OBSTACLE AVIODANCE ROBOT USING ARDUINO

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ABSTRACT:

Obstacle avoidance is one of the most important aspects of mobile robotics. Without it, robot movement would be very restrictive and fragile. This project proposes robotic vehicle that has an intelligence built in it such that it directs itself whenever an obstacle comes in its path. So, to protect the robot from any physical damages. This can be design to build an obstacle avoidance robotic vehicle using ultrasonic sensors for its movement. A micro-controller (AT mega 328P) is used to achieve the desired operation. An ultrasonic sensor is used to detect any obstacle ahead of it and sends a command to the micro-controller. Depending on the input signal received, the micro-controller redirects the robot to move in an alternate direction by actuating the motors which are interfaced to it through a motor driver.

Keywords: ArduinoUno, Arduino software, Motor Driver(L293D),Motors, ultrasonic sensor

I. INTRODUCTION

An obstacle avoiding robot is an intelligent device, which can automatically sense and overcome obstacles on its path. Obstacle Avoidance is a robotic discipline with the objective 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.
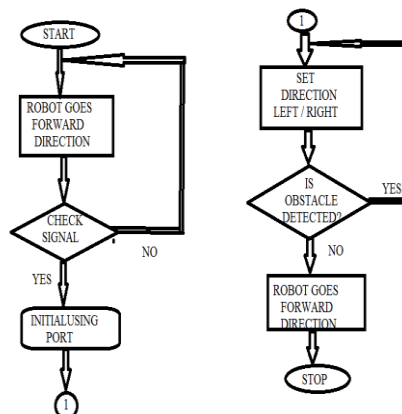It will automatically scan the surrounding for further path.

II. FLOWCHART

Fig1: Obstacle avoidance Flowchart

III. ARDUINO UNO:

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.. You can tinker with your UNO without worring too much about doing something wrong, worst case scenario you can replace the chip for a few dollars and start over again.

"Uno" means one in Italian and was chosen to mark the release of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.
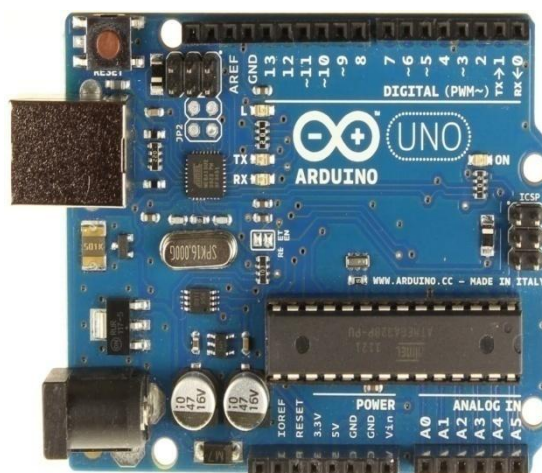

Fig2: ArduinoUno board

IV. ULTRASONIC SENSOR

The sonic waves emitted by the transducer are reflected by an object and received back in the transducer. After having emitted the sound waves, the ultrasonic sensor will switch to receive mode. The time elapsed between emitting and receiving is proportional to the distance of the object from the sensor.
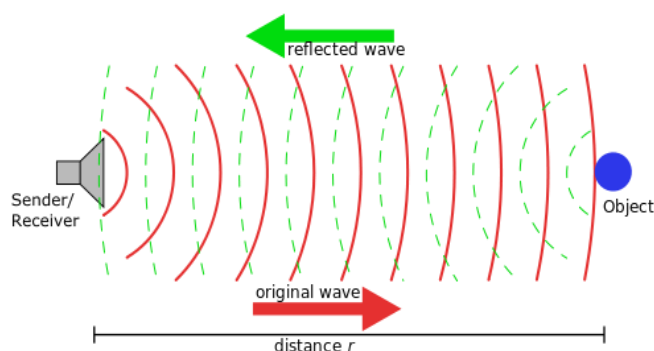

Fig3: basic principle of ultrasonic sensor

Ultrasonic sensor are devices that use electrical–mechanical energy transformation to measure distance from the sensor to the target object. Ultrasonic waves are longitudinal mechanical waves which travel as a sequence of compressions and rarefactions along the direction of wave propagation through the medium.

Fig4: ultrasonic sensor

V. MOTOR DRIVER(L293D)

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.Dual H-bridge Motor Driver integrated circuit *(IC).*
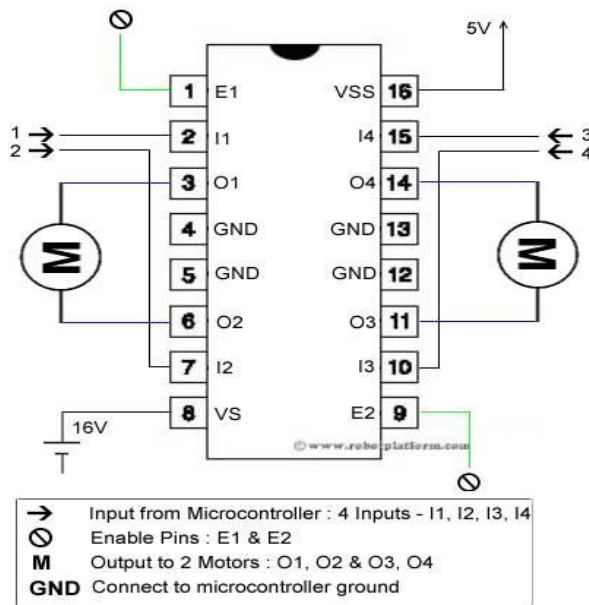

Fig5: Motor driver(L293D)

VI. MOTORS

A DC motor in simple words is a device. An Electric DC motor is a machine which converts electric energy into mechanical energy.

This DC or direct current motor works on the principal, when a current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move.This is known as motoring action. If the direction of current in the wire is reversed, the direction of rotation also reverses.
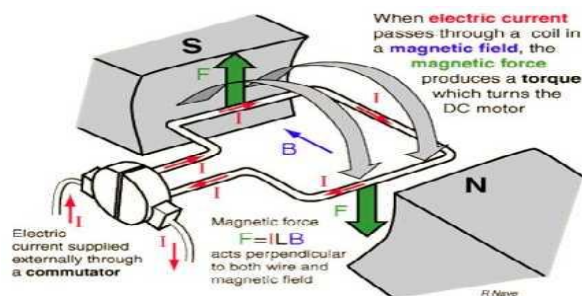
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Fig6: working of DC motor
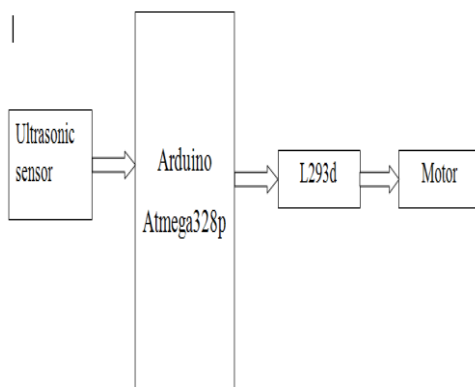
VII. METHODOLOGY

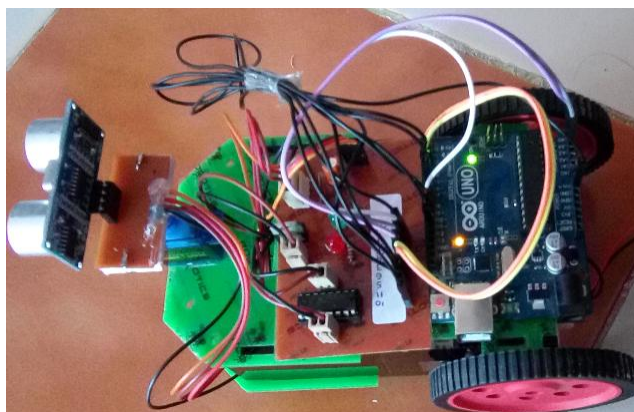**Fig7: Obstacle aviodance block diagram**

VIII. APPLICATONS

- Used in mobile robot navigation systems
- Used for household work like automatic vaccum cleaning.
- Used in dangerous environmemts,where human penetration could be fatal.

IX. ACKNOWLEDGEMENT

X. EXPERIMENTAL RESULTS

XI. CONCLUSION

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 we set for it. This project is been designed and implemented with ATmega 328P micro controller in embedded system domain.Experimental work has been carried out carefully.sensors output will be given to controller.According to the program written in the controller it will give instructions to all devices.

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