

**AHSANULLAH UNIVERSITY OF SCIENCE &
TECHNOLOGY**

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SPRING 2021



CSE 3216 : Microcontroller Based System Design Lab

Project Proposal

Project Name : SMART DUSTBIN

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Objective :

The main objective of the project is to design a smart dustbin which will help in keeping our environment clean and also eco friendly. 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. If dustbin is not maintained than these can cause an unhealthy environment and can cause pollute that affect our health. 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 open when someone comes near at some range than wait for user to put garbage and close it. It's properly running or not. 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.

Social Values :

For social it will help toward health & hygiene .For business we try to make it affordable to as many as possible. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology. 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. For social it will help toward health and

- 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.

Required Components :

Hardware Specifications

- 1.ARDUINO UNO
2. ULTRASONIC SENSOR
3. SERVO MOTOR
4. 9V BATTERY
5. DUSTBIN
- 6.ALARM
- 7.JUMPER WIRES
- 8.GAS SMOKE SENSOR
9. FLAME SENSOR
- 10.LCD DISPLAY
- 11.BREADBOARD
- 12.BUZZER
- 13.RESISTOR

Software Specifications

- Arduino IDE
- MC Programming Language: Embedded C

Working Procedure :

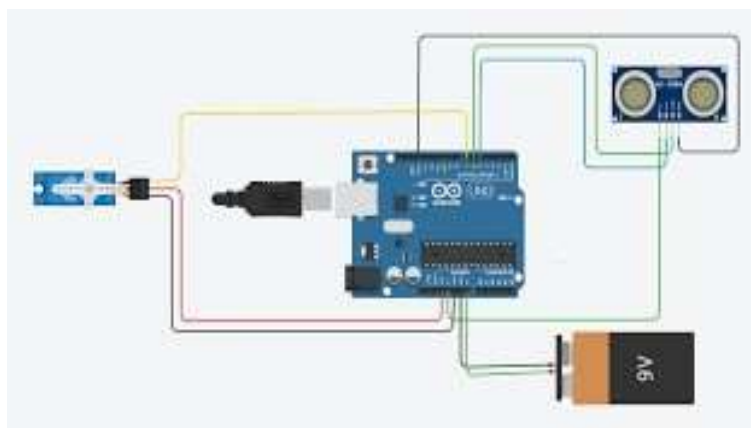
SERVO MOTOR CONNECTION SETUP: Now, let me take you through the actual setup and build process of the Smart Dustbin using Arduino. First, I will start with the mechanism to open the lid. As you might have already guessed, I have

used a Servo Motor for this purpose. In order to open the lid, I have fixed a small plastic tube (like an empty refill of a ball-point pen) to the servo horn (a single ended 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 plastic tube (like an empty refill of a ball-point pen) to the servo horn (a single ended 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 connections using long connecting wires as per the circuit diagram and securing these wires so that they don't hang around. All the wires from both the components i.e. Ultrasonic Sensor and Servo Motor are connected to respective pins of Arduino. This finishes up the build process of the Smart Dustbin. In Arduino Code has been submitted and with all hardware and software.

Block Diagram :



Previous Estimated Budget :

Equipment	Quantity	Budget(BDT)
Arduino Uno Board	1	795
HCSR04 ULTRASONIC SENSOR	1	100
SG90 SERVO MOTOR	1	219
BREADBOARD	2	246
9V BATTERY	2	190
LED'S	2	24
WIRES	36	88
Jumper Wires	As Required	100
Total		1762

Final Expenditure :

Equipment	Quantity	Budget(BDT)
Arduino Uno Board	1	795
HCSR04 ULTRASONIC SENSOR	1	100
FLAME SENSOR	1	85
GAS SMOKE SENSOR	1	179
SG90 SERVO MOTOR	1	219
BREADBOARD	2	246
16*2 LCD DISPLAY	1	227
POT 10K	1	20
CAPACITOR	1	14
9V BATTERY	2	190
LED'S	2	24

BUZZER	2	24
WIRES	36	88
Diode	2	6
Jumper Wires	As Required	100
Total		2393

$$\begin{aligned}
 \text{Budget Comparison} &= \text{Final Expenditure} - \text{Estimated Budget} \\
 &= 2393 - 1762 \\
 &= 631
 \end{aligned}$$

Therefore, we need to add extra 631 BDT from our previously expected budget.

Contribution of Team Members:

Team Members	Work(%)
RAFID HASAN	30
NAHIAN JANNAT	10
SADID RAFAN	40
FAYEM HASAN	20

Challenges :

Problems:

As we have started to work on this project, we have encountered a few challenges throughout the whole process. Such as:

Insufficient Resource:

As this is our first hardware project, both the information and equipment resource were unfamiliar to us. We had a hard time researching about necessary information and so on..

Solution:

With the aid of some friends & teachers' direction, we have tried our best to fulfill our desired project.

Changes & Future Plan:

Overall the "SMART DUSTBIN" project plan hasn't changed since the beginning, although we have moderated some hardware equipments midway. Also in future, we plan to improve this project and add more features for this project so that it can benefit us in more efficient way.

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 Arduinoetc.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. So that normal people to rich people can take benefit from it. Believe this will bring something changes in term of cleanliness as well technology. 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.