International Journal of Emerging Trends in Science and Technology
7(1) June 2021, 11-13
http://www.publishingindia.com/ijetst

Arduino UNO Based Distance and Altitude Measurement using Ultrasonic Sensor

G. N. Sachin Amreiss

Assistant Professor, Department of Electrical and Electronics Engineering,

M.Kumarasamy College of Engineering, Karur, Tamil Nadu, India.

Email: sachinamreissgn.eee@mkce.ac.in

Abstract - In this paper illustration of the designed prototype to improve the distance measurement system using ultrasonic waves and is linked to arduino. The distance from the sensor from the sensor is measured by the ultrasonic sensor. Measurement distance using Arduino Ultrasonic Sensor is a very simple project to measure short distance accurately. Before you start you should know about the Ultrasonic Sensor HC SR-04, which is a less expensive sensor. The ultrasonic sensor has Transmitter and Receiver modules. Part of the transmission releases the heartbeat and part of the receiver receives the heartbeat. If an obstacle is placed in front of the sensor, the transmitted pulse removes the obstruction and is visible in the rear. The displayed pulse is received by the receiver part. The time between transfer and acceptance is calculated. This data is processed to calculate the distance

Keyword: Sensor, Transmitter, Receiver.

I. INTRODUCTION

The prototype is to measure distance by using an ultrasonic sensor and Arduino. [1] This project is very simple in listening but it is complicated in the real life because in the real life any measuring distance tool are available but none of them are automatically so that we have make this project.in this project we have used Arduino Here in this project we have used ultrasonic sensor which working principle is very simple the transmitter transmit the high frequency noise and that wave is reflected by the block or thing then the wave turn back to the ultrasonic sensor and after that receiver receive that signal and microcontroller save that time and from that micro controller measure that distance by using the travel time of the wave here its needed to divide that time by two because wave travel two time to that distance so that it can get the accurate distance.[2] In day to day measurement systems which are used widely in vehicles such as cars, buses, and trucks of independent operating systems to prevent road accidents and to assist drivers when parking their vehicles is important. Industries make use of this system in machines such as robots, forks, wagons, etc. This operation can be performed with the usage of a distance measurement system.

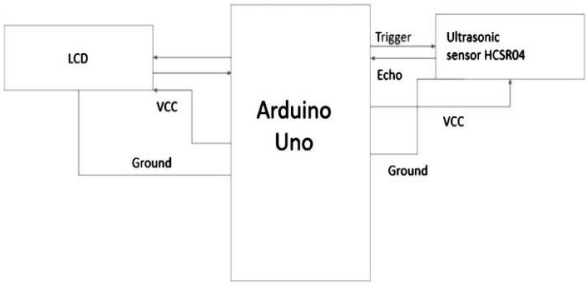

Fig 1.Block diagram of proposed system of distance measurement

II. PROPOSED SYSTEM

Description of Various block diagram MOSFET

MOSFET is required to control the speed of the vehicle. MOSFET is turned on and off on high frequency oil and as the vehicle is connected to the MOSFET series and discharge; The PWM value of the voltage determines the speed of the vehicle. Arduino

- Provide the current value required to unlock the lock.

Turn On Transistor Turn on.

- Control the speed of DC Motors with Potentiometer using System.

The Fig.1 shows the content diagram of the prototype of the system in which circuit Prameters are planned.The fundamental of ultrasonic sensors are like the RADAR system. This sensor has one transmitter and one receiver drum like structure for the data transmission. When the sender sends a low level signal to the signal once the signal reaches the it rmaterial returns to the receiver. Their ability to calculate the distance using time signal travel in the air.[3] This is an effective system of ultrasonic sensor configuration.

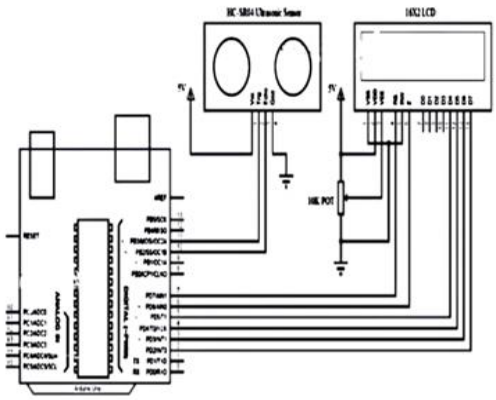

Fig.2.Circuit diagram of the system

The prototype is shown in Fig. 2. Which uses two ultrasonic transducers containing 1 transmitter component and 1 receiver component. The transmitter can provide an ultrasonic sound of 40 KHz frequency while the main receiver is a design for receiving only 40KHz sound waves. signal towards the ultra sonic receiver part in the system. The system is mainly written in MC to calculate the distance from the ultrasonic module. The distance measured on the LCD indicates the distance to the ems.

Ultrasonic devices (also known as transceivers) operate on the same principle as the radar or sonar sensor Ultrasonic generators produce high frequency sound waves and detect echo sensors.[4] Ultrasonic generators use pipe materials such as zinc or lead zirconium tartrate or quartz crystal. the density of the material determines the frequency of the resonant when inserted and excited by the electrodes attached to its side.

Medical scanners used for abdominal or heart ultrasound are designed at 2.5 MHz. In this region, a 40 kHz transducer is used to detect an object in the air. Standard LCDs are connected to 16x2 microcontrollers and 20x2 displays. The lists 16 characters per line for 2 lines and 20 characters per line for 2 lines, respectively.The standard is called HD44780U, referring to -chip controller that receives data from an external source and communicates directly with the LCD.

III. Result and Discussion

A. Hardware Implementation

In this prototype ,first take the motherboard.Connect the Arduino in the motherboard.Both ultrasonic sensor and LCD are connected in the ArduinoHence ,the circuit is ready for calculating the distance. This helps to measure the distance of building and mapping it without any measuring tapes.Also it helps instance decision making for which best possible. [5] Though initial results vary approximation gives best possible outcome.

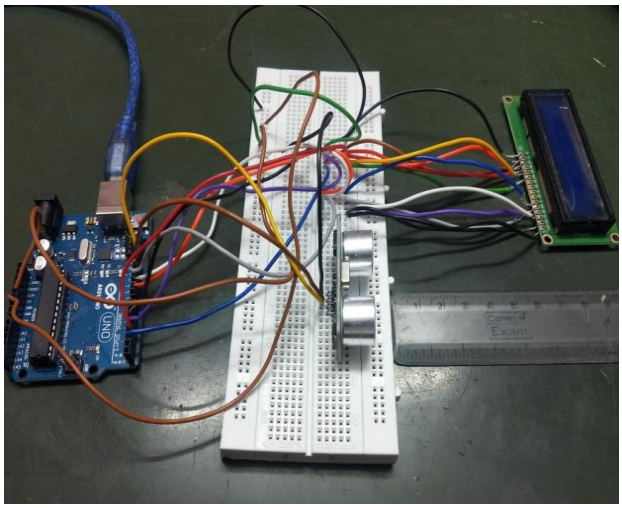

Fig.3.Experimental Setup of prototype

The high-level signal is sent to 10 microseconds using Trigger.

- The module sends 40 KHz signals automatically and then detects whether the pulse is received or not through Echo.
- If the signal is received, then it is through the high level. The time of high duration is the time gap between sending and receiving the signal is calculated.

Thus Fig.3. shows the sample measurement for measuring distance of the building in terms of height.

FORMULA ~ Distance = (Time x Sound speed in Air (340 m/s))/2.

Thus, the measurement of distance and altitude of buildings and any type of huge machines can be

just scanned and determined by means of ultrasonic sensor in terms of time with respective speed.

IV. Conclusion

The device calculates the distance with precision and accuracy Ultrasonic advanced distance meter is less expensive, which is a simple distance measurement device. So ultrasonic distance meter is a very useful tool. Basically the above topology helps to yield precision measurement of height, altitude, distance and width of building, vehicles and instruments without touching or contacting it by means of any instrument. In future scope it is possible to measure mass and ageing of buildings.

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