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Social Distancing Detector And Indicator Using Arduino

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ABSTRACT: The rampant coronavirus disease 2019(COVID-19) has brought global crisis with its deadly spread almost all countries. The absence of any active therapeutic agents and therefore the lack of immunity against COVID19 increases the vulnerability of the population. Though prevention is better than cure, social distancing is the best & feasible approach to fight against this pandemic. One of the foremost important practice in these outbreaks is to make sure a secure distance between people publicly. This tool could assist the efforts of the governments to regulate the virus. Itare often implemented in closed areas or institutions, monitor the extent of people's commitment, and supply analysis and a faster approach to detect possibly corona suspicion cases. The results showed the success of our approach in detecting the distance with accuratemeasures of the important world coordinates. Motivated by this notion, we have created this distance detector to find the people are maintaining the rules.

Keywords: Arduino UNO, Ultrasonic sensor, social distance, Corona virus

1. INTRODUCTION

Coronaviruses are a type of RNA virus that infects all living things and causes sickness. They inducerespiratory tract infections in humans, which can lead to breathing difficulties. Some cases of the common cold (which can also be caused by other types of influenza viruses) cause mild symptoms in humans, whereas other Cov strains can cause SARS, MERS, and other disorders. COVID was first infected in animals in the late 1920s, causing respiratory diseases in them throughout North America. In North Dakota, Arthur Schalk and M.C. Hawn published the first detailed report on a new COVID-related respiratory infection in 1931. Infectious bronchitisvirus was the name given to this virus afterwards(IBV). In 1937, Charles D. Hudson and Fred Robert Beaudette were the first to successfully culture the virus. In mice, JHM and MHV, two new animal coronaviruses, were found. Animal coronaviruses were discovered in large numbers in the 1960s. Coronaviruses were given their name because of their unusual physical appearance. Human coronavirus 229E and human coronavirus OC43 were investigated further in later decades. Other human coronaviruses, such as SARS-CoV in 2003, HCoV NL63 in 2003, HCoV HKU1 in 2004, MERS-CoV in 2013, and SARS-CoV-2 in 2019, have been identified after decades in the 1920s.

2. LITERATURE SURVEY

[1] Created to determine the safe distance between individuals in public places. In this study, the deep CNN approach and computer vision techniques are used. Initially, the pedestrian in the video frame was detected using an open-source object detection network based on the YOLOv3 method. Only the pedestrian class was used as a result of the detection, and other object types were ignored in this application. As a result, the bounding box that bestfits each identified pedestrian can be drawn in the image, and this data will be utilized to calculate distance.

[2] Focused on a video of a street view of people is given as input, and it produces a video with rectangular boxes surrounding each person, with red highlighting the boxes where social distancing norms are breached and green highlighting the boxes where social distancing norms are broken. The solution also generates a bird's eye picture of the detected objects, with circles indicating humans on the street and colored appropriately.

[3] Presented on Tensor flow graphs and Open CV are used in the proposed solution, which takes a video of a street view of people as input and outputs avideo with rectangular boxes surrounding each person, marking the places where social distance rules are breached with red and others with green. The solution also generates a bird's eye picture of the detected objects, with circles indicating humans on the street and highlighted with suitable colors.

[4] Developed to cover the overall framework and design of our social distancing research. The architecture of the models DETR and Efficient-Det, which were utilized for person/pedestrian detection, is discussed in part A, followed by the datasets used for fine-tuning the models and real-time inference in section B. Section C describes the image processing techniques used to create a reliable and accurate detector and to simulate data diversity in order to attain near real-time results. Finally, D walks you through a step-by-step process for determining social separation from the pedestrian detector's output. and the Caffe framework. To use the image processing methods that will be discussed, the Open CV libraryis used.

[5] Proposed concept is built using Python 3, OpenCV, The primary goal of this system is to process video that has been collected which has the video for person detection and social media

processing. Distancing or a breach of safety. As a result, the procedure begins with reading one by one, the frames of a video feed. This proposed system didn't make the people to realize that they a were in social distance by themselves.

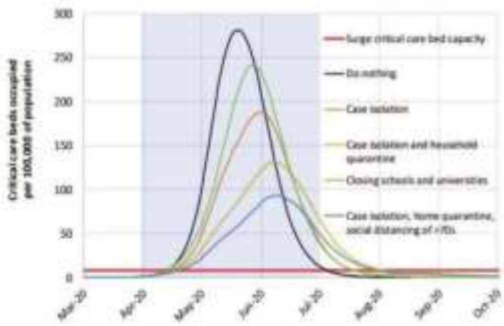


Figure 2.1 COVID-19 RANGE – MONTHLYGRAPHICAL REPRESENTATION

3. METHODOLOGY

The system's development was divided into three major phases:

Hardware design, Software design, and Working.

The circuit was first designed and simulated during the hardware development phase. The circuit was built after it was confirmed that it produced the required output correctly. The software development phase occurred concurrently with the hardware development phase, and a modular approach was used in which the programme was divided into several modules, each of which was tested separately before being combined to form a working programme.

3.1 HARDWARE

3.1.1 BLOCK DIAGRAM

The entire functional block diagram of the model is shown in the figure 3.1

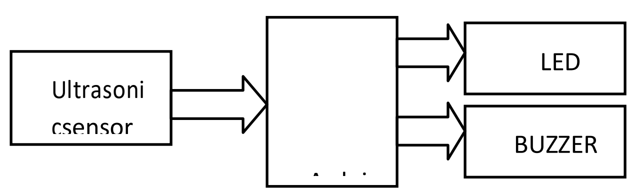


Figure3.1 BLOCK DIGRAM

3.1.2 ARDUINO UNO

The Arduino UNO is a microcontroller board based chip on the ATmega328P(spreadsheet). It has sets of digital input/output pins (of which can be used as ultrasonic sensor inputs), 6 analog inputs,14 digital inputs 4 which are programmable with Arduino IDE using USB cable .

Arduino uno can be powered using an external power supply which ranges from 7- 20 volts.

Figure 3.2 ULTRASONIC SENSOR

3.1.3 ULTRASONIC SENSOR

This ultrasonic sensor shown in the figure 3.2, used to measure the distance up to the range of 30-500kHzfrequencies. There are also some low frequency ultrasonic sensors but here we were using high range of ultrasonic sensor. It usually measures the distance of an obstacle by its waves getting emitted and hit on the obstacle or a person and converts the reflected wave into an signal which is electric.

3.1.4 BUZZER

The buzzer shown in the figure 3.3, is a device which gives signal by producing sound when an the electric signal is induced to it.

Figure 3.3 BUZZER

3.1.5 LED

LED (Light Emitting Diode) shown in the figure 3.4, is a emitting diode which emits light to warn theperson wearing thesystem.

ESP8266-01 module using UART having specified Baud rate.

Figure 3.4 BUZZER

4.PROCESS

Waves from ultrasonic senor is converted into electric signal and the data is passed to Arduino. Though the invisible waves will come back after hitting an optical. The Pin D1 and D2 get activated. Then the Arduino sends the data to the LED and buzzer. Where it is connected to the Pin of Arduino Uno. We've coded and sets the distance and parameters as per government norms. The code canbe modified my increasing the parameters. Echo pin which is in the Arduino uno . Which the Arduino uno is connected to Arduino digital pin number 10. The digital pin 9 is connected to the trig. When it comes to LED and Buzzer Negative, the two are linked. The positive wire of the buzzer will be attached to a (D12) pin, while the positive wire of the LED will be connected to a (D11) pin. Our circuit is complete after all of these connections have been made shown in the figure 4.1.

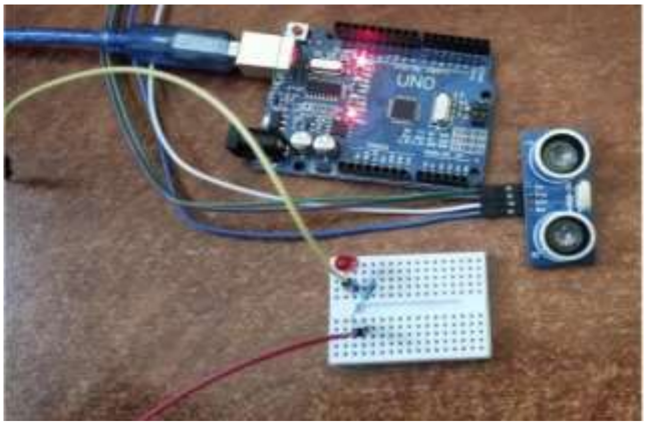


Figure 4.1 INITIAL COMPONENTS SETUP

Figure 4.2 SOCIAL DISTANCINGMETHODOLOGY

4.1.0 SOCIAL DISTANCING METHODOLOGY The methodology of social distancing in public is explained through a pictorial representation, shown inthe figure 4.2.

5. FLOWCHART

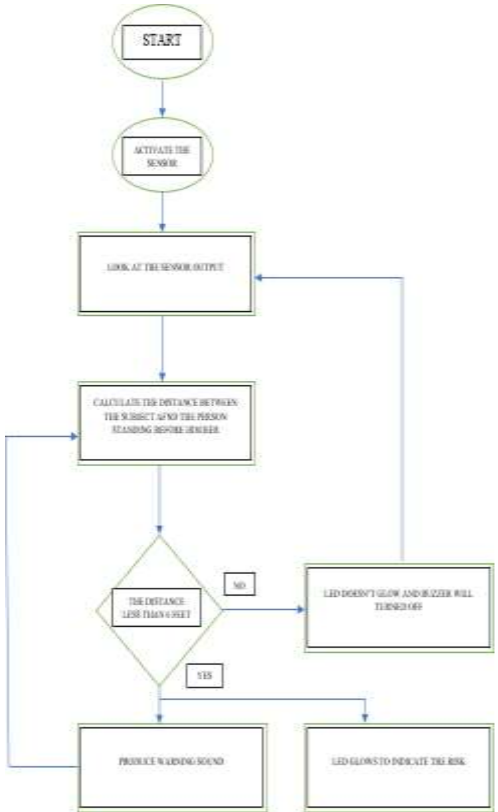


Figure 5.1 FLOW CHART

5.1.1 FLOW CHART

The entire functional flow chart of the model is shown in the figure 5.1

6.ALGORITHM

STEP 1: The power supply get the Arduino and sensor to get activate

STEP 2: The activated sensor emits the invisiblelight which hit the person behind or before the personwho is wearing this system.

STEP 3: The emitted wavelength is then return back to the sensor.

STEP 4: Then the sensor output is checked by the estimated distance as per input.

STEP 5: If the distance is less than x meter then the LED will start to glow and the buzzer will be turned ON.

STEP 6: If the distance is not less than x meter then the LED will not glow and the buzzer will remain OFF.

7. RESULTS AND DISCUSSION

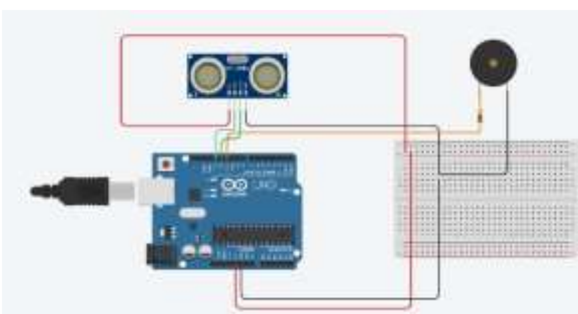
7.1 RESULTS

As a whole the system proposed is used to measure the distance between the two persons and warn the other person who is wearing it and the social distancing norms also done accordingly. DISCUSSION:

Maintaining social distance is the most effective strategy to keep COVID-19 from spreading. As aresult, the created SD-Tag is an effective social distance monitoring system that can be used bothindoors and outdoors to reduce the spread of infectious diseases.

COVID-19 is a virus that can be found in publicplaces.

Other than existing solution, the proposed system is wearable and make the person to make sure that he/she is in safe distance without getting in contact with other people which may reduce the rate of transmission of viruses not only COVID-19 but also other



influenza viruses.

Figure 7.1 TINKER CAD CONNECTIONS

The proposed design is shown in the figure7.1
The proposed design is under the simulation, where the distance for example is given as an input of 72.8

inches/ 200.3 cm/ 6 feet. It is shown in the figure7.2 [SIMULATION 1] since the simulation explain that, the subject is in the SAFE ZONE, so there is no buzzer sound is raised.

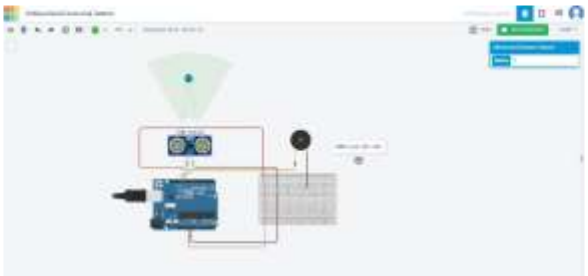


Figure7.2 SIMULATION 1

In case of, figure 7.3 [SIMULATION2] explain that the subject is in the DANGER ZONE, so there is buzzer sound to indicate both the subjects to maintain the distance between them to avoid issues arise.

Figure7.3 SIMULATION 2

8.CONCLUSION

Using this proposed system we can measure the distance between two subject. This product is notonly meant for the usage in pandemic and in other field as well. As we can change the inputs (the distance) in Arduino code it is used to measure even a very long distance or even a very short distance. As WHO prescribed to maintain 6 feet of distance, we have given it has the input. We can modify the distance value at anytime.

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