



OBSTACLE AVOIDING ROBOT

*A report submitted in partial fulfilment of the
requirement for the award of degree of
BACHELORS OF ENGINEERING
in
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ABSTRACT

As humanity is going to enter an era where robots will take the place of human and minimize the human efforts. One of those technologies is Obstacle Avoiding Robot. It will capable of detecting and avoiding the obstacle which come in its path by itself. It is going to consist of different sensors and microcontroller and a set of instruction programmed to the microcontroller. For a basic Obstacle Avoiding Robot Arduino can be taken as microcontroller for programming, ultra sonic sensor for detecting the obstacles, motor driver would be used to drive motors according to the set of instruction. When it starts to move when switched on the ultra sonic sensor will detect the obstacles and when an obstacle is detected it will stop. With the help of servo motor it will check for an open path in left and right direction. Whichever path it will find suitable it will turn to that path and start moving. Certain improvements can be made to this robot and will be used in numerous of sectors. It will play a major role in the field of automation. It can be used in automated mapping of some unknown place where human hasn't reached it will collect necessary details and would create a virtual map of that place. It will also be in automated delivery and other home applicants like vacuum cleaner dustbin etc.

CHAPTER 1: PROBLEM IDENTIFICATION

Problem objective

The robot has the ability to detect the object in its path and stop, then find best path and start moving again by using ultrasound detector to calculate distance. With the help of set of instruction it will overcome the things which fall in its place.

Application

There is numerous application of this robot some it are:

- **Self driving cars:** One of the most promising technologies will have a huge part of obstacle avoiding robot. It can be included as the safety feature in cars that when the driver accidently sleep while driving sensors detect it and using obstacle avoiding robot car will be guided and park at a safe place until the driver woke up.
- **Rescue mission:** Place where it is difficult for man to reach like in coal mine active volcano to rescue in difficult times. This robot would be a great choice to use. By sending various things (food, oxygen, equipments) or sending essential data would be very beneficial.
- **Delivery Robot:** Futuristic technologies where the delivery would be done by robots would include obstacle avoiding robot to guide their way to the destination.

CHAPTER 2: FEATURE FINALIZATION

Components included in the obstacle avoiding robot-

1. **Arduino-** It is a single board microcontroller. It is able to create attractive Projects which are able to sense various things physically and digitally. It is powered by the USB cable connected to laptop or with battery. It has various digital and analog input output pins. Arduino also have an IC, voltage regulator and a power LED indicator to show that Arduino is ON.



Figure 1 2.1 Arduino

2. **Ultra Sonic Sensor-** It is used to detect the distance between the object and the sensor. Sensor works on the principle of echo. By emitting ultrasonic waves and receiving. With the help of time taken to receive the waves after striking from the object it calculate distance knowing that the speed of waves is same that of speed of light i.e. 3×10^8 m/s.



Figure 2 2.2 Super Sonic Sensor

3. **Motor Driver** - It is an interfacing device to connect motor with the microcontroller i.e. in this case it is Arduino. Motor driver make it easy to control the motors.



Figure 3 2.3 Motor Driver

4. **Servo Motor** - It is used to rotate the object to certain angle with great accuracy. In obstacle avoiding robot it is used to rotate ultra sonic sensor to check for the alternate path after robot get blocked by an obstacle.



Figure 4 2.4 Servo Motor

CHAPTER 3: DESIGN FLOW

Design Model 1

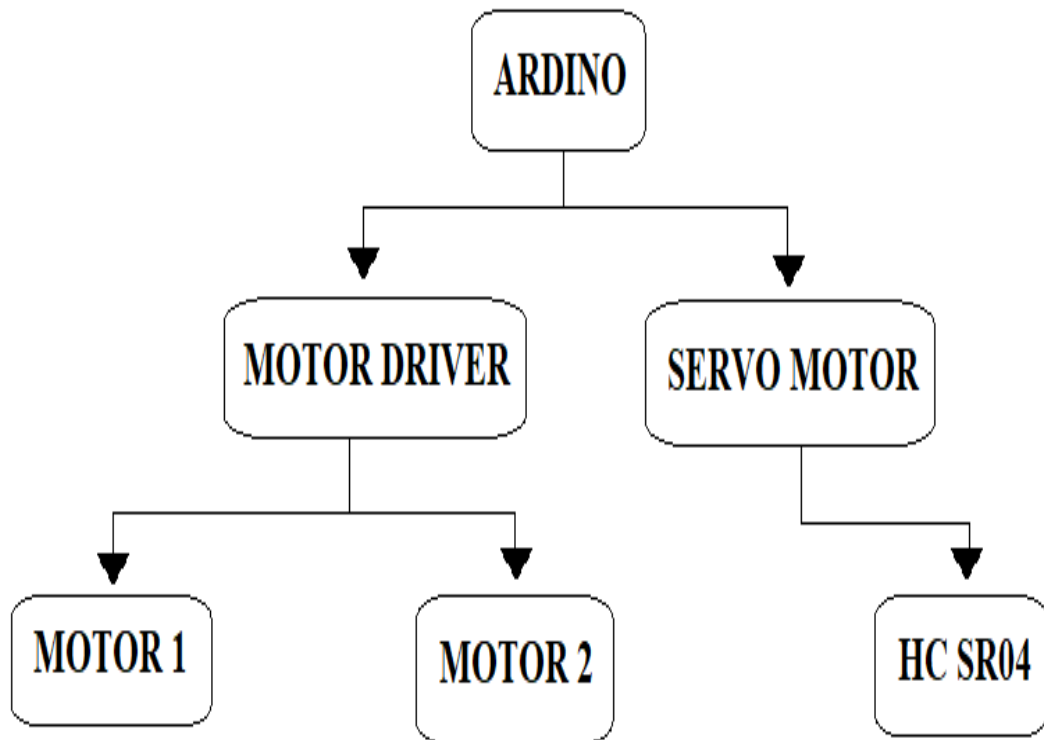


Figure 5 3.1 Design Model 1

Design Model 2

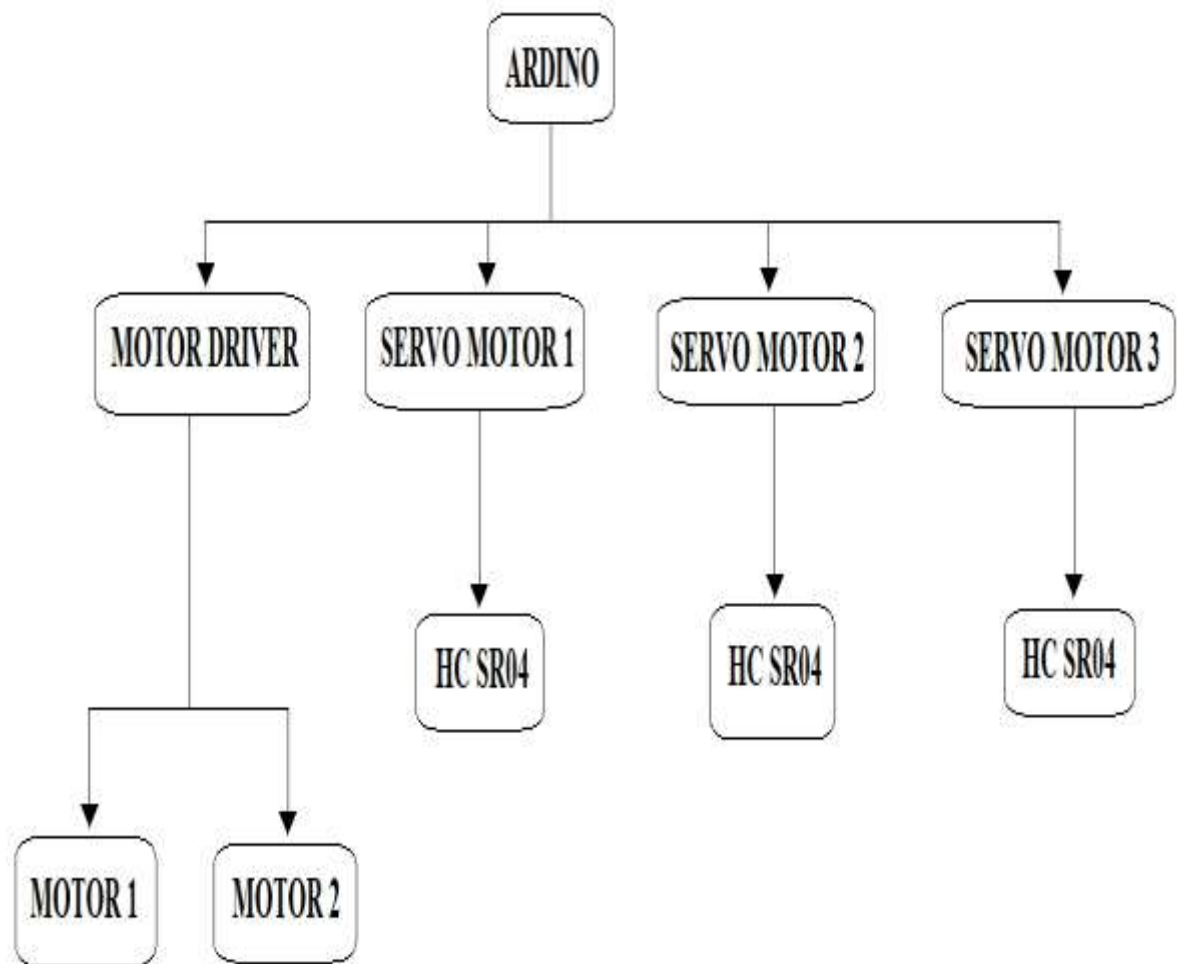


Figure 6 3.2 Design Model 2

CHAPTER 4: BEST POSSIBLE DESIGN

Block Diagram

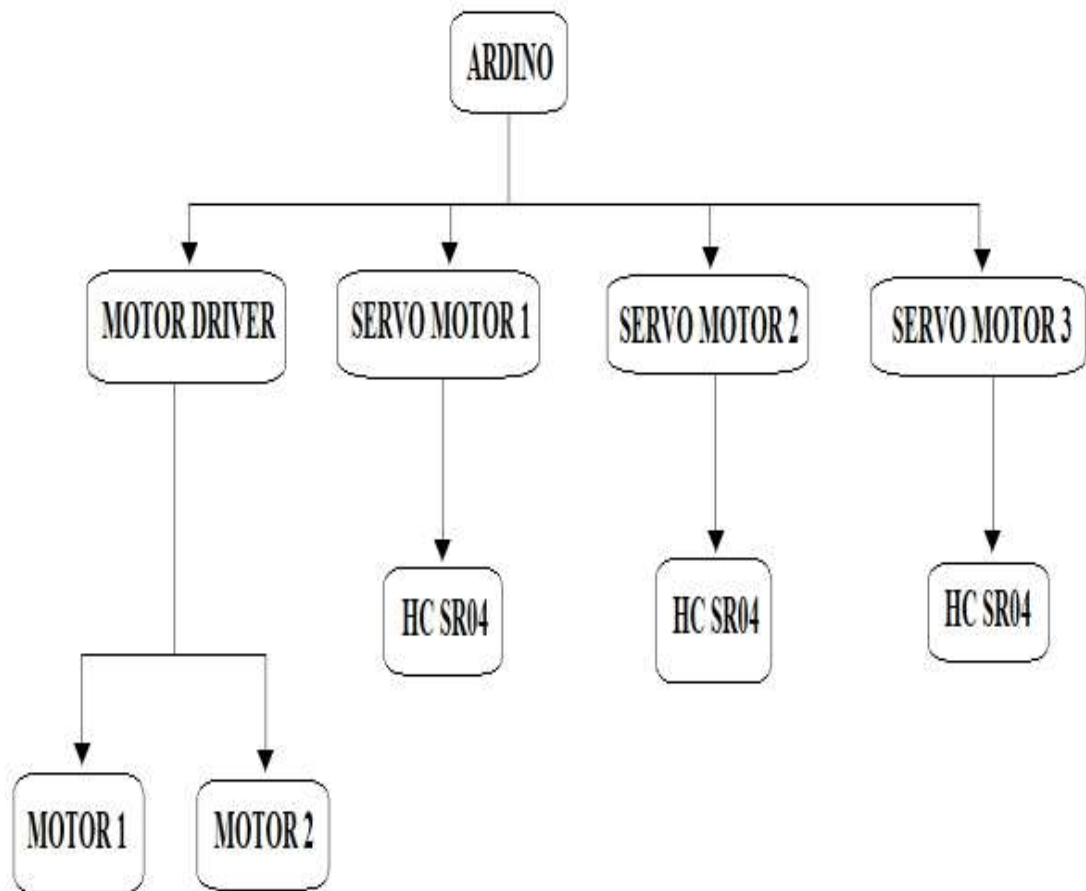


Figure 7 4.1 Block Diagram

Flow Chart

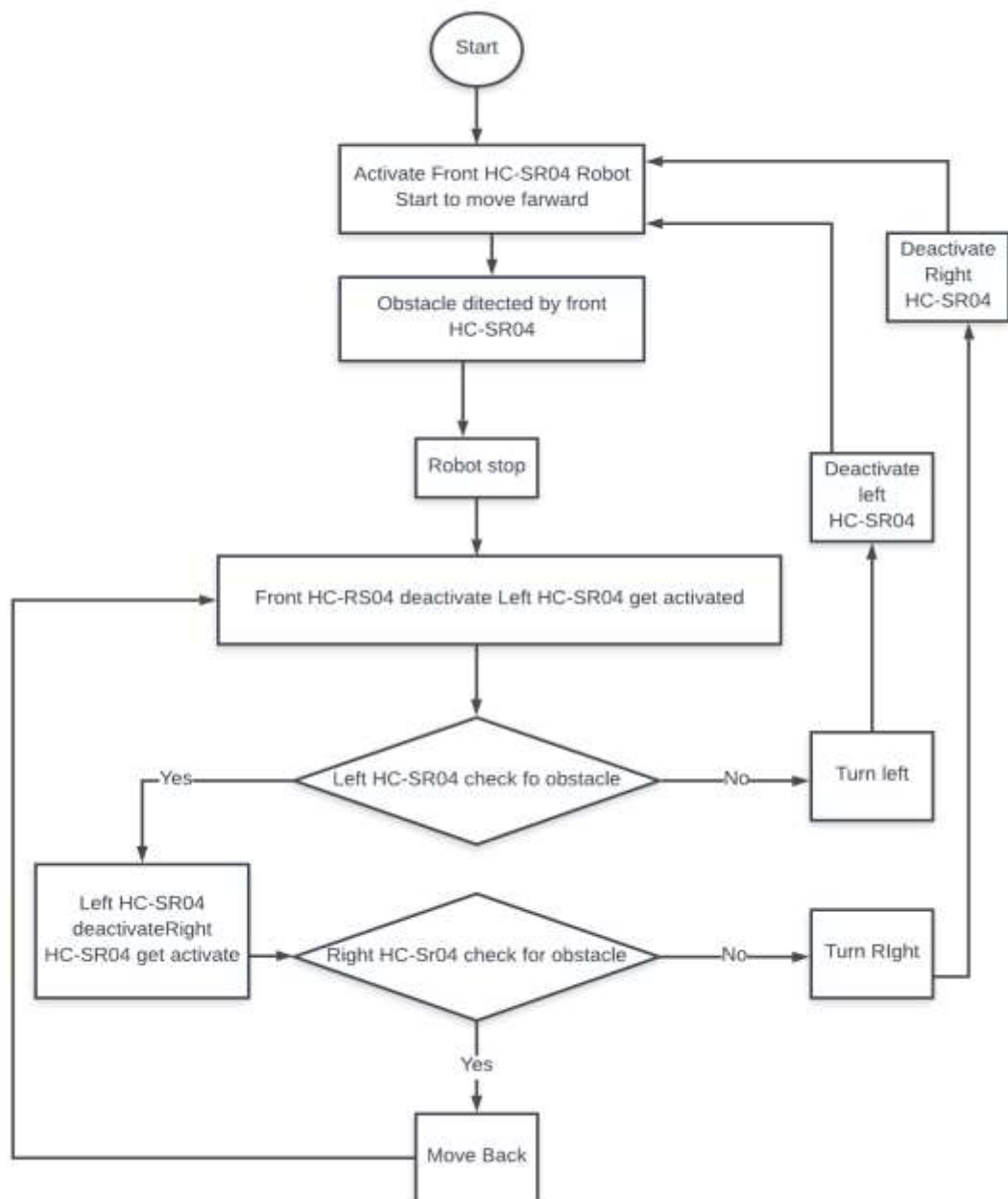


Figure 8 4.2 Flow Chart

Algorithm

1. Front HC-SR04 is activated and left and right HC-SR04 is deactivated.
2. Front HC-SR04 Detect obstacle and robot stop.
3. Left HC-SR04 get activate and check for obstacle.
 - 3.1. If obstacle found deactivate left HC-SR04 and go to step 4.
 - 3.2. If not found turn left and go to step 1 and 2.
4. Right HC-SR04 get activate and check for obstacle.
 - 4.1. If obstacle found go to step 5 and deactivate right HC-SR04.
 - 4.2. If obstacle not found turn right and go to step 1 and 2.
5. Move back and stop.
 - 5.1. Got to step 3.

CHAPTER 5: TESTING and OUTCOME

Simulation and Output

In the project the ultrasonic sensor (HC SR04) is used to calculate the distance between the obstacle and the bot. The distance is calculated in centimetres.



Testing and Steps to overcome

Problem	Steps to overcome
Ultrasonic sensor was not calculating distance properly in cm	Used the NewPing library for the distance calculation precisely.
Motor Driver was not working.	As VCC was 12v the jumper of 5v regulator was removed.
On detecting the obstacle, the robot was taking a U-turn	Time delay for turning was decreased.

Table 1 5.1 Testing and Solution

CHAPTER 6: CONCLUSION AND FUTURE SCOPE

Conclusion

The robot can be used to minimize human efforts and can be sent to the place where there is a risk if like but essential data is required for some work. By developing certain things and providing intelligence the robot can further be used in various sectors.

Future Scope

Obstacle avoiding robot has a bright future in the field of –

- **Automation:** everything which has wheels and have a starting and a destination would include an obstacle avoiding robot. It also increase safety and reduce human effort.
- **Automated Mapping:** For human to go on a new place like a coal mine or a new planet for discovery, a mapping would be very important before a human being can be sent over there. This would be solved y the obstacle avoiding robot.

CHAPTER 7: COST ANALYSIS

Component/Material	Amount	Issued or Purchased	Price (Rs)
Arduino UNO	1	P	400/-
Ultra Sonic Sensor	1	I	-
Motor Driver	1	P	150/-
Battery 12v chargeable	1	P	300/-
Motor 300 rpm	2	P	320/-
Tyre	2	I	-

Chassis	1	I	-
Servo motor	1	P	90/-
9 v battery non rechargeable	1	I	50/-
Total			1310/-

Table 2 7.1 Cost Analysis

ECE ARCHIVES PROJECT SUBMISSION FORM

Project Code: CU/ECE/20____/Sem____/UID_____ (To be filled by Office)

Project Name: Obstacle Avoiding Robot

Name Jayant Pathak

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5.	Bedanta Bhandar Kayastha	17BEC1103	4	9101134794

Section to be filled by Project Mentor

Status (Please tick, whichever applicable)

Working		Not Working	
Marks Awarded		60	

Project Mentor Details:

Name Rajpreet Singh

Employee ID _____

Sign _____

Date _____

Section to be filled by Project Examiner(s)

Status (Please tick, whichever applicable)

Working		Not Working	
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