Design & development of an LED distance indicator

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Abstract

The work presented in this paper highlights about the design & development of an LED indicator for various of engineering applications. The project is designed to develop distance measurement system using ultrasonic waves and interfaced with Arduino. We know that human audible range is 20hz to 20khz. We can utilize these frequency range waves through ultrasonic sensor HC-SR04.The advantages of this sensor when interfaced with Arduino which is a control and sensing system, a proper distance measurement can be made with new techniques. As large amounts are spent for hundreds of inflexible circuit boards, the Arduino will allow business to bring many more unique devices. This distance measurement system can be widely used as range meters and as proximity detectors in industries. The hardware part of ultrasonic sensor is interfaced with Arduino. This method of measurement is efficient way to measure small distances precisely. The distance of an obstacle from the sensor is measured through ultrasonic sensor. After knowing the speed of sound the distance can be calculated. The work presented here is the mini-project work of the second semester engineering students of electronics & communication engineering department of Dayananda Sagar College of Engg., Bangalore, Karnataka.

Keywords— PWM, RF, Transmitter, Receiver, LED, Ultrasonic sensing, Arduino.

1. Introduction to the work

Today's the developing world shows various adventures in every field. In each field the small requirements are very essential to develop big calculations. In earlier days the measurements are generally occur through measuring devices. But now a day's digitalization as is on height. Therefore, we use a proper display unit for measurement of distance. We can use sources such as sound waves which are known as ultrasonic waves using ultrasonic sensors and convert this sound wave for the measurement of various units such as distance, speed [1]. This technique of distance measurement using ultrasonic in air includes continuous pulse echo method, a burst of pulse is sent for transmission medium and is reflected by an object kept at specific distance. The time taken for the sound wave to propagate from transmitter to receiver is proportional to the distance of the object [8]. In this distance measurement system we had ultrasonic sensor HC-SR04 interfaced with arduino UnoR3. Programming and hardware part of ultrasonic sensor interfacing with arduino UnoR3 [9]. are also used in it. Gas sensors are used to detect the toxic gases, a Metal detector is used to detect bomb. Ultrasonic sensor is used to find the distance of the object or person in a certain proximity [2].

2. Proposed methodologies adopted

The Fig. 1 gives the overall block diagram of the LED indicator that is being developed as an mini project by us. It consist of an ultrasonic sensor, an Arduino microcontroller board, a sensor and a computer for processing of the programs that has been written [10].
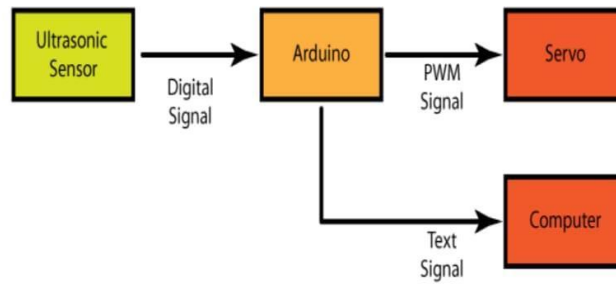
Fig. 1 : Overall block diagram of the mini project that is developed

3. Above block diagram of the mini project

Most ultrasonic sensors are based on the principle of measuring the propagation time of sound between send and receive (proximity switch) [11] [3].
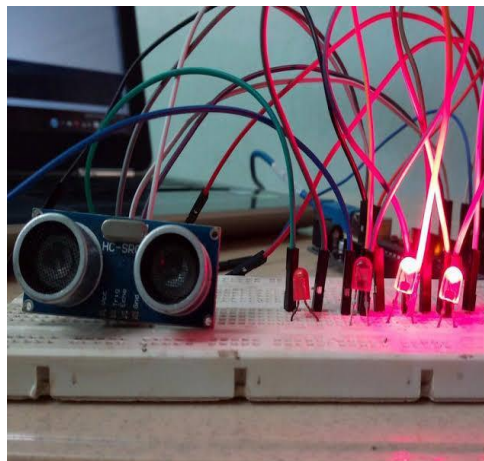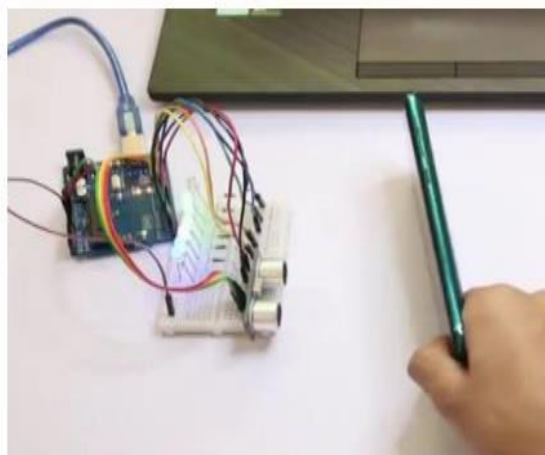

Fig.1 : Photographic view of the LED indicator

Fig. 2 : Bread board connection of the LED indicator mini project-1

4. Examination of the many papers

Today's the developing world shows various adventures in every field. In each field the small requirements are very essential to develop big calculations. In earlier days the measurements are generally occur through measuring devices. But now a day's digitalization as is on height [12]. Therefore, we use a proper display unit for measurement of distance. We can use sources such as

sound waves which are known as ultrasonic waves using ultrasonic sensors and convert this sound wave for the measurement of various units such as distance, speed [4] [5].

5. Experimental results

Fig. 1 gives the photographic view of the LED indicator, whereas the Fig. 2 gives the bread board connection of the LED indicator mini project-1. The Fig. 3 gives the bread board connection of the LED indicator mini project-2, while the Fig. 4 gives the circuit diagram connection of the LED indicator designed & developed by the mini project team.
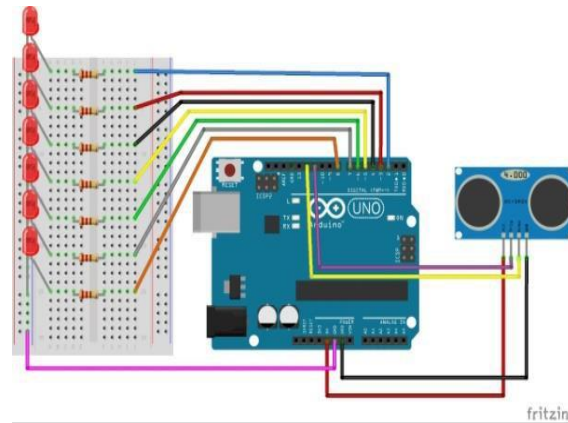

Fig. 3 : Bread board connection of the LED indicator mini project-2

6. Conclusions / conclusive remarks of the survey

A LED indicator was designed & developed by the mini project students which could be used for a host of telescience applications. In this project, a distance measurement system is developed using ultrasonic sensors interfaced with Arduino [13]. This sensor when interfaced with Arduino which is a control and sensing system, a pro per distance measurement can be made with new techniques. Arduino will allow business to bring many more unique devices in a nominal rate , since large amounts are spent for hundreds of inflexible circuit boards. The hardware part of ultrasonic sensor is interfaced with Arduino and the code is written in embedded c language [6]. The distance of an obstacle from the sensor is measured and speed of sound is calculated using this information.This is a very efficient method to measure small distances in a precise manner.This distance measurement system can be widely used as range meters and as proximity detectors in industries. This distance measurement system can be widely used as range meters and as proximity detectors in industries is utilized. Ultrasonic sensor HC SR04 id used here [7].

References

[1]. Siri Ravinath, Supriya S., Aruna Rao B.P., Department ECE, Bangalore Institute of Technology, Bangalore, July 2021, with research on why sensor cannot work in vacuum, IARJSET ISSN (Print) 2394-1588, International Advanced Research Journal in Science, Engineering and Technology, Vol. 8, Issue 7, July 2021

[2]. Paper published by Mrs. S.R. Pawar, MIT academy of engineering, Pune, Department of electronics and communication engineering, August 2021, IARSJET.

[3]. Paper published by Prakhar Shrivastava, Praveen Kumar, Ankit Tiwari in June 2021, IARJSET.

[4]. Paper written by Siri Ravinath, Supriya S., Aruna Rao B.P., LED distance indicator literature survey, Department of electronics and communication engineering Institute of technology, Bangalore July 2021.

[5]. Pallavi R. Bhat, Pavithra G, Dr. T.C. Manjunath, "Design and development of navigation system for the blind people using image processing", JASC: Journal of Applied Science and

Computations, ISSN NO: 1076-5131, ISO 9001:2008: Certified, JASC Approved By: UGC,NSL, NISCAIR, CSIR, Volume V, Issue XII, pp. 993-1002, IF - 5.8, Paper id 141, An ISO 7021 : 2008 Certified Journal, DOI : 16.10089/JASC, DOI:16.10089.JASC.2018.V5I12.453459.1500226, UGC Approved Journal- 41238, Dec. 2018.

[6]. Pallavi R. Bhat, Pavithra G, Dr. T.C. Manjunath, "Development of a GUI for finding the moments of objects in a image using shape analysis", JASC: Journal of Applied Science and Computations, ISSN NO: 1076-5131, DOI:16.10089.JASC.2018.V5I12.453459.1500227, ISO 9001:2008: Certified, JASC Approved By: UGC, NSL, NISCAIR, CSIR, Volume V, Issue XII, pp. 1003-1008, IF - 5.8, Paper id 142, An ISO 7021 : 2008 Certified Journal, DOI : 16.10089/JASC, UGC Approved Journal- 41238, Dec. 2018.

[7]. Pavithra G., Dr. T.C.Manjunath, "Raster scanning approach of pattern matching techniques", Int. Journal of Research Engg. & Tech. (IJERT), Journal Paper No. IJERTCONV6IS13013, Impact Factor 7.86 (2018-19), ISSN: 2278-0181, Volume 6, Issue 13, pp. 1-3, Special Issue April 2018.

[8]. Manpreet Kaur & Jai Pal, "Distance Measurement of Object by Ultrasonic Sensor HC-SR04", JSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 05, ISSN (online): 2321-0613, 2015.

[9]. J. David and N. Cheeke, "Fundamentals of ultrasonic waves", CRC Press, Florida, USA, 2002, ISBN 0-8493- 0130-0

[10]. H. He, and J. Liu, "The design of ultrasonic distance measurement system based on S3C2410," Proceedings of the IEEE International Conference on Intelligent Computation Technology and Automation, Oct. 2008.

[11]. Tarek Mohammad, "Using Ultrasonic and Infrared Sensors for Distance Measurement", World Academy of Science, Engineering and Technology, Volume 3, March 2009

[12]. O'Daly, B., Morris, E., Gavin, G., O'Byrne, J., McGuinness, G. "High-power low-frequency ultrasound: A review of tissue dissection and ablation in medicine and surgery" Journal of Materials Processing Technology, Volume 200, Issues 1-3, Pages 38-58. 8 May 2008

[13]. Xiao Chen, Chenliang Wu, "Ultrasonic Measurement System with Infrared Communication Technology", Journal of computers, Volume 6, No. 11, November 2011.