PROJECT

I have worked on a project namely “OBSTACLE-AVOIDING-ROBOT”

Obstacle Avoiding Robot is an intelligent device which can automatically sense the obstacle in front of it and avoid them by turning itself

The scope of this project is to find automatically sense the obstacles in front it and avoid them by turning itself.

Robotics is an interesting and fast growing field. Being a branch of engineering, the application of robotics are increasing with the advancement of technology

It is an Arduino based robot and Arduino is the main processing unit of the robot
that uses ultra sonic range finder sensors to avoid collisions

The technology used here is IOT(internet of things)-it describes physical objects that are embedded with sensors, processing ability, software and other technologies

My role and responsibility in this project is team leader as well as team member ..circuit designing and working principle of the circuit.

This robot is introduced because in many of the industries we have seen that many heavy components which they have to move from one place to another place which is not possible without the help of

machines.with this we got an idea and we introduce the robot named as OBSTACLE-AVOIDING-ROBOUT USING ARDUINO

The components required in this project is

- Arduino Uno
- Ultrasonic Range Finder Sensor – HC – SR04
- Motor Driver IC – L293D
- Servo Motor (Tower Pro SG90)
- Geared Motors x 2
- Robot Chassis
- Power Supply
- Battery Connector
- Battery Holder

Arduino Uno

Arduino Uno is an ATmega 328p Microcontroller(used for controlling other portions of an electronic system) 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.

ULTRASONIC RANGE FINDER:

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

MOTOR DRIVER:

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).

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 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.

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

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.

- **Applications:**
  - Obstacle avoiding robots can be used in almost all mobile robot navigation systems.
  - They can be used for household work like automatic vacuum cleaning.
  - They can also be used in dangerous environments, where human penetration could be fatal.
  - Back sonar of automobiles

- Advantages:
- It is low cost circuit
- The programming of micro controller is easy

- Disadvantage:
- A disadvantage of obstacle avoidance based on edge detecting is the need of the robot to stop in front of an obstacle in order to provide a more accurate measurement.
- It is not in human control.

- It is use for short distance only as ultrasonic sensor sense and find the object from 2cm-4m so used only for short distance.

FEATURES OF ULTRASONIC SENSOR:

- Compact and lightweight
- High sensitivity and high pressure
- High reliability
- Power consumption of 20ma
- Narrow acceptance angle

CONCLUSION:

It gives an opportunity to test mechanical and electronics and programming skills.

FUTURE ENCHANCEMENT IN PROJECT:

In future this project can be enhance by connecting bluetooth and a camera so that the user can see the detected obstacle on his screen by sitting at just one place

REFERANCE:

Amir attar, abishek Desai, shahid khan-“line follower and obstacle avoidance bot using Arduino” -international journal of Advanced computational engineering and networking Aug 1987.