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Smart Automated Dustbin

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Abstract: ***The project's major goal is to create a smart trash can that would aid in maintaining a clean and environmentally friendly environment. Since technology is becoming increasingly intelligent, we are utilizing Arduino to develop a smart dustbin that will help clean the environment. This intelligent trash can management system is based on a microcontroller and has ultrasonic sensors on the trash can. If trash bins are not maintained, they might lead to pollution that is bad for our health and create an unhealthful atmosphere. In the suggested technique, a smart trash can made of an Arduino Uno, an ultrasonic sensor, a servo motor, and a battery jumper wire has been created. The Smart Dustbin program will now be performed when all hardware and software connections have been made. Dustbin lids will raise when someone approaches within a certain distance and then wait for the user to load and seal the bin. Either it's operating properly or not. In terms of society, it will promote cleanliness and health, and in terms of business, we work to make it as widely accessible and inexpensive as we can. so that everyone, from the poor to the affluent, may profit from it.***

Keyword: Arduino UNO, ultrasonic sensor, smart dustbin, servo motor, health conscious

I. INTRODUCTION

The rate increasing population in our country has increasing rapidly and also, we have increase in garbage which have increased environmental issue. Dustbin is a container which collects garbage's or stores items which recyclable or non-recyclable, decompose and non-decompose. They are usually used in homes, office etc., but in case they are full no one is there to clean it and the garbage are spilled out. The surrounding of a dustbin is also conducive for increasing the pollution level. Air pollution due to a dustbin can produce bacteria and virus which can produce life harmful diseases for human. Therefore, we have designed a smart dustbin using ARDUINO UNO, ultrasonic sensor which will sense the item to be thrown in the dustbin and open the lid with the help of the motor. It is an IOT based project that will bring a new and smart way of cleanliness. It is a decent gadget to make your home clean, due to practically all offspring of home consistently make it grimy and spread litter to a great extent by electronics, rappers and various other things.

Since the smart dustbin is additionally intriguing and children make fun with it so it will help to maintain cleanliness in home. It will be applied for various type of waste. Dustbin will open its lid when someone/object is near at some range then it will wait for given time period than it will close automatically. Here lid will close when you don't want to use and it will only open when it required.

II. OBJECTIVE

A Smart trashcan is a particular kind of trashcan that is meant to gather trash without any physical interaction with people. Everything is becoming smarter right now, even technology. Utilizing technology, a straightforward trash can is transformed into one that is simpler to use and that senses rubbish and opens its top to collect it. An automatic open-close lid is what it is. The amount of rubbish within this trash can is also detected. Since there is no physical contact between the trash can and a person, this trash can also protect us from viruses and bacteria. It maintains a healthy and environmentally friendly atmosphere.

III. PROPOSED AUTOMATIC DUSTBIN

A. Methodology

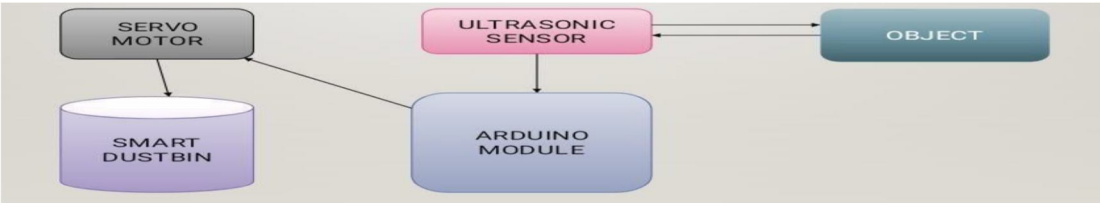

Fig. 1 Block Diagram

After assembling the Smart Dustbin and establishing all required connections, upload the code to an Arduino board and supply the circuit with a 9V power source. Once the device is turned on, the ultrasonic sensor continues to look out for any nearby objects. The Arduino determines the object's distance from the trash can if the sensor detects any objects. The Arduino will turn on the servo motor if the distance is less than the preset threshold. It will cause the lid to open by supporting it with an outstretched arm. The lid automatically closes after a while. The trashcan also has a level-sensing ultrasonic sensor, which continuously gauges the garbage's level. Consequently, when the trash can is overflowing, the lid will not open.

B. Circuit Diagram

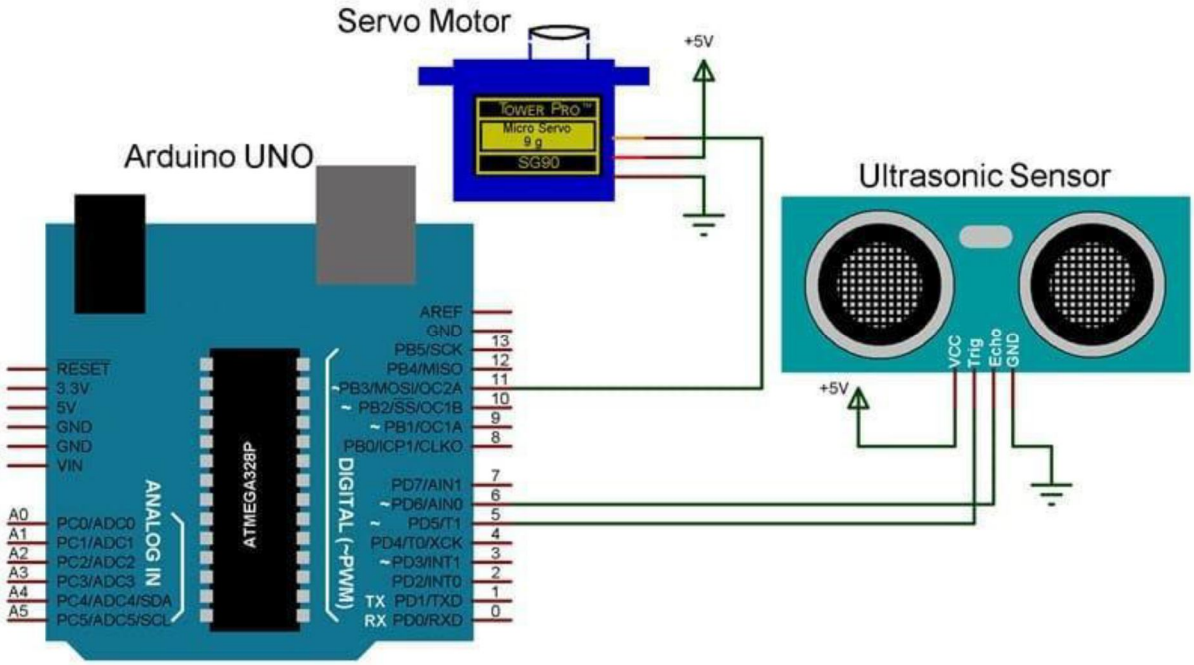

Fig.2 Circuit Diagram

The circuit diagram for smart dustbin contains three main components: Arduino Uno, Power supply and an ultrasonic sensor.
The Ultrasonic sensor HC-SR04 pins echo and trig are connected to Arduino Uno pins 5 and 6 respectively. The VCC pin is connected to 5V on Arduino Uno and both the grounds are connected together.
A 9v battery has been connected to Vin pin on the Arduino Uno and grounds are connected together. Pin 11 is connected to the servo motor.

C. Components

1) Arduino UNO: Arduino UNO is a low-cost, flexible, and easy-to-use programmable open-source microcontroller board that can be integrated into a variety of electronic projects.
2) Servo Motors: A servo motor is a rotary actuator or linear actuator that allows for precise control of angular or linear position , velocity and acceleration.
3) Ultrasonic sensor: An ultrasonic sensor is an electronic device that measures the distance of a target object by emitting ultrasonic sound waves, and converts the reflected sound into an electrical signal. Ultrasonic waves travel faster than the speed of audible sound .
4) Jumper wire: A jump wire is an electrical wire, or group of them in cable, with a connector or pin each end. Jumper wires are used to connect two pints in a circuit.
5) 9V Battery: Battery is used to convert chemical energy into electricity and as a source of power.
6) Jumper Wire: A jumper wire is an electrical wire, or group of them in a cable, with a connector or pin at each end, which is used to interconnect the components of a breadboard or circuit.
7) Dustbin: A container to collect and store the garbage.

IV. RESULT

When dustbin is being opened -

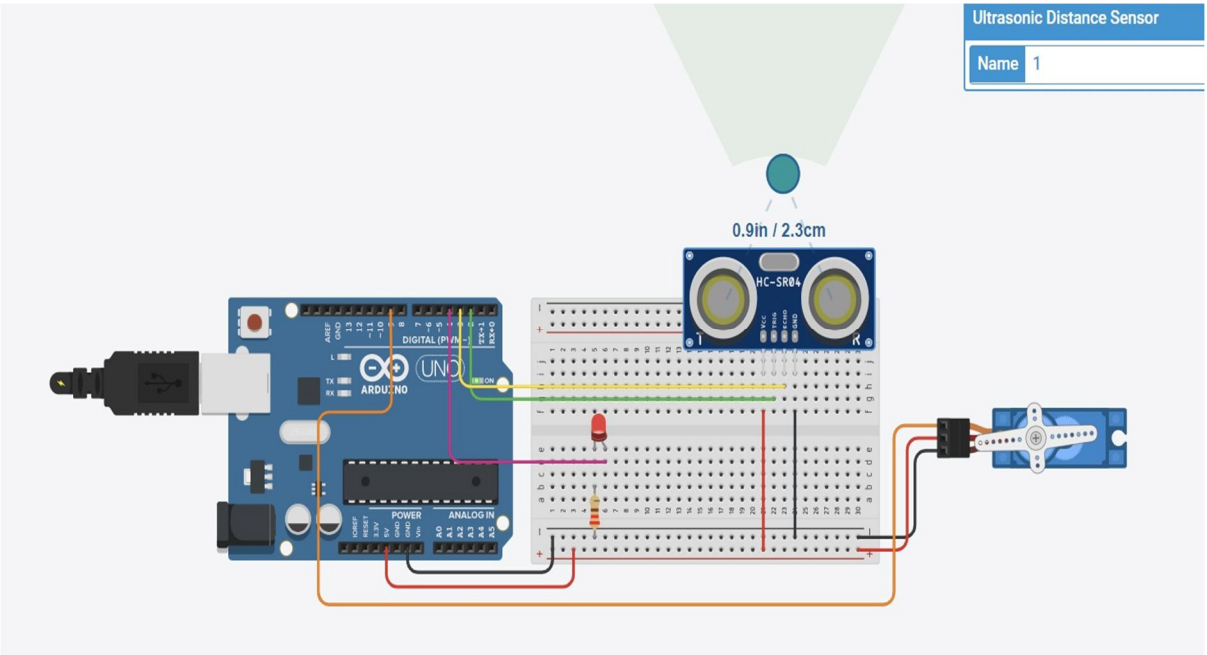

Fig. 3.1 Dustbin is being opened

In the above-mentioned image, we can see that when the object reaches in the proximity of less than 5 inch from the dustbin ultrasonic sensor, the lid of the dustbin gets open. This operation is being performed by the servo motor by rotating its shaft by 180 degrees. This is indicated by turning on a red LED.

When dustbin is being closed –

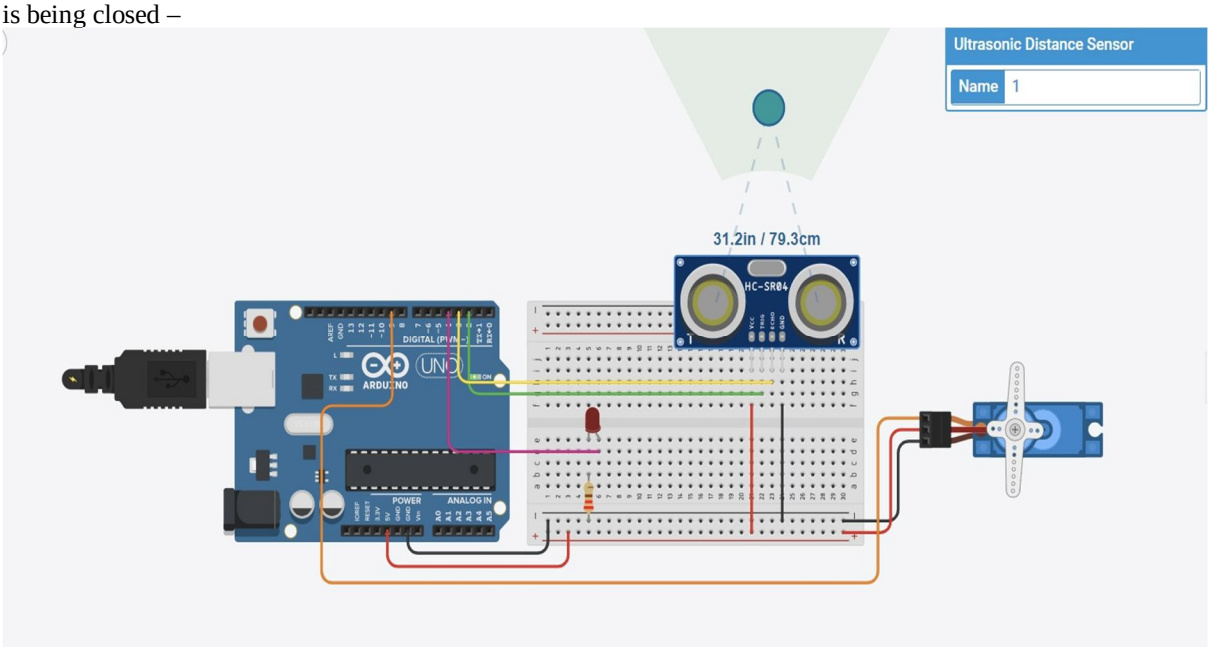

Fig. 3.2. Dustbin being closed

In the above-mentioned image, we can see that when the object reaches in the proximity of more than 5 inch from the dustbin ultrasonic sensor, the lid of the dustbin gets closed. This operation is being performed by the servo motor by rotating its shaft by negative 180 degrees. This is indicated by turning off a red LED.

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V. CONCLUSION AND FUTURE SCOPE

A simple but useful project is Smart Dustbin using Arduino. Using this project , the lid of the dustbin stays closed , so that waste is not exposed . This dustbin can make an evolution changes toward cleanliness. The combination of intelligent waste monitoring and trash compaction technologies, smart dustbins are better than traditional garbage dustbin. It is equipped with smart devices like sensor , Arduino etc. For social it will help toward health and hygiene. For business we try to make it affordable . So that normal people to rich people can take benefit from it. So this is our project.

The Future scope of our proposed model as follows -

1) It can be made durable by making it compact and cost effective
2) Two bins can be placed to collect wet and dry waste separately
3) Wet waste can be decomposed and used for making biogas
4) Solar panel can be used
5) Water proof circuit design.

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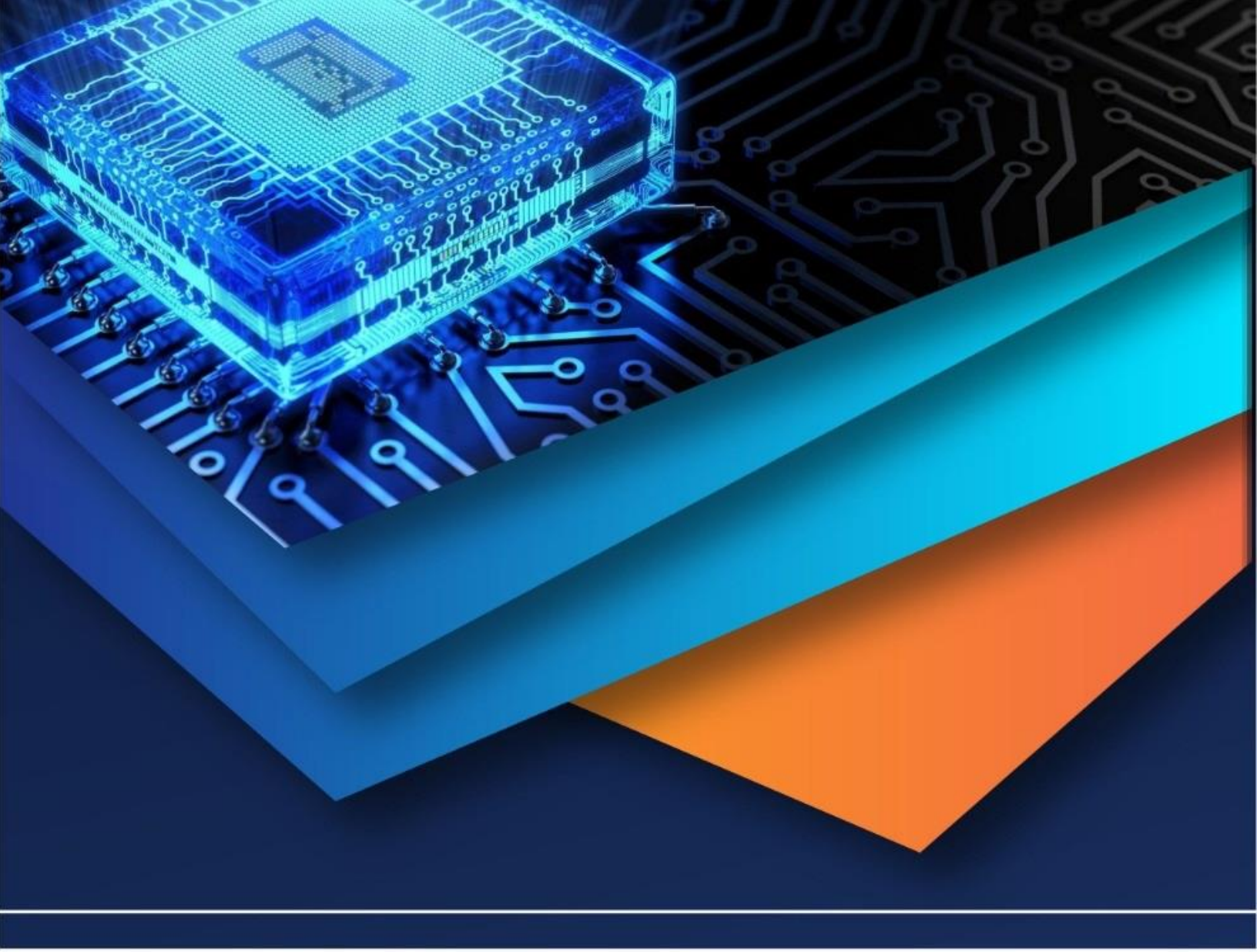

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