Mini Project Report on

SMART DUSTBIN

Submitted in partial fulfillment of the requirement for the award of the degree of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE & ENGINEERING

Submitted by:

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CANDIDATE' S DECLARATION

I hereby certify that the work which is being presented in the project report entitled " **Smart Dustbin**" in partial fulfillment of the requirements for the award of the Degree of Bachelor of Technology in Computer Science and Engineering of the Graphic Era (Deemed to be University), Dehradun shall be carried out by the under the mentorship of **Mr. Prabhdeep Singh, Assistant Professor**, Department of Computer Science and Engineering, Graphic Era (Deemed to be University), Dehradun.

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Chapter 1

Introduction

As the world is in a stage of up gradation, there is one stinking problem we have to deal with Garbage In our daily life, we see the pictures of garbage bins being overfull and and all the garbage spills out. This leads to the number of diseases as large number of insects and mosquito breeds on it. A big challenge in the urban cities is solid waste management not only in India but for most of the countries in the world . Hence such a system has to be built which can eradicate this problem or at least reduce it to the minimum level . The project gives us on of the most efficient ways to keep our environment clean and green. The prime need of a lifestyle begins with cleanliness and cleanliness begins with dustbin. A society will get its waste dispatched properly only if the dustbin are placed well and collected well.

1.1 Problem statement

The main problem in the current waste management system in most of the Indian cities is the unhealthy status of dustbins. In this paper we have tried to upgrade the trivial but vital component of the urban waste management system.

1.2 Abstract

As people are getting smarter, so are the things. While the though comes up for Smart cities. There is a requirement for Smart waste management. It is a common sight to witness garbage

spilled out in and around the dustbins. The environment around a dustbin is also conducive for increasing the pollution level in air. Air pollution due to a dustbin can produce bacteria and virus which can produce life threatening diseases in human beings. The idea of smart dustbin is for the smart buildings, Colleges, Hospitals and Bus stands. The Smart Dustbin thus thought is an improvement of normal dustbin by elevating it to be smart using sensors and logics. For smart dustbin operation we are using ultrasonic sensor for detecting distance and object and another sensor servomotor is used for opening and closing the dustbin top.

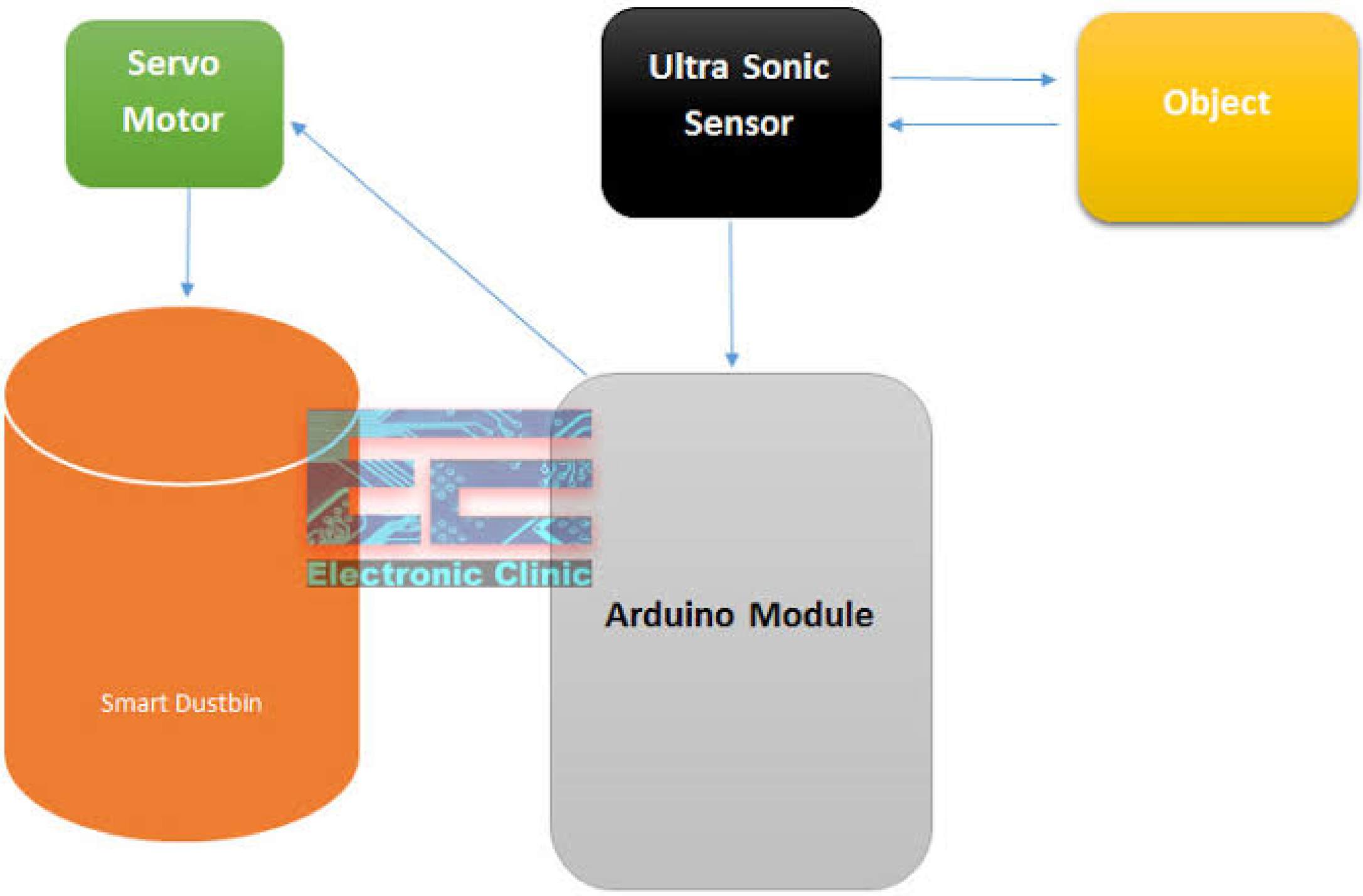

Fig 1.1 Block Diagram of Smart Dustbin

Chapter 2

Literature Survey

For the last few years, many researches are focusing on IOT based applications, especially researchers are focusing on smart city. According to, a Smart City is an infrastructure where everything is interconnected and can interact with each other. In a smart city, everything is supposed to be smart and intelligent in decision-making ability. A smart city leads to a smart environment, smart health, smart parking, smart economy, people, smart administration and smart living of the people. The Smart city provides all the better facilities to citizens and assures that there is a clean and green environment for them. To make the environment clean, there should be an effective system for collecting waste. In this section, various research about garbage or waste collection and a better management mechanism for the collect waste is reviewed.

Waste management is an emerging era of most populated as well as less populated cities. In IOT, it also has emerged as a field in smart cities Various prior research has been conducted for collecting waste, but most of the research is server-based or authority monitoring of garbage bins that are installed in public places.

This mechanism consumes enough an amount of energy and time on fulfilling of a single request. Therefore, an intelligent edge-node based mechanism is necessary for collecting waste from requesting bins, which consumes less energy and time.

The main plan of planned work is to develop a wise intelligent garbage alert system for correct garbage alert system for correct garbage management. A smart alert system is meant for garbage clearance. This method is assisted by the inaudible device that is interfaced with Arduino UNO. This system provides information regarding how a waste collection is being done and followed up by the municipality authority. Now the most

popular Internet of things (IOT) at the hardware level, the sensor system may be a garbage bin with an inaudible devices. This paper describes the appliance of our model of " SMART DUSTBIN" in managing the waste assortment system of a smart city. This paper also aims at encouraging further research on the topic of waste management. The project offers U.S one amongst the foremost economical ways that to stay our surroundings clean and inexperienced. The Smart Dustbin designed are going to be causation knowledge regarding the degree of garbage collected in numerous elements of the Smart city. The dataset can be analyzed to gain lots of insights. The collected knowledge set over a amount of your time can produce a historical knowledge set. Our Smart Dustbin sends U.S. the message that contains the updated level of garbage alongside the Date and Timestamp.

Smart Dustbin can be improvised to a large extent to include automatic segregation of different wastes so that

A major issue hampering the solid waste management system can be resolved. With further

Improvement

Mechanism to shoo away animals and birds from feeding and polluting the environment can be done.

Thus

These measures can reduce Human cost involved and helps in reducing the overall cost of solid

management aided by solid waste segregation at source itself and also by reducing the spread of

pollution to a great extent. Moreover from a social point of view the persons involved in garbage collection, segregation and disposal will be prevented from being infected and paves the way for their healthy well-being.

Chapter 3

Methodology

SMART DUSTBIN USING ARDUINO is an IOT based project. Here we are using Arduino for code execution, for sensing we used ultrasonic sensor which will open lid and wait for few moment. It will bring drastic changes in term of cleanliness with the help of technology. Everything is getting with smart technology for the betterment of human being. So this help in maintaining the environment clean with the help of technology. It as a sesnsor based dustbin so it would be easy to access/uses for any age group.

Our aim is also to make it cost effective so that many number of people can get the benefit from this.And it should be usable to anyone and helpful for them.

To complete our project, we require some software as well as hardware.

3.1 Required Software

ARDUINO IDE

3.2 Required Hardware

ARDUINO UNO

ULTRASONIC SENSOR

SERVO MOTOR

9V BATTERY

DUSTBIN

JUMPER WIRES

SERVO MOTOR CONNECTION SETUP

Now, let me take you through the actual setup and build process of the Smart Dustbin using Arduino.

First, I will start with the mechanism open the lid. As you might have already guessed, I have a SERVO MOTOR for this purpose. In order to open the lid, I have fixed a small thread to the servo horn using instant glue.For this mechanism to be able to open the lid of the dustbin, It must be placed near the lid.

In this the actual setup of dustbin design and build the system by using Arduino. Starting with the mechanism of opening the lid of dustbin, For this purpose Servo motor has been used. To open the lid, I have attached a Small thread to the servo horn using instant glue.

ULTRASONIC SENSOR CONNECTING

After successfully servo motor is placed now it' s time for sensor, so HC- SR04 Ultrasonic sensor is placed at the front of the dustbin.

WIRING UP THE COMPONENTS

The final step in the build process is to make the necessary connection using long connecting wires as per the circuit diagram and securing these wires so that they don' t hang out around. All the wires from both the components Ultrasonic sensor and Servo motor are connected to respective pins of Arduino. The finishes up the build process of the Smart dustbin. In Arduino Code has been submitted, and with all hardware and software connection in dustbin. We will run our dustbin, wait its working or not.

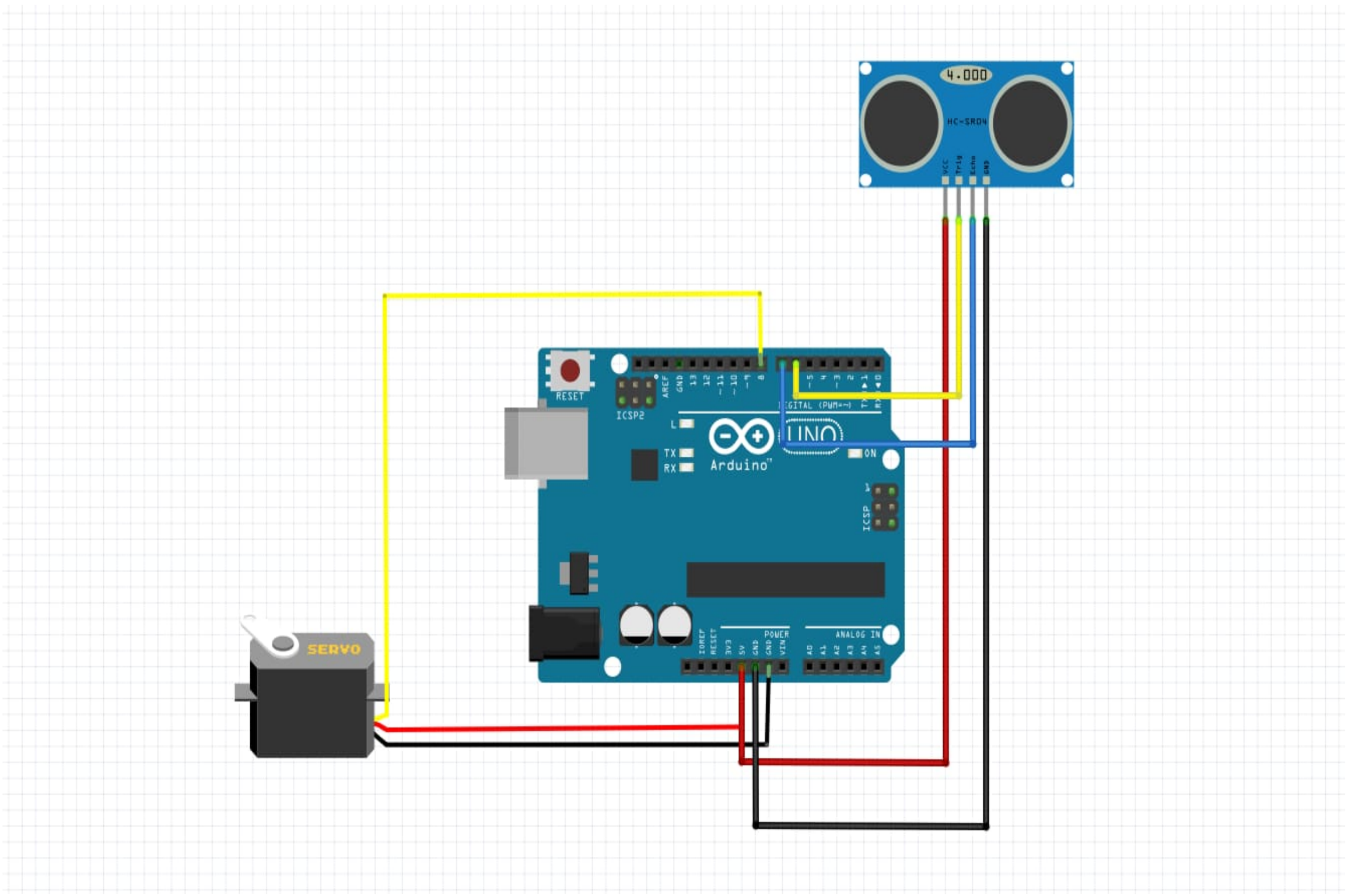

FIG 3.1 CIRCUIT DIAGRAM OF PROJECT

CIRCUIT DIAGRAM EXPLANATION

The circuit diagram of smart dustbin is shown in given above. Arduino Uno board is a microcontroller, it is important component of UNO board. In this order component are present like a power supply, ultrasonic module and servo motor etc.

The ultrasonic echo pin and trigger pin is connected to digital pin D7 and D6. The +Vcc pin is connected to +5V supply and GND pin is connected to ground pin of Arduino Uno board. The signal pin of Servo motor is connected to digital pin D8 of Arduino. Hence, servo motor is used of open the cap of dustbin. For this project and components used, the preset level of distance between dustbin and hand is fixed to 30 cm.

Ultrasonic Sensor: This sensor is used for measuring distance and detecting object come near to it. It only detects obstacle when Trigger pin receive high pulse for the period more than 10 us. When ultrasonic detect object, the echo pin of module is set to high. When echo signal in obtained ,we can calculate the distance. Initially, the cap of dustbin is switched back to zero-degree position (close) by the servo motor. The controlley keeps on monitoring the signal receive from ultrasonic module. When ultrasonic module detect object, the controller check if it crosses a threshold distance value set for open the cap of dustbin. As soon as that happens, The controller triggers the servo motor when then open cap for limited line (as set in this code).For this system prototype set time is given for 2 second.

Arduino Uno

sketch_jan20b.ino

```
#include<Servo.h>  //servo library
Servo sg90;
int echo=7;
int trig=6;
int servopin=8;
int distance;
int duration;
void setup(){
    sg90.attach(8);
    pinMode(trig,OUTPUT);
    pinMode(echo,INPUT);
}
void loop()
{
  digitalWrite(trig,0);
  delay(2);
  digitalWrite(trig,1);
  delayMicroseconds(10);
  digitalWrite(trig,0);
  duration=pulseIn(echo,1);
  distance=duration*0.034/2;
  if(distance<30)
  {
    sg90.write(0);
    delay(2500);
    Serial.print(distance);
  }
  else
  {
    sg90.write(180);
    delay(1000);
  }
}
```

FIG 3.2 CODE FOR SMART DUSTBIN USING ARDINO

Chapter 4

Result and Discussion

Fig 4.1 Working Model of Smart Dustbin

4.1 RESULT

The dustbin is able to open the lid with the help of servo motor whenever its detects motion. The Ultrasonic Sensor is giving the details about the waste present in the dustbin. The status of the waste is transferred to the municipal authority whenever it is exceeding the threshold value.

4.2 DISCUSSION

The population increases day by day and generates million tons of waste per year. Waste management organizations in different countries faces the challenge to provide to recycle the waste , keeping health standards and environment friendliness. The smart waste management system collects the waste in proper time, disposes and recycle in the proper way.

Chapter 5

Conclusion and Future Work

5.1 CONCLUSION

Here we are going to make an evolution change toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better and shoulders above traditional garbage dustbin. It is equipped with smart devices like sensors Arduino etc. Lid of the dustbin will automatically open when an object coms near to the dustbin and after certain time period it will close the lid. For society, it will help towards health and hygiene so that normal people to rich people can take benefit from it. Believe this will bring something changes in terms of cleanliness as well technology.

5.2 FUTURE WORK

For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it. So our next work will be adding one more sensor which will sense whether our dustbin is full or not. And there will be a display will be added so that user can notify that dustbin is full or not.

References

[1] Meghana K C, Dr. K R Natraj. IOT based intelligent Bin for Smart Cities.

[2] Kasliwal Manasi H, Suryawanshi Smitkumar B. A Novel Approach to garbage Management Using Internet of things for Smart Cities.

[3] Vishesh Kumar Kurrel, Smart Garbage Collection Bin Overflows indicator using Internet of things.

[4] Kumar NS Vuaylakshmi B, Prathana RJ, Shankar A. IOT based smart garbage alert system using Arduino UNO. In2016 IEEE Region 10 conference (TENCON)2016 Nov 22 (pp. 1028-1034).IEEE.