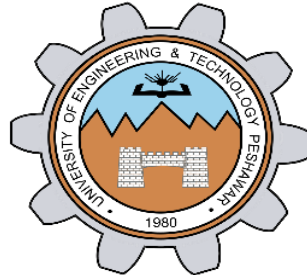


Project Proposal

Intelligent Vehicle Collision Detection System based on Ultrasonic Rangefinder and 8051 Microcontroller



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MBSD Lab

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"On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work."

Student Signature:

Submitted to:

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May 24, 2023

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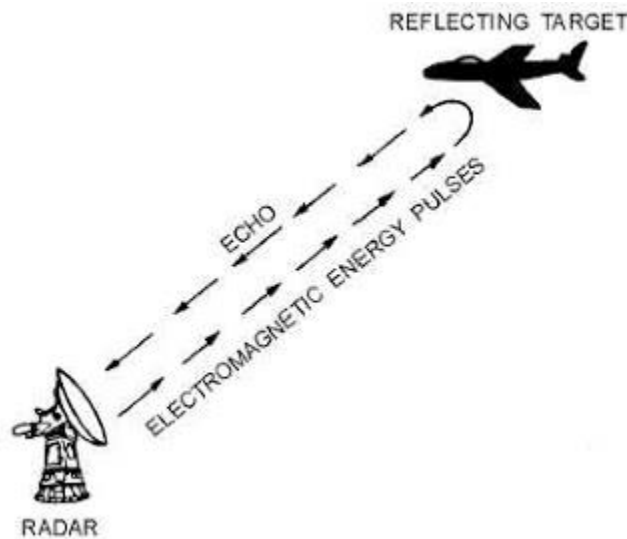
Intelligent Vehicle Collision Detection System based on Ultrasonic Rangefinder and 8051 Microcontroller

Introduction:

In this project, we have built an Ultrasonic Rangefinder using 8051 Microcontroller and Ultrasonic Sensor. We have different ways to measure the distance. One way is to use Ultrasonic Sensor or Module for distance measurement. This article explains you how to measure the distance using 8051 microcontroller. This Ultrasonic Range Finder system measures the distance up to 4 meters with an accuracy of 3 mm.

Working Principal:

Generally, the distance can be measured using pulse echo and phase measurement method. Here, the distance can be measured using pulse echo method. The ultrasonic module transmits a signal to the object, then receives echo signal from the object and produces output signal whose time period is proportional to the distance of the object. The mechanism of the ultrasonic sensor is similar to the RADAR (Radio Detection and Ranging).



This circuit calculates the distance of the object based on the speed of the sound wave at normal temperature and displays the distance on LCD.

Components Required for Ultrasonic Rangefinder

- AT89C51 Microcontroller
- 8051 Programming board
- Programming cable
- HC – SR04 Ultrasonic Module
- 16 x 2 LCD
- 10K Ω Potentiometer
- 10 μ F / 16V Electrolytic Capacitor
- 2 x 10K Ω Resistor (1/4 Watt)
- 0592 MHz Crystal
- 2 x 33pF Capacitors
- Push Button
- Connecting wires
- Power Supply
- Keil μ Vision Software
- Proteus



How Ultrasonic Rangefinder using 8051 Circuit works?

When HIGH pulse of 10 μ s is applied to the TRIG pin, the ultrasonic module transmits 8 consecutive pulses of 40 KHz. after transmitting 8th pulse the ECHO pin of the sensor becomes HIGH. When the module receives reflected signal from the object, the ECHO pin becomes LOW.

The time taken by the signal to leave and return to the sensor is used to find out the range of the object.

$$\text{Distance in centimeters} = (\text{Time}/58)$$

$$\text{Object distance in inches} = (\text{Time}/148)$$

Distance can also be calculated using speed of the ultrasonic wave 340m/s.

