

Automobile Radar System using Processing IDE

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Abstract- The primary result of this research paper is to design a protection system based on Ultrasonic sensor. The idea of making an Ultrasonic Radar appeared to us while viewing the technology used in defense and now even used in automobiles employing features like automatic / driverless parking system, accident prevention during driving etc. The applications of such have been seen recently in the self parking car systems launched like Volkswagen, Hyundai etc. and even the upcoming driverless cars by Google like WAYMO. The paper done by us can be used in any systems we may want to use like in-car, a bicycle or anything else. The use of Arduino in the project provides the flexibility of usage of above said module according to the requirements [1].

Keywords- Arduino, Automobile, Driverless, Parking system, Ultrasonic sensor.

I. INTRODUCTION

The word “radar” is a contraction derived from the words Radio Detection and Ranging. It refers to the technique of using waves to detect the presence of objects nearby us [2]. Today Radar is use for wide variety of applications including Weather Forecasting, in Air force, in Naval, in Army. In this project we use ultrasonic sensor which means we are using ultrasonic waves to identify the object. Those frequencies which are beyond the limit of human hearing i.e., above 20000 Hz(20 KHz) are called ultrasonic waves.

Moreover, in this fast-moving world there is an immense need for the tools that can be used of the betterment of the civilization and not devastating their lives. Hence, we divided to make some of the changes and taking advantages of the processing capabilities of Arduino [3].

The self driving cars were the background, whose technology let me think about automated parking system. The reason of accidents on road in India is due to carelessness of people while driving, they never care about the security and even many other nations. So, this thing let me to work over this problem and forced to take out a better solution to that by designing something that will cut the number of accidents as well as the carelessness of

the people. This idea will work in a way that it will scan continuously the traffic in the coming road and at the same time will alarming the driver for when to prevent accident as well as securing the car from getting minor scratches with the other vehicles..

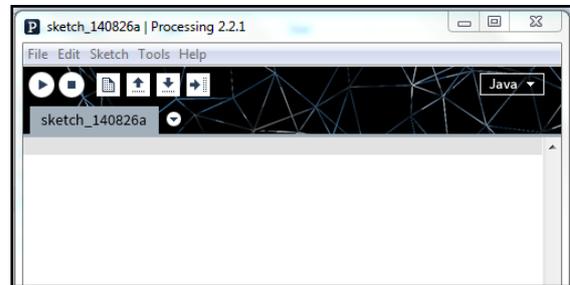


Fig. 1 – Processing module

II. COMPONENT USED

A. ARDUINO MICROCONTROLLER UNO

The arduino uno is a microcontroller board based on the atmega328. It has 14 digital input /output pins, 6 analog inputs, a 16mhz ceramic resonator, usb connection, a power jack, an icsp header and a reset button [1]s.

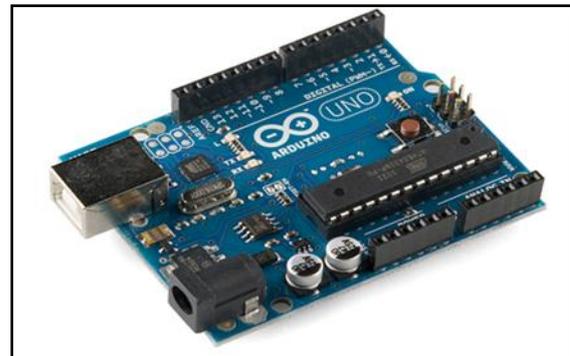


Fig. 2 – Arduino Uno

B. SERVO MOTOR

A servomotor is a rotational machine that allows for all kinds of angular moment, velocity, position and acceleration. It builds of an appropriate motor coupled to a sensor for location feedback [4]. It

also needs a comparatively advanced controller, often a dedicated module designed specifically for use with servomotors.



Fig. 3 – Servo Motor

C. ULTRASONIC SENSOR

Ultrasonic sensor conjointly referred to as transceivers, once they each send and receive, however added usually known as transducers [5]. It works on a principle like measuring device and navigational instrument that measure attributes of a target by decoding the echoes from radio or sound waves severally. Inaudible sensing elements generate high frequency sound waves and measure the echo that is received back by the sensor. Sensors calculate the measure between causation the signal associated receiving the echo to see the gap to an object [8].

Applications:

1. This technology may be used for measure wind speed and direction tank or channel level, and speed through air or water.
2. For measure speed or direction a tool uses multiple detectors and calculates the speed from the relative distances to particulates within the air or water.
3. To live tank or channel level, the sensing element measures the gap to the surface of the fluid.
4. Conjointly wetness, sonar, medical extremist, stealer alarms and non-destructive testing [9].



Fig. 4- Ultrasonic Sensor

D. PROCESSING IDE

Processing is an open supply artificial language and integrated development surroundings (ide) engineered for the electronic arts, new media art, and visual style communities with the aim of teaching the basics of programming in an exceedingly visual context, and to act the muse for electronic sketchbooks.

E. ARDUINO IDE

The arduino integrated development surroundings (ide) may be a cross-platform application written in java, and comes from the ide for the process artificial language and the wiring comes. It's designed to introduce programming to artists and alternative newcomers unacquainted software package development [7].

III METHODOLOGY

The aim of this project is to see an objects place on a axis victimization unhearable sensors. In fig.1 an unhearable device is employed to send a high frequency sound waves and record the time it takes for the mirrored sound to come back. The device then uses the time to calculate the space the article is from the device. $\text{Speed of sound} = \text{distance traveled} / \text{time}$. There square measure several sensible reasons why we might use sensors to find an object. Most gps (global positioning systems) use sensors to trace objects on the bottom. The article could also be automotive, a package, a ship embarrassed, etc. The ping unhearable device uses wave to seek out the space of an object. Once the wave hits an object, it reflects off the article. The article could also be directly before of the article or at an angle for the signal to be received. Because it has already been expressed the circuit consists of an unhearable transmitter and a receiver each of that work same frequency. They use unhearable electricity transducers as output and input devices severally and their frequency of operation is decided by the actual devices in use.

The transmitter is constructed around 2 nand gates of the four found in ic3 that square measure used here wired as inverters and within the explicit circuit they kind a multivibrator the output of that drives the electrical device. The trimmer p2 adjusts the output frequency of the transmitter and for bigger potency it ought to be created same because the frequency of resonance of the transducers in

use. The receiver equally uses a electrical device to receive the signals that square measure mirrored back to that the output of that is amplified by the electronic transistor tr3, and ic1 that may be a 741 op-amp. The output of ic1 is taken to the non inverting input of ic2 the amplification issue of that is adjusted by means that of p1[10]. The circuit is adjusted in such some way on keep in balance as long identical because the output frequency of the transmitter. If there's some movement within the space coated by the unhearable emission the signal.

That is mirrored back to the receiver becomes distorted and the circuit is thrown out of balance. The output of ic2 changes short and the schmitt trigger circuit that is constructed round the remaining 2 gates in ic3 is triggered. This drives the output transistors tr1,2 that successively provides a signal to the alarm or if there's a relay connected to the circuit, serial with the collector of tr1, it becomes activated. The circuit works from 9-12V dc might be used with batteries or an influence provide [6]

IV. APPLICATION

The various applications this could be used as:

1. This could be employed in planning for a driverless automotive or for a self parking automotive.
2. It helps the motive force in avoiding collisions or accidents by horrible him early.
3. In aviation, craft square measure equipped with radio detection and ranging devices that warn of craft or alternative obstacles in or approaching their path, show weather data, and provides correct altitude readings.
4. Marine radio detection and ranging accustomed live the bearing and distance of ships to stop collision with alternative ships, to navigate.

EQUATION

echo Pin = vi
 pulse Time = pulse In(echo Pin, HIGH);
 distance = pulse Time/58;
 num Readings = ten
 total = total + distance; average = total/num Readings.

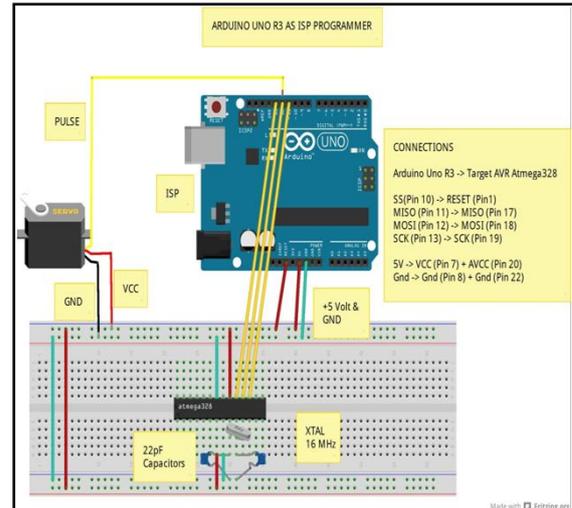


Fig. 5- Reference to the Arduino.

V. ADVANTAGES

1. Radio detection and ranging procurable value is extremely low.
2. The working and maintenance value is low at the reason behind moving elements.
3. Radar's jam is troublesome
4. Inaudible is little it simply works at anyplace whereas easy radar cannot work that place.
5. It s distance activity resolution is high.
6. Its activity updates in conclusion.
7. It additionally works in many varieties of weather and atmospherical conditions.
8. NASA uses radio detection and ranging to map the world and alternative plants.

VI. CONCLUSION

The idea of constructing associate inaudible radio detection and ranging seemed to United States of America because viewing the technology employed in defense, be it Army, Navy or Air Force and even employed in the cars using options like automatic/driverless parking systems, accident interference throughout driving etc [10]. The applications of such are seen recently within the self parking automotive systems launched by AUDI, FORD etc. And even the future driverless cars by Google like Prius and Lexus. The project created by United States of America is often employed in any systems we have a tendency to might want to use like in a very automotive, a bicycle or the rest. the utilization of Arduino within the project provides the flexibleness of usage of the above-said module in keeping with the wants.

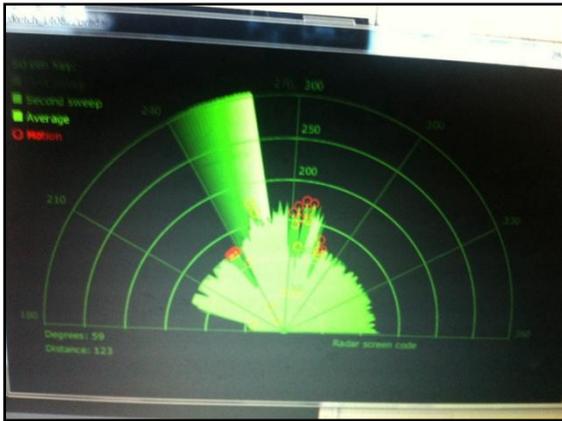


Fig. 6- radio detection and ranging Screen

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