**Obstacle Avoiding Robot**

As I don’t know much about Arduino, because I am just got introduced to it. But as far as I researched I got to know some details about this obstacle avoiding robot. It is an Arduino based robot that uses Ultrasonic range finder sensors to avoid collisions.

**Arduino Uno**

Arduino Uno is an ATmega 328p Microcontroller based prototyping board. It is an open source electronic prototyping platform that can be used with various sensors and actuators.

Arduino Uno has 14 digital I/O pins out of which 6 pins are used in this project.

**HC – SR04**

It is an Ultrasonic Range Finder Sensor. It is a non-contact based distance measurement system and can measure distance of 2cm to 4m.

**L293D**

It is a motor driver which can provide bi-directional drive current for two motors.

**Servo Motor**

The Tower Pro SG90 is a simple Servo Motor which can rotate 90 degrees in each direction (approximately 180 degrees in total).

The basic principle behind the working of ultrasonic sensor is as follows:

Using an external trigger signal, the Trig pin on ultrasonic sensor is made logic high for at least 10µs. A sonic burst from the transmitter module is sent. This consists of 8 pulses of 40KHz.

The signals return back after hitting a surface and the receiver detects this signal. The Echo pin is high from the time of sending the signal and receiving it. This time can be converted to distance using appropriate calculations.

Connections Using Arduino

Arduino is the main processing unit of the robot. Out of the 14 available digital I/O pins, 7 pins are used in this project design.

The ultrasonic sensor has 4 pins: Vcc, Trig, Echo and Gnd. Vcc and Gnd are connected to the +5v and GND pins of the Arduino. Trig (Trigger) is connected to the 9th pin and Echo is connected to 8th pin of the Arduino UNO respectively.

A Servo Motor is used to rotate the Ultrasonic Sensor to scan for obstacles. It has three pins namely Control, VCC and GND. The Servo Control Pin is connected to pin 11 of Arduino while the VCC and GND are connected to +5V and GND.

L293D is a 16 pin IC. Pins 1 and 9 are the enable pins. These pins are connected to +5V.  Pins 2 and 7 are control inputs from microcontroller for first motor. They are connected to pins 6 and 7 of Arduino respectively.

Similarly, pins 10 and 15 are control inputs from microcontroller for second motor. They are connected to pins 5 and 4 of Arduino. Pins 4, 5, 12 and 13 of L293D are ground pins and are connected to Gnd.

First motor (consider this as the motor for left wheel) is connected across the pins 3 and 6 of L293D. The second motor, which acts as the right wheel motor, is connected to 11 and 14 pins of L293D.

The 16th pin of L293D is Vcc1. This is connected to +5V. The 8th pins is Vcc2. This is the motor supply voltage. This can be connected anywhere between 4.7V and 36V. In this project, pin 8 if L293D is connected to +5V supply.

The working of the project is explained below.

When the robot is powered on, both the motors of the robot will run normally and the robot moves forward. During this time, the ultrasonic sensor continuously calculate the distance between the robot and the reflective surface.

This information is processed by the Arduino. If the distance between the robot and the obstacle is less than 15cm, the Robot stops and scans in left and right directions for new distance using Servo Motor and Ultrasonic Sensor. If the distance towards the left side is more than that of the right side, the robot will prepare for a left turn. But first, it backs up a little bit and then activates the Left Wheel Motor in reversed in direction.

Similarly, if the right distance is more than that of the left distance, the Robot prepares right rotation.  This process continues forever and the robot keeps on moving without hitting any obstacle.

**The aim of this project is to implement an obstacle avoiding robot using ultrasonic sensor and Arduino.**