

Social Distancing Protocol Using Arduino

Panthangi Sai Lohith

Department of Electronics and communication Engineering
Sreenidhi Institute of Science and Technology
Hyderabad, India.

Abstract- In view of the current situation the COVID-19 has become ubiquitous in every corner of the world. We must aim at preventing the community spread of the virus. To achieve this we must make sure a proper social distance is maintained from individual to individual. To make sure that a proper social distance is maintained from individual to individual I came up with the idea of social distancing device using Arduino uno. The main aim of this is to make sure a proper distance is maintained among individuals so that community spread of virus can be diminished. Here ultrasonic sensors are installed on three sides of the cap so it that measure the min imum distance to be maintained by the individual in 360 degrees. Also a buzzer is installed which alerts the individual by giving a buzzer upon not maintaining a minimum distance. I used Arduino uno along with ultra sonic sensors and buzzer to indicate alerts.

Keywords- Arduino uno, ultrasonic sensors, buzzer.

I. INTRODUCTION

Social distancing is a term for non-pharmaceutical infection prevention and control intervention implemented to avoid/decrease contact between those who are infected with a disease-causing pathogen and those who are not, so as to stop or slow down the rate and extent of disease transmission in a community. This eventually leads to decrease in spread, morbidity and mortality due to the disease. This propounds a low priced prevention device based on sensor minimal effort framework for home applications in ultrasonic sensors has been actualized to detect the distance through the recognition by sensor. So, this is a simple project which will show major effect on to society and helpful in maintaining social distancing in this pandemic situation.

II. LITERATURE SURVEY

The main principle in this protocol is the ultrasonic sensing feature, the Ultrasonic transmitter transmits an ultrasonic wave, this wave travels in air and when it gets objected by any material it gets reflected back toward the sensor this reflected wave is observed by the Ultrasonic receiver module.

Now, to calculate the distance using the above formulae, we should know the Speed and time. Since we are using the Ultrasonic wave we know the universal speed of US wave at room conditions which is 330m/s. The circuitry inbuilt on the module will calculate the time taken for the US wave to come back and turns on the echo pin high for that same particular amount of time, this way we can also know the time taken.

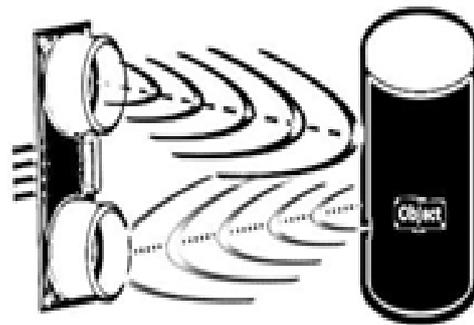


Fig.1 Ultrasonic reflections.

III. BACKGROUND

Module separates into 3 modules:

1. Sensing module:

In this protocol we use ultrasonic sensor HC-SR04, which is best opted for Arduino uno. Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

The basic principle of work:

- Using IO trigger for at least 10us high level signal,
- The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.
- IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic to returning. Test distance = (high level time × velocity of sound (330M/S) / 2.



fig2 Ultrasonic sensor.

2. Alarm module:

There are many choices for the communicating information between product and user. One of the most common choices is buzzer usage in system. Understanding some of the technologies and configurations of buzzers is useful during the design process, so in this we will describe typical configurations, provide example buzzer tones, and present common drive circuit options. Buzzers are a simple and inexpensive means of providing communication between electronic products and the user. Piezo and magnetic buzzers are used in similar applications with the primary differences being that magnetic buzzers operate from lower voltages and higher currents than their piezo buzzer counterparts, while piezo buzzers offer users higher SPLs in generally larger footprints. Buzzers configured as indicators require only a dc voltage to operate but are limited to a single audio frequency of operation, whereas transducers require external circuitry, but provide a wider range of audio frequencies.

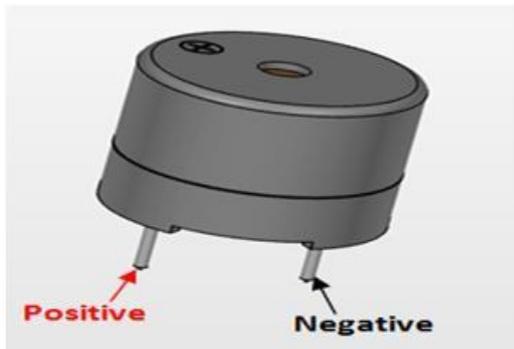


Figure 3 buzzer.

2. Arduino uno:

The Arduino Uno is an open source micro-controller board based on the Microchip ATmega328p micro-controller and developed by the source Arduino.cc. The board is equipped with sets of digital and analog (I/O) pins that may be interfaced to various (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9v battery, though it accepts voltages between 7 and 20 volts. This board comes with all the features required to run the controller and can

be directly connected to the computer through usb cable that is used to transfer the code to the controller using software IDE (Integrated development Environment) software, mainly for development of Arduino . IDE is equally compatible with Windows, MAC or Linux Systems, however, Windows, MAC is preferable to use. Programming languages like C and C++ are used in IDE.

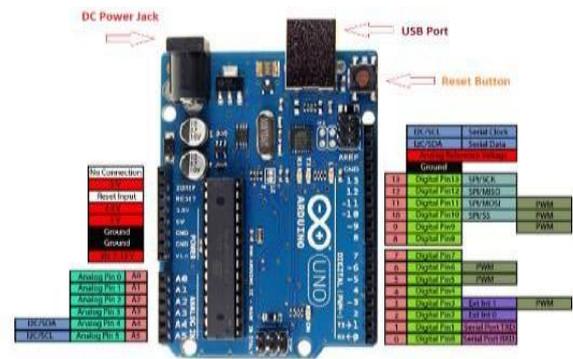


figure 4 Arduino uno pin layout.

IV. WORKING

Now, with the help of Arduino uno we can connect buzzer and ultrasonic sensors to the available out ports of the Arduino. So, in order to start the Arduino we have to dump\insert the code for the functioning of pins in the Arduino. Programming languages like c,c++ are used. Arduino IDE is a special software running on your system that allows you to write sketches (synonym for program in Arduino language) for different Arduino boards. The Arduino programming language is based on a very simple hardware programming language called processing. Every Arduino sketch has two main parts to the program:

- Void setup () – Sets things up that have to be done once and then don't happen again.
- Void loop() – Contains the instructions that get repeated over and over until the board is turned OFF.

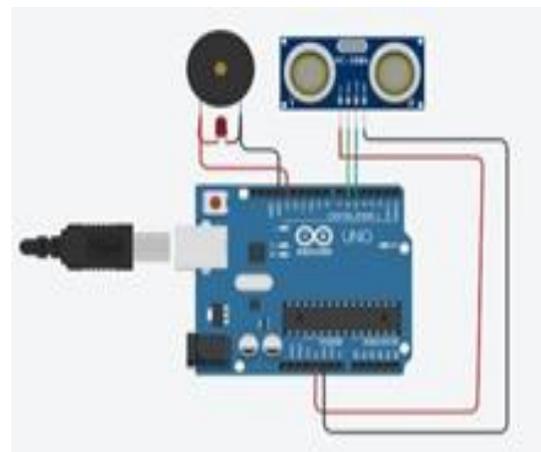


Figure 5 protocol layout.

V. OUTCOMES AND REVIEW

Most people who get COVID-19, the illness caused by the new coronavirus, experience mild to moderate symptoms, including fever, cough and shortness of breath, experts say. But for some people, the disease can be far worse. And early data show that older adults and individuals with underlying health conditions such as diabetes, heart disease and lung disease are more likely to experience severe illness, even death. Staying home as much as possible and avoiding crowded spaces even if you are young, healthy and symptom-free helps reduce the risk of infection in the high-risk population. So, developing this sensing setup to our caps or belt, we can maintain proper social distancing and get rid of this ubiquitous situation.

VI. CONCLUSION

Hence Framework of this Project is very efficient in saving our lives from this pandemic situation which we are facing due to COVID-19. In this paper, I just tried to help the society to fight against COVID-19. In the absence of a vaccine for COVID-19, social-distancing is the only solution left with human beings. Hence, in this paper, I have tried to use the Ultrasonic sensors for human distancing. In case of any emergency interaction or in any other circumstances when interaction cannot be avoidable by using this device, the users can maintain a safe distance from each other. The alarming system warns the human when they cross the threshold minimum safe distance.

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