

OBSTACLE AVOIDANCE ROBOT USING ARDUINO

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Abstract : Now day's many industries are using robots due to their high level of performance and reliability and which is a great help for human beings. The obstacle avoidance robotics is used for detecting obstacles and avoiding the collision. This is an autonomous robot. The design of obstacle avoidance robot requires the integration of many sensors according to their task.

The obstacle detection is primary requirement of this autonomous robot. The robot gets the information from surrounding area through mounted sensors on the robot. Some sensing devices used for obstacle detection like bump sensor, infrared sensor, ultrasonic sensor etc. Ultrasonic sensor is most suitable for obstacle detection and it is of low cost and has high ranging capability.

This project also presents a dynamic steering algorithm which ensures that the robot does not have to stop in front of an obstacle which allows robot to navigate smoothly in an unknown environment, avoiding collisions.

Keywords: Robots, Ultrasonic Sensor, Bump Sensor, Infrared Sensor,

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1. INTRODUCTION

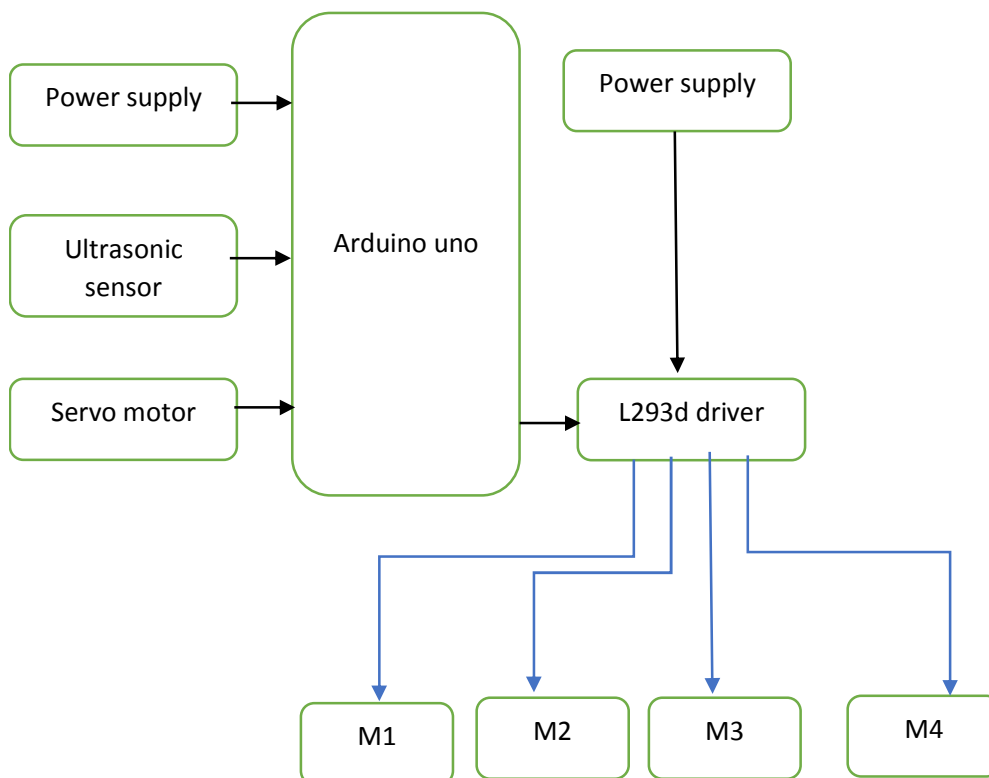
Robotics is part of Today's communication. In today's world ROBOTICS is fast growing and increasing field. It is simplest way for latest technology modifications. Now a day's communication is part of advancement of technology. So, we decided to work on ROBOTICS field, and design something which will make human life simpler in day to day aspect. Thus, we are supporting this cause.

An obstacle avoiding robot is an intelligent device, which can automatically sense and overcome of moving vehicles on the basis of the sensorial information. The use of these methods front to classic methods (path planning) is a natural alternative when the scenario is dynamic with an unpredictable behaviour. In these cases, the surroundings do not remain invariable, and thus the sensory information is used to detect the changes consequently adapting moving. It will automatically scan the surrounding for further path.

This project is basis stage of any automatic robot. This ROBOT has sufficient intelligence to cover the maximum area of provided space. It has a ultrasonic sensor which are used to sense the obstacles coming in between the path of ROBOT. It will move in a particular direction and avoid the obstacle which is coming in its path. We have used four D.C motors to give motion to the ROBOT. The construction of the ROBOT circuit is easy and small. The electronics parts used in the ROBOT circuits are easily available and cheap too.

The goal of this paper is to develop methods that helps user to control & program a robot with high level of abstraction from robot specific language.

2. BLOCK DIAGRAM



1) Working

Before going to working of the project, it is important to understand how the ultrasonic sensor works. 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 $10\mu s$. 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.

The aim of this project is to implement an obstacle avoiding robot using ultrasonic sensor and Arduino. All the connections are made as per the circuit diagram. The working of the project is explained below.

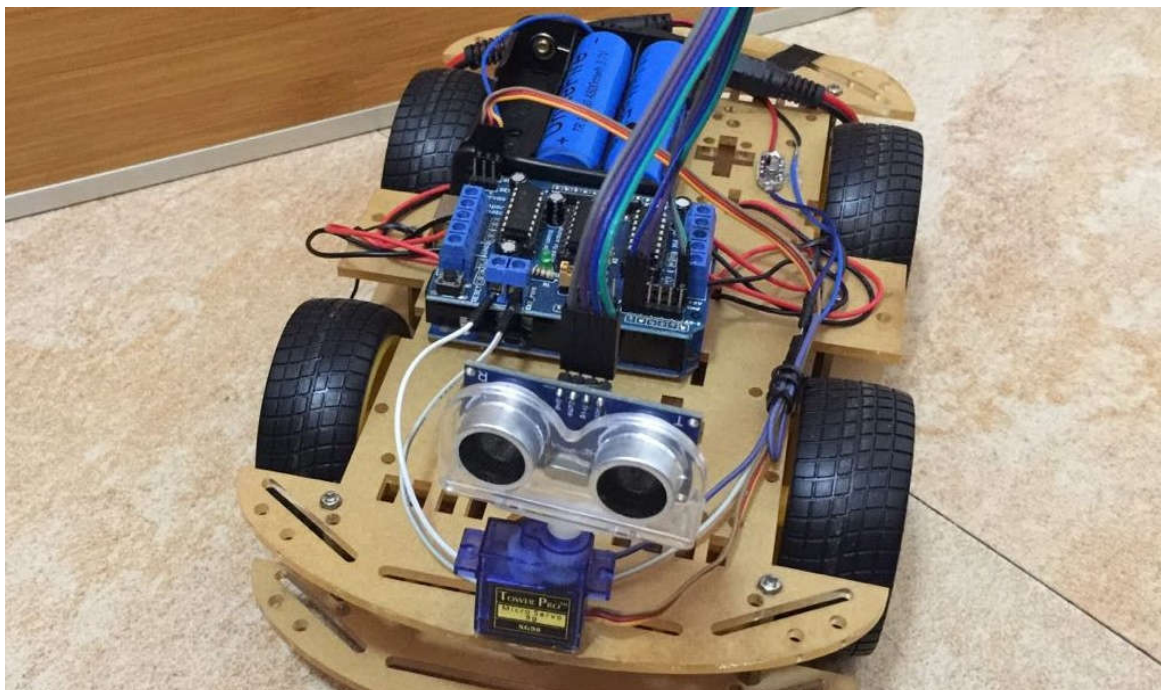
When the robot is powered on, both the motors of the robot will run normally and the robot moves forward. During this time, the ultrasonic sensor continuously calculate the distance between the robot and the reflective surface.

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.

3.RESULT

Hence, In this project, an Obstacle Avoiding Robot is designed. It is an Arduino based robot that uses Ultrasonic range finder sensors to avoid collisions.



4. CONCLUSION

We build a robotic vehicle which moves in different directions like Forward, Backward, Left, and Right when input is given to it. The goal of our project is to create a autonomous robot which intelligently detects the obstacle in his path and navigate according to the actions that we set for it.

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