy 2 , T.Karuppiah3, Smart Waste Segregation with Crusher Using Arduino, Vol. 8, Issue 4, April 2019.

[8] Madhurakavi Aparna, Sri Vidya Gunturi, Meghana Santhosh, R Yaminee, S Muthulakshmi*, Garbage Segregating and Alerting Nexus, Volume-8 Issue-6, August 2019.

[9] T. Saminathan, Akash Musipatla, P. Manideep Varma, P. Shahid Khan, G. Mahesh Kumar, IoT Based Automated Waste Segregator for Efficient Recycling, Volume-8 Issue-6S, April 2019.

[10] Gaurav Pawar1, Abhishek Pisal2, Ganesh Jakhad3, Godson Koithodathu4, Prof. Piyush G.Kale5, RASPBERRY PI BASED AUTOMATED WASTE SEGREGATION SYSTEM, Volume: 05 Issue: 10 | Oct 2018.

[11] Harnani Hassan, Fadzliana Saad, Muhammad Suhaimi Mohd Raklan, A Low-Cost Automated Sorting Recycle Bin powered by Arduino Microcontroller, 14–15 December 2018.

[1] MR. H.N. CHAITHANYA DAS MR. JESWIN JOSE MR. KUSHAL R. MR. JAGADEESH H, WASTE SEGREGATION USING SMART DUSTBIN, PROJECT REFERENCE NO.: 40S_BE_0621.