

PROFESSIONAL TRAINING REPORT

at

Sathyabama Institute of Science and Technology

(Deemed to be University)

Submitted in partial fulfillment of the requirements for the award

of Bachelor of Engineering Degree in

Electrical and Electronics Engineering

By

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SCHOOL OF ELECTRICAL AND ELECTRONICS

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INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A" by NAAC

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NOVEMBER2021

SCHOOL OF ELECTRICAL AND ELECTRONICS

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **JOTHIKA P(39140020)** who carried out the project entitled “**SMART DUSTBIN USING ARDUINO UNO**” under our supervision from June 2021 to November 2021.

INTERNAL GUIDE

HEAD OF THE DEPARTMENT

Dr.SIVACHIDHAMBARANATHAN M.E.,Ph.D.,

DECLARATION

I **JOTHIKA** Phereby declare that the Project Report entitled “ **SMART DUSTBIN USING ARDUINO UNO**”done by me under the guidance of , is submitted in partial fulfillment of the requirements for the award of Bachelor of Technology degree in Information Technology.

DATE:

PLACE:

SIGNATURE OF THECANDIDATE

ACKNOWLEDGEMENT

The satisfaction and elation that accompany the successful completion of any task would be incomplete without the mention of the people who have made it possible. It is our great privilege to express our gratitude and respect to all those who have guided me during the course of my Professional Training.

First and foremost, we would express our sincere gratitude to our beloved Founder Chancellor Col. Dr. JEPPIAAR, M.A., B.L., Ph.D., I extend my sincere thanks to our Chancellor Dr. Mariazeena Johnson, B.E., M.B.A., M.Phil., Ph.D., and the President Dr. Marie Johnson, B.E., M.B.A., M.Phil., Ph.D., for providing me the necessary facilities for the completion of the professional training. I also acknowledge our Vice Chancellor Dr. S. SundarManoharan Ph.D., and the Pro Vice Chancellor Dr. T. Sasipraba, M.E., Ph.D., for their constant support and endorsement.

I would like to express our gratitude to our Registrar Dr. S. S. Rau, Ph.D. and Controller of Examinations Dr. IgniSabastiPrabu M.E., Ph.D., for their valuable support offered to complete my professional training successfully.

I like to express our gratitude to Dr. SIVA CHIDAMBARANATHAN M.E. Ph.D .Head of the Department of electrical and electronic engineering, Sathyabama Institute of Science and Technology for having been a constant source of support and encouragement for the completion of the professional training.

I would also like to express our sincere thanks to our internal guide who guided me in the preparation of the report.

Also, I thank the Almighty and my Parents for supporting me in the completion of the professional

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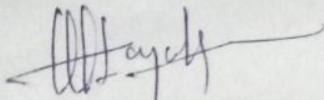
Thurs day, 25 November 2021

CERTIFICATE

This is to certify that **Ms. JOTHIKA.P**, 3rd year, **B.E.(Electrical And Electronic Engineering)** student of **SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY, CHENNAI**. has undergone her project work in **LORDS ENGINEERING, Chennai** from **5th November 2021 to 20th November 2021**

Her project work on "**Internet Of Things**" was completed successfully.

We wish her success in all her future endeavors.


M. JAYAKUMAR.

(Manager Personnel)



ABSTRACT

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also ecofriendly. We are inspired from Swaach Bharat Mission. Now a days technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. In this proposed technology we have designed a smart dustbin using ARDUINO UNO, along with ultrasonic sensor, servo motor, and battery jumper wire. After all hardware and software connection, now Smart Dustbin program will be run. Dustbin lid will when someone comes near at some range than wait for user to put garbage and close it .

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LIST OF ABBREVIATIONS

IOT	Internet of things
PWM	Pulse With Modulation
GND	Ground
VCC	Voltage Common Collector
GSM	Global System For Mobile
MSW	Municipal Solid Waste
GPS	Global Positioning System

CHAPTER-1

1.1 INTRODUCTION

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also ecofriendly. We are inspired from Swaach Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. In this proposed technology we have designed a smart The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also ecofriendly. We are inspired from Swaach Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using Arduino. This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. In this proposed technology we have designed a smart dustbin using ARDUINO UNO, along with ultrasonic sensor, servo motor, and battery jumper wire. After all hardware and software connection,now Smart Dustbin program will be run. Dustbin lid will when someone comes near at some range than wait for user to put garbage and close it .

CHAPTER-2

2.1.EXISTING SYSTEM

A dustbin is a large container with a lid which people put their rubbish in and which is usually kept outside their house.dustbin(or garbage bins,trash cans,whatever you can call them)are small plastic(or metal) containers that are used to store trash(or waste) on a temporary basis. They are often used in homes,offices,streets,park etc. To collect the waste.In some places,littering is a serious offence and hence public waste container are the only way to dispose small waste.usually, it is a common practice to use separate bins for collecting wet or dry,recyclable or non-recyclable waste.

2.2.PROPOSING SYSTEM

In existing method the ULTRASONIC SENSOR and SERVO MOTOR is used. Automatic lid opening and closing method is used in smart dustbin and microcontroller programming is done in the system. A simple but useful project called smart dustbin using arduino is designed and developed here.using this project,the lid of the dustbin stays closed,so that waste is not exposed(to avoid flies and mosquitos) and when you want dispose any waste,it will automatically open the lid.

CHAPTER-3

3.1.LITERATURE SURVEY

A .DRONE BASED SMART GARBAGE MONITORING SYSTEM USING COMPUTER VISION.

Author:Prasad Dhole, Kajal Gholap.

In big city areas Municipal solid waste (MSW) and its management is one of major problem in all over the world .This can causes increase in diseases, which is harmful for all the peoples and animals. To address this issue, this paper represent the smart system for the detection of garbage using image processing ,which uses the drone to capture images of places with garbage .To inform It send the image and location of that place to nearest garbage collection authority using Global Positioning System (GPS) and Global System for Mobile (GSM) module. Future applications of this smart garbage monitoring system which will tackle both garbage identification and collection using robotics. Hence, the future scope and relevance of this system will be discussed.

B. Smart Garbage Bin Alert System using HC-SR04 Ultrasonic Sensor.

Author: Priya Sidam¹ , Mohini Mate² , Pradhnya Nagarare.

The Internet of Things (IOT) is an environment in which objects, animals or people are provided with unique identifiers and the ability to transfer data over a network without requiring human-to-human or human-to-computer interaction When it comes to the waste industry waste and recycling collectors are always looking at ways to minimize cost and increase productivity when possible. The IOT can change the way waste collectors carry on with their operations, know more information about their bins and bring change in the method of waste collection. IOT based smart garbage bins alert system , in this project our main aim is to have a proper maintenance of waste management. We are used a ultrasonic sensor which passes sensing signals to the Arduino microcontroller. By the use of wi-fi module the sensing data will store in the database and also the notifications are transmitted to the administrator and garbage cleaner. We are also designed the user interface application in which the user may captured the image of the waste collection in any area. This image uploaded in the municipal website and searched by map system where it belongs to and clean it.

3.2.BLOCK DESCRIPTION

After wiring and attaching all the devices and setting up to the Smart Dustbin, now observe all the important setup whether they are well connected or something missed. After connection set up now next step is to submit/upload code in Arduino and supply power to the circuit. When system is powered ON, Arduino keeps monitoring for any things that come near the sensor at give range. When Ultrasonic sensor detect any object for example like hand or others, here Arduino calculates its distance and if it less than a certain predefines value than servo motor get activate first and with the support of the extended arm of the lid. Lid will open for a given time than it will automatically close.

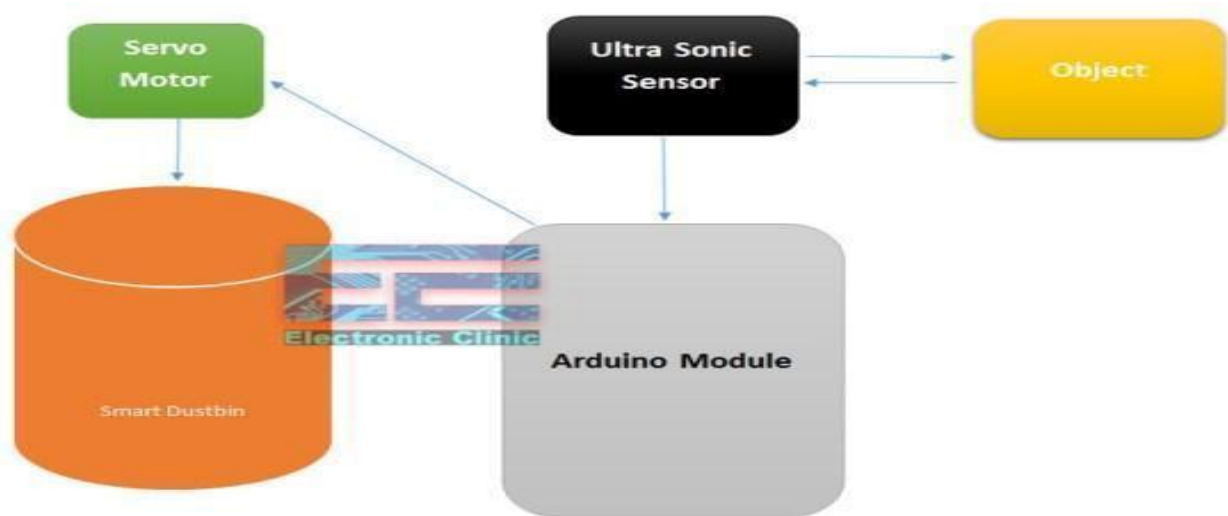


Fig.1.arduino module

3.3.CIRCUIT DESCRIPTION

Arduino Uno board consist ATmega328 P microcontroller, it is important component of UNO board. In this other components are present like a power supply, ultrasonic module and servo motor etc. The ultrasonic sensor echo pin and trigger pin is connected to pin digital pin D7 and D8. The +Vcc pin is connected to +5V supply and GND pin is connected to ground pin of arduino Uno board. The control (PWM) pin of servo motor is connected to digital pin D9 of arduino. Hence, servo motor is used to open the cap of dustbin. The ultrasonic sensor echo pin and trigger pin is connected to pin digital pin D7 and D8. The +Vcc pin is connected to +5V supply and GND pin is connected to ground pin of arduino Uno board. The control (PWM) pin of servo motor is connected to digital pin D9 of arduino. Hence, servo motor is used to open the cap of dustbin. We can also use Arduino NANO instead of Arduino uno. Do not have to change source code because the board use identical pin for controlling servo motor, switch and ultrasonic sensor. The simplest part of the project smart dustbin using arduino is software part because it is clean, simple and easy to understand.

The program check the distance had also used “Servo.h” inbuilt library function for servo operation.

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

1.1. Required Software:

- 1. ARDUINO IDE

1.2 Required Hardware:

- 1. ARDUINO UNO
- 2. ULTRASONIC SENSOR
- 3. SERVO MOTOR
- 4. 9V BATTERY
- 5. DUSTBIN

A. HC-SR04 Ultrasonic Sensor

The Ultrasonic Sensor HC-SR04 is one of the most commonly used distance measuring sensors and works extremely well with arduino. The time its take the sound wave to be sent, hit the object and return back to the sensor is measured.

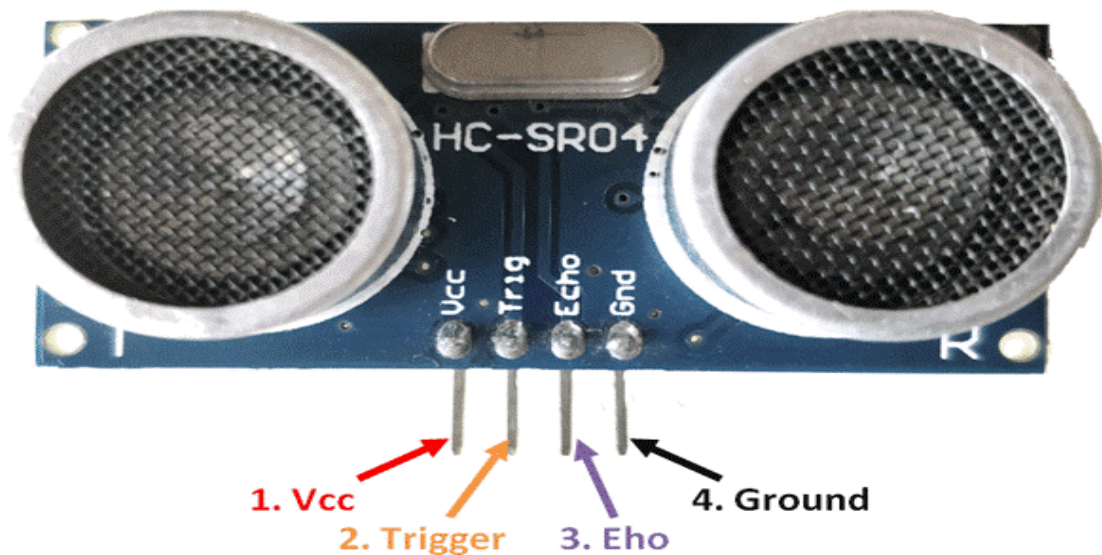


Fig 1.1. HC-SRO4 ultrasonic sensor

B. Arduino UNO :

Arduino is an open source computer hardware and software company, project, and user community that designs and manufactures single board . The ultrasonic sensor module uses any two digital pins on the Arduino for Trig and Echo.



Fig.1.2.Arduino uno

D. Connecting Wire:

For the connection of the Ultrasonic sensor to the Arduino microcontroller by using the jumper wire. A jump wire is an electrical wire or group of them in a cable with a connector or pin at each other.



Fig.1.3. Connecting wire

Program:

```
#include <Servo.h> //servo library

Servo servo;

const int trigPin = 5;
const int echoPin = 6;
int servoPin = 7;

// defines variables
long duration;
int distance;
int safetyDistance;

void setup() {
  servo.attach(servoPin);
  pinMode(trigPin, OUTPUT); // Sets the trigPin as an Output
  pinMode(echoPin, INPUT); // Sets the echoPin as an Input
  Serial.begin(9600); // Starts the serial communication
  servo.write(0); //close cap on power on
  delay(100);
  servo.detach();
}

void loop() {
```

```

// Clears the trigPin
digitalWrite(trigPin, LOW);
delayMicroseconds(2);

// Sets the trigPin on HIGH state for 10 micro seconds
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);

// Reads the echoPin, returns the sound wave travel time in microseconds
duration = pulseIn(echoPin, HIGH);

// Calculating the distance
distance= duration*0.034/2;

safetyDistance = distance;
if (safetyDistance <= 8){
    servo.attach(servoPin);
    delay(1);
    servo.write(0);
    delay(3000);
    servo.write(90);
    delay(1000);
    servo.detach();
}

// Prints the distance on the Serial Monitor
Serial.print("Distance: ");

```

```
Serial.println(distance);  
}
```

CONCLUSION

Here we are going to make an evolution changes 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 sensor Arduino etc. Lid of the dustbin will automatically open when an object comes near to the dustbin and after certain time period it will close the lid. For social it will help toward health and hygiene, for business for we try to make it affordable to many as many possible.

ADVANTAGES

A reduction in the number of waste collections needed by up to 80%, resulting in less manpower, emissions, fuel use and traffic congestion A reduction in the number of waste bins needed.

Maintain environment hygiene (i.e. no overflowing of waste and less unpleasant odor). It will help in bringing evolution by technology in term of cleanliness.

APPLICATION

To prevent overflow of garbages from the dustbin.

REFERENCE:

- [1]Kumar NS, Vuayalakshmi B, Prarthana RJ Shankar A. IOT based smart garbage alert systemusing Arduino UNO. In2016 IEEE Region 10 Conference (TENCON) 2016 Nov 22 (pp. 1028-1034). IEEE.
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