# GADDI

Our robot named as Gaddi is an **'obstacle avoiding robot'.**
The basis of code of our robot is that if any object comes in its way it will change its path to either left or right direction
depending on direction which has greater extent of vision.

## Technical Aspects of the Project

1. **Aurdino-Uno**
   Micro-controller which contains our code work. It is the brain of our robot.

2. **HCSR-04 sensor**
   We have used this for measuring distance of objects.
   We used a module of this sensor.

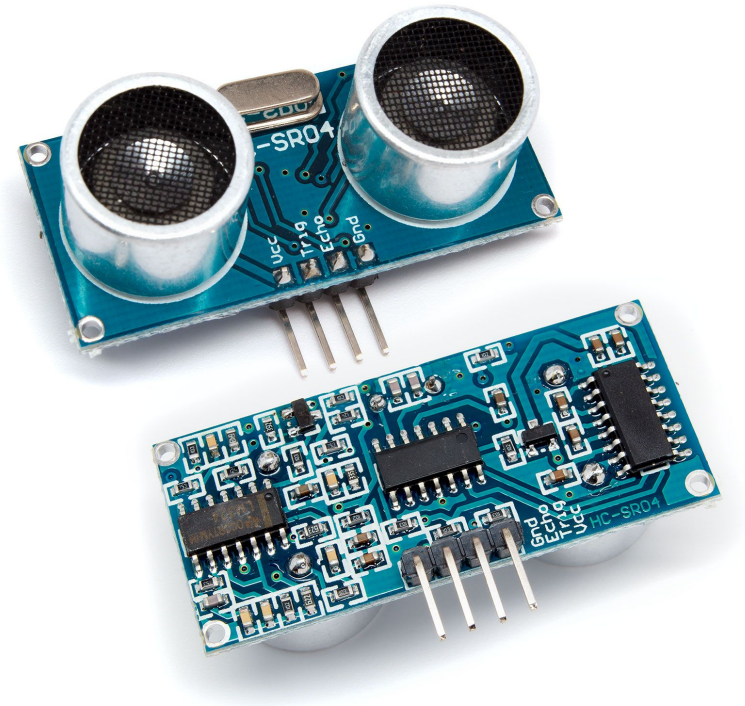
3. **5V servo motor**
   Sensor is mounted on servo motor so it is able to take distance from three directions : front, left and right.

4. **12V servo motor**
   Used for steering purpose because the bot works by axle mechanism.

5. **12V 100rpm dc motor (x2)**
   Used it to give torque to the rear wheels.

# Theory Involved in the Project

HC SR-04 sensor sends ultrasonic wave, it has two section one for sending signal and one for recieving, controlled by trig-Pin and echo-Pin respectively. Helpful resource *http://arduinobasics.blogspot.in/2012/11/arduinobasics-hc-sr04-ultrasonic-sensor.html*




Calculating the time interval we can measure distance of object from which wave is reflected.
If we divide time interval by 58.2 it gives distance in centi-metre, i.e.

$$distance(in\ cm) = \frac{time\ taken\ by\ echo-Pin\ to\ receive\ trig-Pin\ signal(in\ sec)}{58.2}$$

Servo motor is controlled using PWM(Pulse Width Modulation).It can easily be controlled in Aurdino using servo library.


Servo motor continuosly rotate to and fro from one position to another giving 180 degrees of coverage and stops for a while at middle and end positions
where sensor takes distance and store in variables (middle-distance, right-distance, left-distance).
If middle-distance is less particular value(in our code 60 cm) aurdino will send signal to servo motor contolling steering to rotate.
Rotation of steering motor depends on values of right-distance and eft-distance , the one which has larger value i.e. side which has larger extent of vison, our robot's path changed towards that side.

This turn, unlike XLR8, is achieved by axle mechanism. For simplicity of code and efficiency of power, we used a single tyre in the front.


DC motors are for motion of our robot. These rotate continuously to move robot in forward direction. If middle-distance becomes less than 10cm(case in which robot can't be steered) dc motors are coded to move robot in backward direction for 4000ms.

# Drawbacks Further Development

The biggest drawbacks of the bot we experienced are

1. It does not detect a moving obstacle.
2. Constant speed while turning. For a smoother turn, it is better that the bot decrease its speed, during the turn and then increase again when it is in straight path.

We will continue this project insem, when we aim to implement the code on Raspberry Pi 3, and add position coordinates to it. Assuming that, it can detect moving obstacles. Now the bot can be programmed to reach from one location to another in institute, on its own. This would be an insti level small scale model of google car.

# References

A sample turn by the bot, is illustrated in video:
*https://www.youtube.com/watch?v=ZbmxNN3Voko*

For complete code, refer
*https://gist.github.com/karora666/ea846402b5090acca2974e627abb7df4*

*https://drive.google.com/open?id=0BzbSkJJZwASTN2E4cHRITFBidjhERjdPVG1EM1c4d2RQOFZj*