# Ultrasonic Radar For Object Detection,Distance And Angle Measurement

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***Abstract-*** *We proposed the system by using "ultrasonic radar for the object detection, distance and angle measurement" .Ultrasonic are used to measure the distance and the servo motor to measure the angle .The distance and angle calculated by arduino, The signal is transmitted through USB cable to personal computer .This process is running continuously.The personal computer display the output through GUI using i3 processor.*

***Keywords***- Introduction, proposed system, existing system, modules,advantage,conclusion, reference.

## I. INTRODUCTION

RADAR is an object detection system which uses radio waves to determine the range, altitude, direction, or speed of objects. Radar systems come in a variety of sizes and have different performance specifications. Some radar systems are used for air-traffic control at airports and others are used for long range surveillance and early-warning systems. A radar system is the heart of a missile guidance system. Small portable radar systems that can be maintained and operated by one person are available as well as systems that occupy several large rooms. Radar was secretly developed by several nations before and during the World War II. The term RADAR itself, not the actual development, was coined in 1940 by United States Navy as an acronym for Radio Detection and Ranging. The modern uses of radar are highly diverse, including air traffic control, radar, astronomy, air-defense systems, antimissile systems, antimissile systems; marine radars to locate landmarks and other ships; aircraft anti-collision systems; ocean surveillance systems, outer space surveillance and rendezvous systems; meteorological precipitation monitoring; altimetry and flight control precipitation monitoring; altimetry and flight control systems; guided missile target locating systems; and groundpenetrating radar for geological observations. High tech radar systems are associated with digital signal processing and are capable of extracting useful information from very high noise levels.

## II. PROPOSED SYSTEM

- Our project to detect the object by using ultrasonic
- It much easier for fisherman to track the fishes

**Design and Fabrication:**

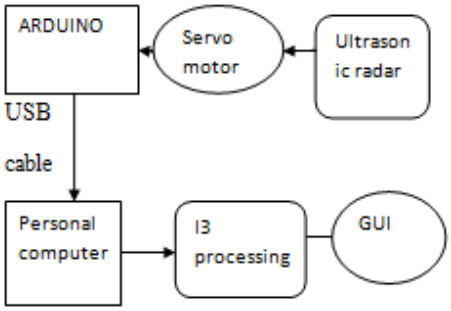



Fig1: block diagram

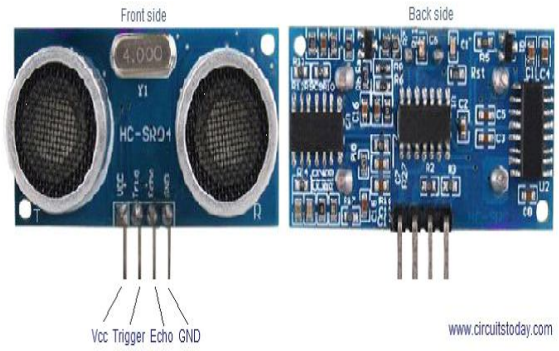
## III. SYSTEM COMPONENT

**Ultrasonic Sensor:**

Ultrasonic sensors [7] (also known as transceivers when they both send and receive, but more generally called transducers) work on a principle similar to radar or sonar which evaluate attributes of a target by interpreting the echoes from radio or sound waves respectively. Ultrasonic sensors generate high frequency sound waves and evaluate the echo which is received back by the sensor. Sensors calculate the time interval between sending the signal and receiving the echo to determine the distance to an object.

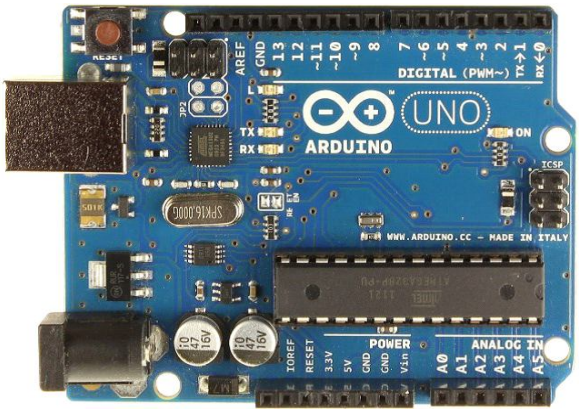
This technology can be used for measuring wind speed and direction (anemometer), tank or channel level, and speed through air or water. For measuring speed or direction a device uses multiple detectors and calculates the speed from the relative distances to particulates in the air or water. To measure tank or channel level, the sensor measures the distance to the surface of the fluid. Further applications include: humidifiers, sonar, medical ultra sonography, burglar alarms and non-destructive testing.

Systems typically use a transducer which generates sound waves in the ultrasonic range, above 18,000 hertz, by turning electrical energy into sound, then upon receiving the echo turn the sound waves into electrical energy which can be measured and displayed.



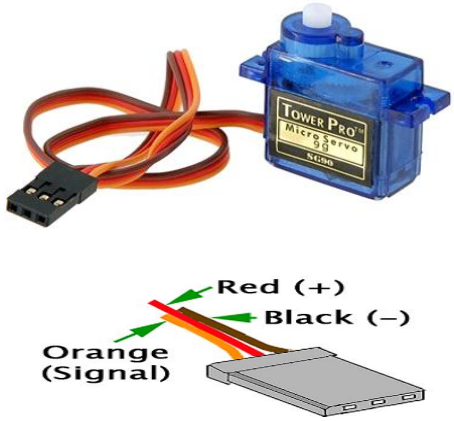

**Arduino UNO R3**

The Arduino Uno is a microcontroller board based on the ATmega328. It has 14 digital Input /Output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16MHz ceramic resonator, USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 programmed as a USB-to-serial converter.




**Servo motor**

A servomotor is a rotary actuator that allows for precise control of angular position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors. Servomotors are not a different class of motor, on the basis of fundamental operating principle, but uses servomechanism to achieve closed loop control with a generic open loop motor. Servomotors are used in applications such as robotics.

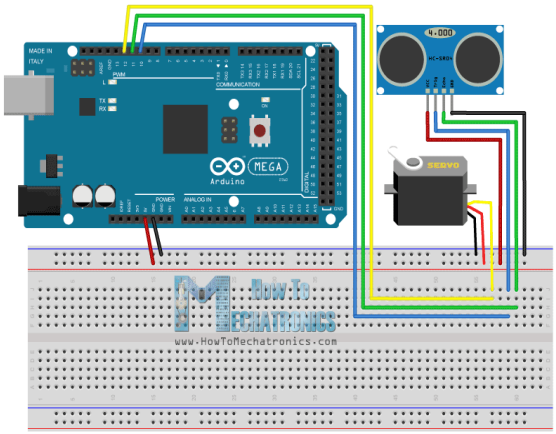



**Circuit Diagram:**

We connected the Ultrasonic Sensor HC-SR04 to the pins number 10 and 11 on the Arduino Board.

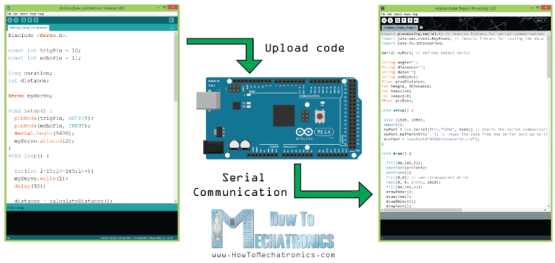
TrigPin = 10.
EchoPin = 11.

the servo motor to the pin number 12 on the Arduino Board. shows circuit structure for the project.
MyServo = 13.




**To Sketch and upload code**

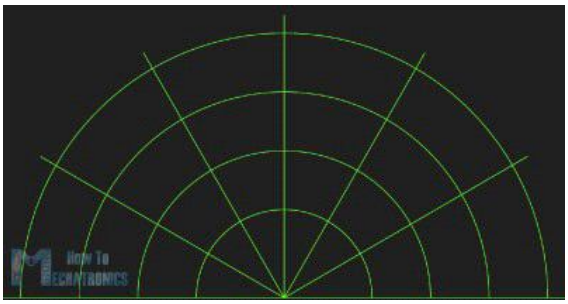
Then, we make a code and upload it to the Arduino board to enable the interaction between the Arduino and the Processing IDE Fig(12).




**Write and upload sketch to Processing**

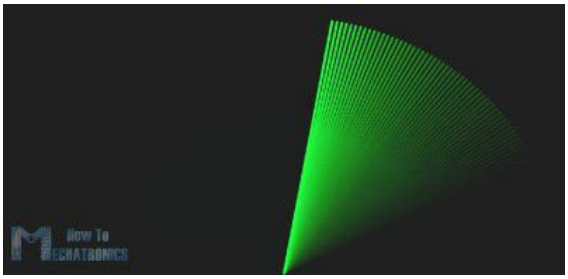
- The values for the angle and the distance measured by the sensor will be read from the Arduino board by the Processing IDE using the SerialEvent() function which reads the data from the Serial Port. These values will be used for drawing the lines, the detected objects and some texts.

- For drawing the radar display we make this function drawRadar() which consist of arc() and line() functions Fig(13).



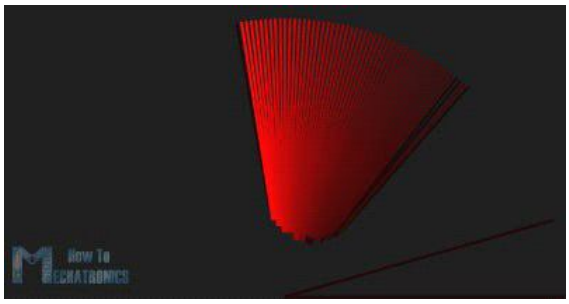
**Radar screen(1)**

For drawing the moving lines we make this function *drawLine()*. Its center of rotation is set with the *translate()* function and using the *line()* function in which the iAngle variable is used to redraw the line for each degree.



**Radar screen(2)**

For drawing the detected objects we made the *drawObject()* function. It receives the distance from the ultrasonic sensor, transforms it into pixels. Then, using the angle detected by the sensor it draws the object on the radar screen .

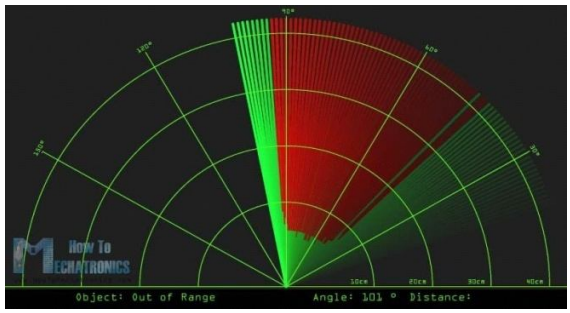


**Radar Screen(3)**

For drawing the detected objects we made the *drawObject()* function. It receives the distance from the ultrasonic sensor, transforms it into pixels. Then, using the angle detected by the sensor it draws the object on the radar screen .

- To illustrate the text on the screen, we make the *drawText()* function that draws texts on some particular locations. All of these functions are called in the main *draw()* function which is repeated in each iteration to draw the screen details.

We are using the *fill()* function with 2 parameters for simulating motion blur and slow fade of the moving line. Fig (16) shows the final appearance of the radar screen:




## IV. CONCLUSION

Radar is normally used to determine velocity, range, and position of an object. In this technical project, we read the distance and angles of detected objects in order to convert these data into visual information. The performance of our project is so good. It works smoothly to detect objects within the designed range. The screen shows the information clearly with enough delay for the user.

## REFERENCES

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