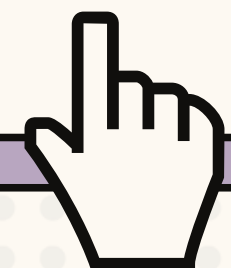


DISTANCE MEASUREMENT SYSTEM OF OBJECT BY ULTRASONIC SENSOR



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**PRESENTED BY
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INTRODUCTION

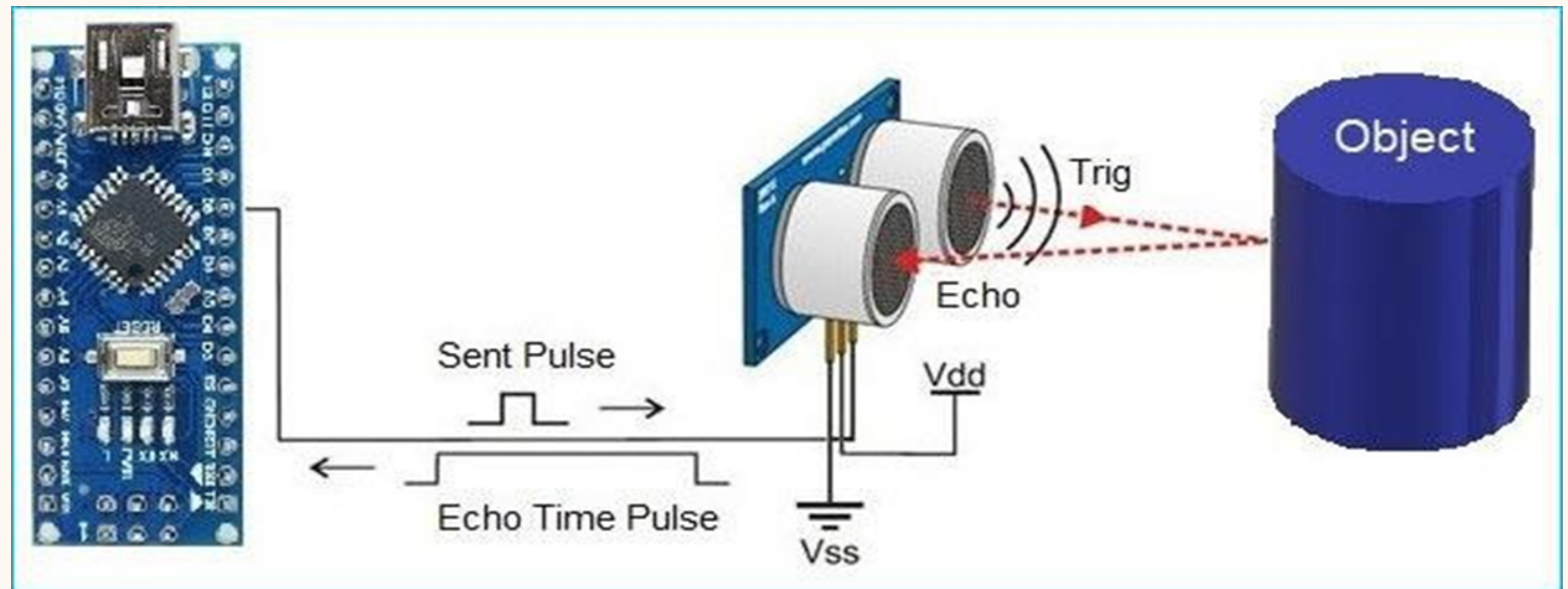
·A distance detector is any device capable of measuring the distance between two points. The origin the distance between two points. The origins of distance measurement by means of graduated lengths of material such as chain, tape measure. Basically, this ultrasonic technology is based on ultrasound and a common use of ultrasound is in range finding that perfectly related to the objective. Properties of ultrasonic waves like reflection, transmission over large distances with no appreciable loss of energy make it suitable for distance measurement. Ultrasonic waves are suitable for both air and underwater. The accurate measurement of distance is major subject of study in the field of engineering and technology.

LITERATURE REVIEW

Sr. No.	Author	Description
1	Manpreet Kaur, Jai Pal (2019)	The paper proposed to build an efficient module that consists of ultrasonic sensor HC-SR04 with 89s52 microcontroller for distance measurement. This device make the use of microcontroller for calculation of distance and displaying the obtained results on LCD The experimental setup and result are described. And <u>sensors's</u> maximum range of object detection is 4m.
2	Mohammed Sufyan MOHAMMED (2017)	In this paper, a prototype of distance measurement and object detection system was designed and implemented successfully using Zigbee technology and ultrasonic sensing technology. This system can monitor a particular area and detect the location, direction and distance of the object that comes its way and convert it into a model that can be visually represented.
3	Prakhar Shrivastava, Praveen Kumar, Ankit Tiwari (2014)	The importance of the project is calculating accurate distance from any obstacle that we want to measure. The device can be used in many different fields and categories like distance calculation in construction field, robots, car sensor to avoid obstacles and many other applications. The building process of the device was based on using as much as possible from the courses taken in the university, like Micro Processor.

PROBLEM STATEMENT

A low cost distance measurement system using ultrasonic sensor which works good in different light condition and has the capability to detect the both distance and location of the object.



MOTIVATION

- Nowadays, we have some difficulties in obtaining the distance that we want to measure.
- Even though, measuring tape is an easy option, but this kind of tool will have a limitation of manual error. Before this, engineers have produced a range finder module but, in the end, they find out the module have many disadvantages like limitation for distance, different result for different coloured obstacles, and need a calibration for every time before starts using it.
- Manual distance measuring is always done at the expense of human error. Precise and fix measurement of low range distance, is the main objective for this project. So, to solve the problem of distance measurement and to get accurate value this project is used to measure distance using ultrasonic sensors.

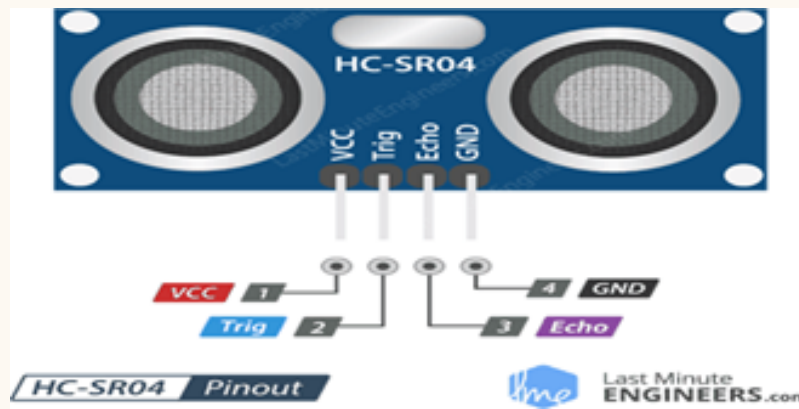
OBJECTIVES

- The main objective of the project is to provide useful and low-cost measurement system that is easy to configure and handle.
- Precise and fix measurement of low range distance
- To measure a distance at any obstacle.
- Operating range of 0.5m up to 2m with an accuracy of 1 cm.

METHODOLOGY

- Object is sensed by ultrasonic sensor by emitting ultrasonic waves.
- The data is sent to Arduino uno which further calculates the distance according to the given formula $[\text{distance (cm)} = 0.017 * \text{duration (us)}]$.
- Then the Arduino uno displays the calculated distance on the 16 x 2 LCD.
- So keeping these applications in mind, the Ultrasonic Sensor is a great tool to measure distances without making any physical contact for small distances. They use the concept of ECHO to measure the distance. In this project, we'll learn how to measure the distance by interfacing HC-SR04 sensor module with Arduino and display the distance on a 16×2 LCD

REQUIRED COMPONENTS



Ultrasonic sensor



Arduino Uno



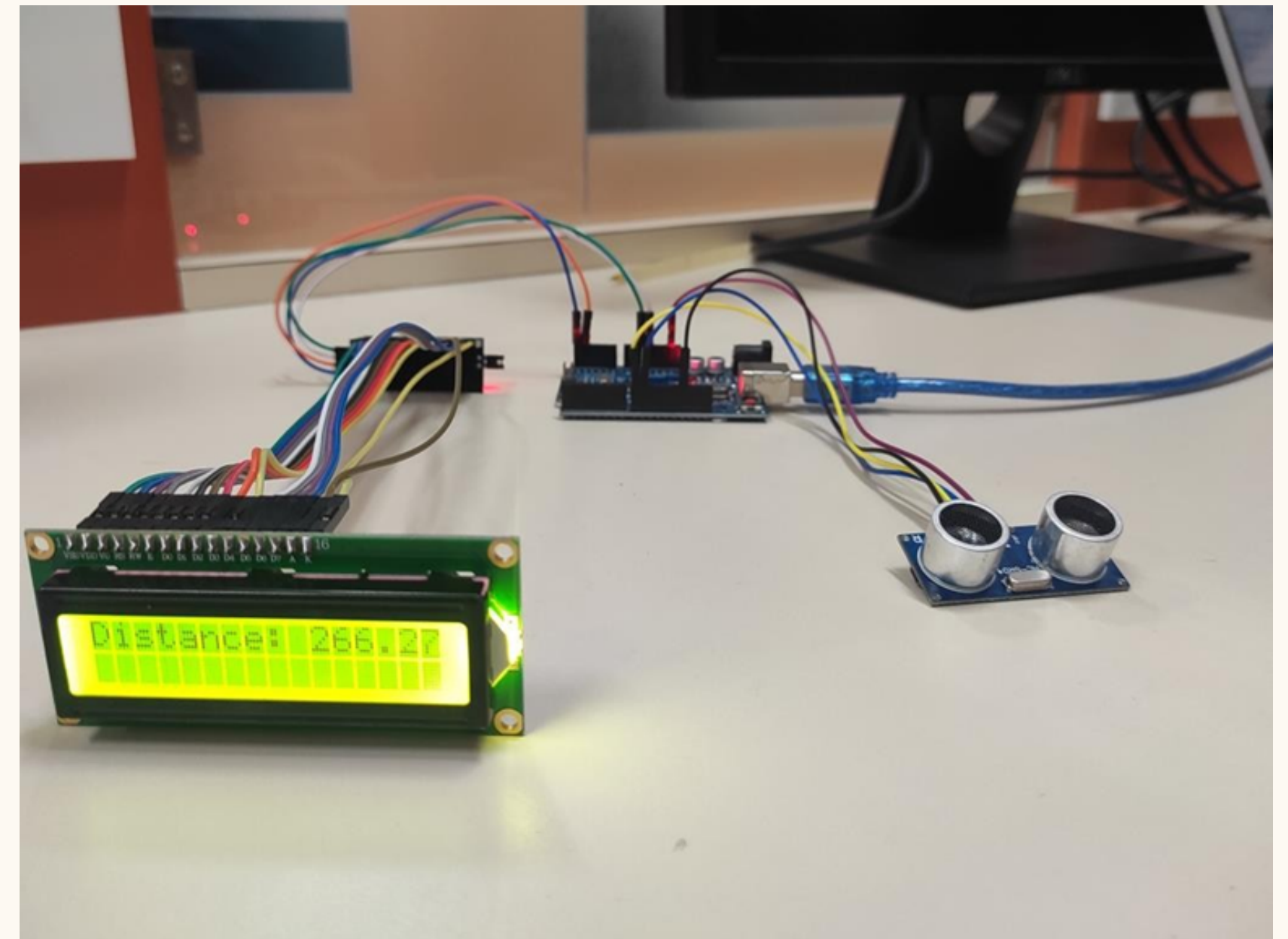
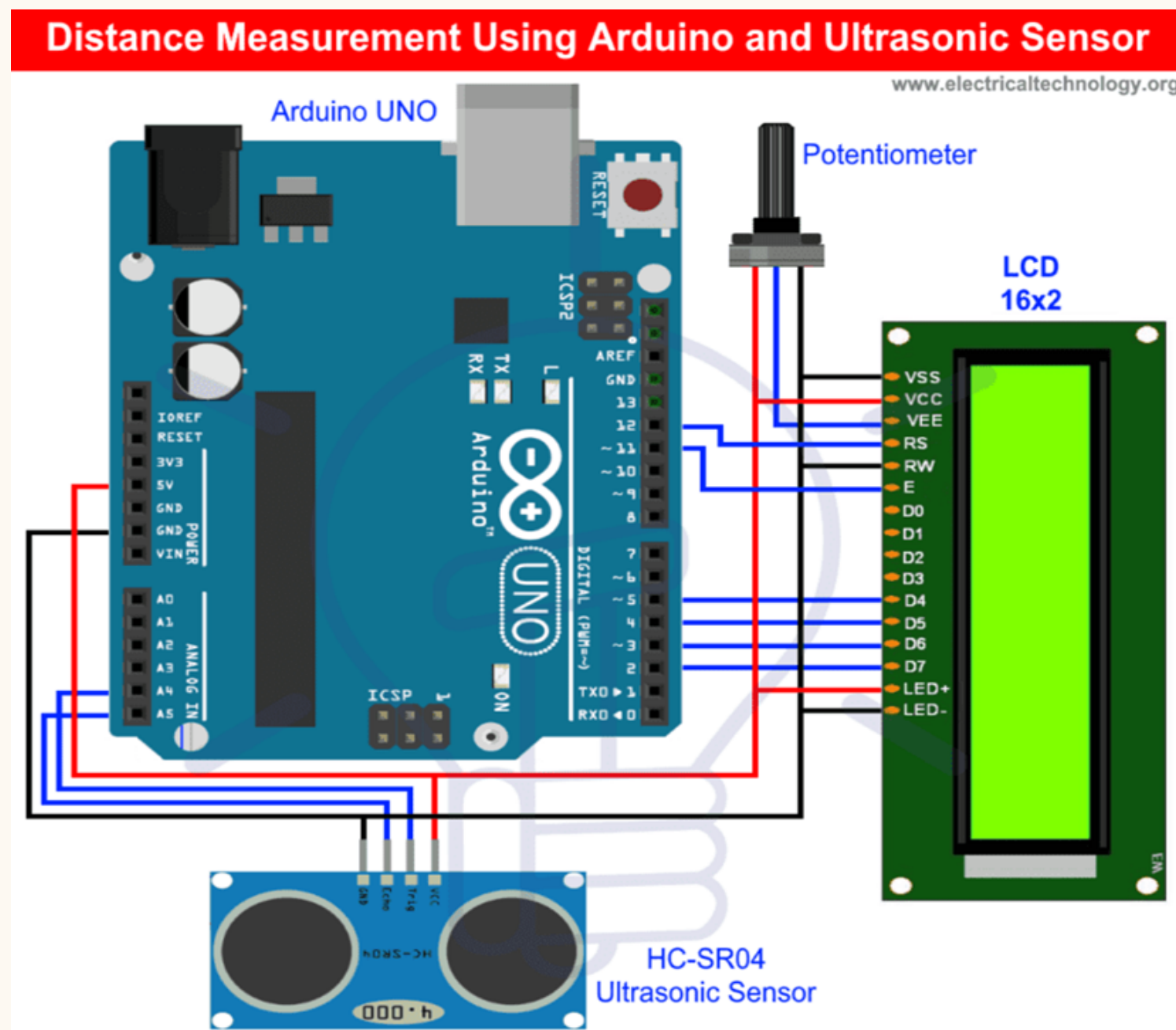
I2C Model



LCD
Display

Software Used - Arduino IDE

CONSTRUCTION



EXPERIEMENTAL RESULTS

S. NO.	THEROTICAL VALUE	CALCULATED VALUE
1	10 cm	9.9965 cm
2	50 cm	50.1253 cm
3	100 cm	99.8005 cm
4	180 cm	180 cm

APPLICATIONS

1. **Used in vehicles**
2. **Vacuum cleaners**
3. **Object detecting device created for blind people**



CONCLUSION

- This Ultrasonic distance measurement technique is low cost and simple. It is handy system for non-contact measurement of distance. The device calculates the distance with suitable accuracy and resolution.
- This device has application in many fields. Besides, the application of ultrasonic sensors are wider than infrared sensor in robotic or any application.
- Future enhancement can be done by considering specific object's material or condition in order to avoid unnecessary error.

FUTURE SCOPE

- The interest for ultrasonic sensors is likewise expanding for sanitization bands as they have inbuilt closeness sensors. Implementation of a smart social distancing band using these ultrasonic sensors can be done efficiently.
- When a person is approaching towards us and is not maintaining 6 feet distance then the sensors can sense the person in front of us and can alert the user that the person in front of us is not maintaining social distancing. Implementation of a smart parking system with ultrasonic sensors can also be done.
- When an obstacle is near to the vehicle then the sensors will alert the driver that there is an obstacle at some particular distance. There are many applications where ultrasonic sensors can be used and the demand for ultrasonic sensors are increasing rapidly.

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