Smart Dustbin

NABANEETA BANERJEE[1], SAYANTANI MUKHERJEE[2], SAYANI SAHA[3], PADMANAVA BANERJEE[4], SAIKAT DUTTA[5], SAYANTAN JANA[6]
[1, 2, 3, 4, 6] *Department of Electronics & Communication Engineering, Guru Nanak Institute of Technology, Kolkata, India*

***Abstract*— The smart dustbin uses an Ultrasonic sensor HC-SR04 to detect objects in front. It and sends the signals to Arduino Uno. The Arduino understands the signal and sends a signal to the Servomotor which opens the flap on top of the dustbin. So it is just a normal bin where everyone can dispose waste but integration of some hardware components is done for more efficient use of it. Smart Dustbin is integrated with some hardware components such as Arduino, NODEMCU, Servo Motor, Ultrasonic sensors.**

***Indexed Terms*— Smart Dustbin, Arduino, long distance, IOT based, Ultrasonic Sensor**

I. INTRODUCTION

Garbage and diseases are very common problem in today's situation, every one of us wants everything that looks clean and tidy. Not every individual is aware of there environmental problems based on a large amount of garbage scattered on the streets. The dustbins which are provided from the govt. facilities are dirty and unattractive due to lack of maintenance. So this matter is also a reason in itself for people not to throw the garbage in the dustbin maybe one of the reason is it's a manual process of opening the lid and also closing it after throwing.

So here comes our IOT project of smart dustbin, we designed and Implemented a smart dustbin in an unique way which will be fully automatic[1] . The dustbin is for the dry trash so the whole idea behind this project is that the ultrasonic sensor will detect an object and automatically the lid will open and it will remain opened as long as we are not throwing the garbage in it after that the lid will get closed.

A lot of people has done projects on this topic earlier , but we must say that our project is quite different from others as we have considered a lot of prospective while making this project[2-3]. Right now our world is going through a very tough time as we are fighting against corona virus which basically spreads by touching people or any surface. This device will help throwing the garbage without touching or opening the device by our hands, thus we will be able to maintain hygiene properly and the possibility of spreading the virus will be less.

II. EXPERIMENTAL

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 tern of cleanliness with the help of technology. Here we also use Servo Motor for automation of lid and then we use Battery for 5 V power supply [4,5]

REQUIRED SOFTWARE:

- ARDUINO IDE

REQUIRED HARDWARES:

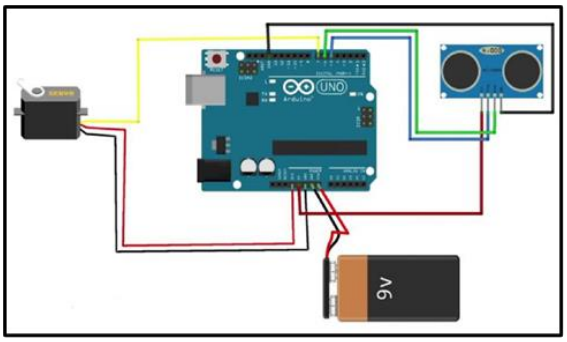
- UNO BOARD
- ULTRASONIC SENSOR
- SERVO MOTOR
- 9V BATTERY
- DUSTBIN
- JUMPER WIRE

Here, we have used Arduino as microcontroller which has 20 input/output digital pins of which 6 are PWM outputs and 6 are analog inputs. We have loaded program into it by computer software. Arduino will control the full system. It will recieve signal from mobile application via bluetooth and the floor cleaning machine will work when we require.

We have also used a Servo motor (Fig. 7) which is a rotational or translational motor to which power is supplied by a servo amplifier and serves to apply torque or force to a mechanical system like an actuator

or brake. It allows for precise control in terms of angular position, acceleration, and velocity which is associated with a closed-loop control system which considers the current output [11-12] and alters it to the desired condition. Here the speed is determined by the frequency of the applied voltage and the number of magnetic poles.

The ultrasonic sensor detects human hand and waste when the hand and the waste are placed in front of that sensor and the lid of that dustbin opens and the waste is put into it.



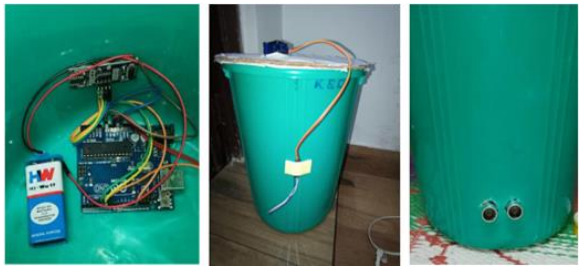
The ultrasonic sensor echo pin and trigger pin is connected to pin digital pin D7 and D8. The +Vcc pin is connected to +5V supply and GND pin is connected to ground pin of arduino Uno board. The control (PWM) pin of servo motor is connected to digital pin D9 of arduino. Hence, servo motor is used to open the cap of dustbin [12-13].

Ultrasonic sensor:
Echo pin is connected in to D6
Trigger pin is connected into D5
Vcc is connected into 5v supply
GND is connected into the GND of Arduino board

SG 90 Micro Servo Motor:
The control pin is connected into D7
GND pin is connected into GND
Other wire pin is connected into 3.3v

Power source (9V Battery):
GND pin is connected into GND
Vcc is connected into Vin

III. DISCUSSION



The design of a smart dustbin system with an Arduino microcontroller and ultrasonic sensor (HCSR04) consists of two designs, namely hardware design, including device design, and software design including Arduino source code. The main system design is a battery that functions as power control in turning on and off smart dustbin, Aurdino Uno R3 that functions as a conduit of programs from smart dustbins, Ultrasonic sensor functions to detect hand movements when disposing of garbage and servo motor as opening the lid of the smart trash can and closing it again automatically. The whole idea behind this project is that the ultrasonic sensor will detect an object and automatically the lid will open and it will remain opened as long as we are not throwing the garbage in it after that the lid will get closed.

IV. CONCLUSION

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 and when you want dispose any waste, it will automatically open the lid.

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