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CORONA AVOIDANCE SYSTEM USING PIR SENSOR

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Abstract: In the coronavirus outbreak pandemic by COVID-19, the World Health Organization (WHO) has been issuing several guidelines through all government agencies. In line with those guidelines, social distancing in the population has been a major prevention practice, compelled by all government agencies worldwide. Despite strong recommendations to maintain at least one-and-a-half-meter distance between the persons, the guideline is not scrupulously followed. The conventional method of keeping people at a safe distance in this covid Standard Operating system could not ensure that the everyone Obeys the rule. An automatic social distancing system needs to be created to assistant train individuals to stay at a safe distance. The system could perform social distancing detection accurately and can assist in the movement of people in an area. This technique which can help to reduce the virus is social distancing. Hence, in this project we proposed a system using PIR and ultrasonic sensors, and Arduino controller to help the person to remind of having social distancing.

Keywords: WHO, Corona virus, Social distance, PIR

I. INTRODUCTION

COVID-19 (Coronavirus disease 2019) is an infectious disease caused by SARS-CoV-2 (severe acute respiratory syndrome coronavirus). It was identified in December 2019 in China. It was declared a pandemic by WHO. COVID-19's doubling rate is on average 7.4 days. The spread of COVID-19 is due to the transmission of coronavirus. Coronavirus enters the human body through openings like the mouth, nose, and eyes. The droplets exerted through sneezing, coughing, and sometimes talking can spread the coronaviruses from person to person. To reduce the rate of COVID-19 transmissions, many government medical bodies and WHO have suggested some preventive measures through the guidelines. One of the important guidelines suggested by WHO to reduce transmission is social distancing. Social distancing indicates maintaining the distance between two persons. It is strongly recommended by WHO that a minimum distance of 1.5 m must be maintained to reduce COVID-19 transmission. The proposed methodology in this paper is used to maintain a social distance of 2m in the vicinity. Various approaches were suggested by the researchers. Researchers used the CCTV cameras either at a public place or through the surveillance system through the Drone to check the crowd status in public places. Based on the crowd, governing authorities decide for maintaining the social distancing and preventive measures to reduce the spread of COVID-19. But these approaches are applicable in a mass population. At the same time, it is a responsibility of an individual to follow the interim guidelines issued by the WHO to maintain social distancing of 2 m. For the same, there is no such technical mechanism. Due to this, there is a need for such a device that will find the presence of human beings in the vicinity and alerts individually about the same so that he/she will maintain a social distancing. Based on this approach, in the proposed work the wearable device is suggested. This device will help each individual to maintain at least social distancing. Due to this, the spread of the COVID-19 virus will minimize. In the suggested proposed device, PIR sensor interfaced with Arduino which will detect the human presence. If human presence will be there, then it will notify the individual through the buzzer and LED. Hence, the individual will be alerted and will maintain the social distancing at the public place also. By using this device, any person will come to know the presence of a human being nearby him/her. Due to that, it will be helpful to keep social distancing to avoid the spread of the COVID-19 virus. This will minimize the spread of the virus in the community or in the people who are infected or were in contact with infected persons or COVID-19-affected persons. The paper comprises a literature survey related to COVID-19, guidelines to avoid the spread of COVID-19 followed by the scientific and technical approach used to avoid the spread of COVID-19 in a society in the motivation section. The method specifies the economically feasible solution provided by the usage of the PIR sensor to avoid the spread of the virus. The proposed algorithm specifies the working principle of the device designed by using a PIR sensor to indicate the human presence in a vicinity.

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II. PROPOSED SYSTEM

In the proposed technique, preventive measures to break the chain of transmission in the vicinity are a prime consideration. In the methodology of maintaining social distancing, the device with PIR sensors is proposed. This device helps in maintaining social distance and warns a person needs to maintain the distance of 2m. The device having PIR sensors will be developed for sensing humans in the vicinity of 2 m. The device consists of Arduino, PIR sensors, buzzer, ultrasonic sensor and connecting wires. The Arduino will act as a controlling unit and will control different operations such as sensing input signals, and according to the input, signal outputs will be generated as per programming. PIR sensors allow the sense of movement of an object in a range, and this detects different levels of infrared radiations. The buzzer is used as an audio signalling device that alerts about people's presence in the vicinity within a certain distance. This buzzer will indicate the person who is breaking the social distancing guideline. All the components are connected properly through wires. The pir and ultrasonic sensor will detect the moving object. After detecting an object in a range of 2 m, it will send the audio message as "person is present at a distance of 2 m." When that person comes closer at a distance of 1 m, then it will send an altering signal that the person needs to maintain the distance. In this, the PIR sensor will detect the human presence after sensing through the front as well as the back sensor. This will send the sensor signal to the Arduino. Arduino will continuously take input through these PIR sensors and be processed as per the threshold value for the distancing as 2 m and 1.5 m. If the distance sensed will be 2 m, then it will issue an audio signal which will provide an alert about the distance. And if the person comes in a range of 1.5 m or less, then it will send an audio signal and send the signal to the buzzer. This buzzer will indicate both people who have this device and who have not to wear this device. Also, the buzzer will be continuing to ring until it will be stopped by the stop button. Because of this, the persons in the vicinity will try to maintain the distancing criteria of at least 1.5 m. Also, the LED light will be issued to maintain the distance.

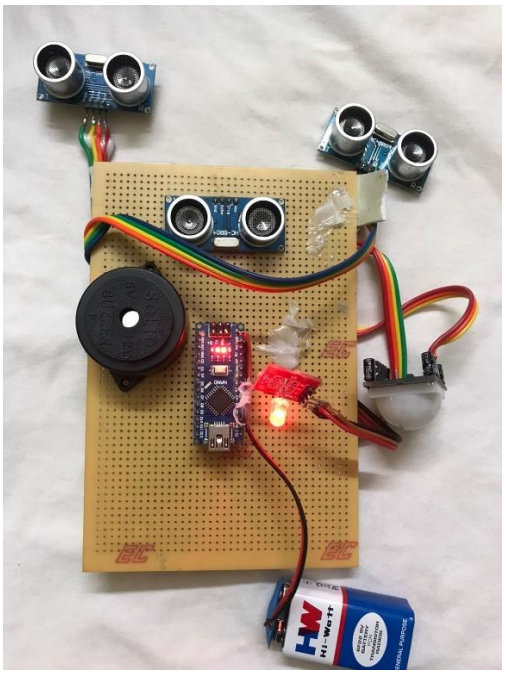

Figure 1. Proposed system

III. METHODS AND MATERIALS

3.1: Methodology-

We have created a simple social distancing device using PIR and Ultrasonic sensors which is easily accessible, easy to build and cost efficient. The method we have used to build our system is less complicated and the cost of building is cheap and effective. It is user friendly, affordable and it is designed in a such a way that every individual can access it without any negative impact. It is economically feasible and every individual can afford it. The entire flow of the proposed device is given below in Figure2.

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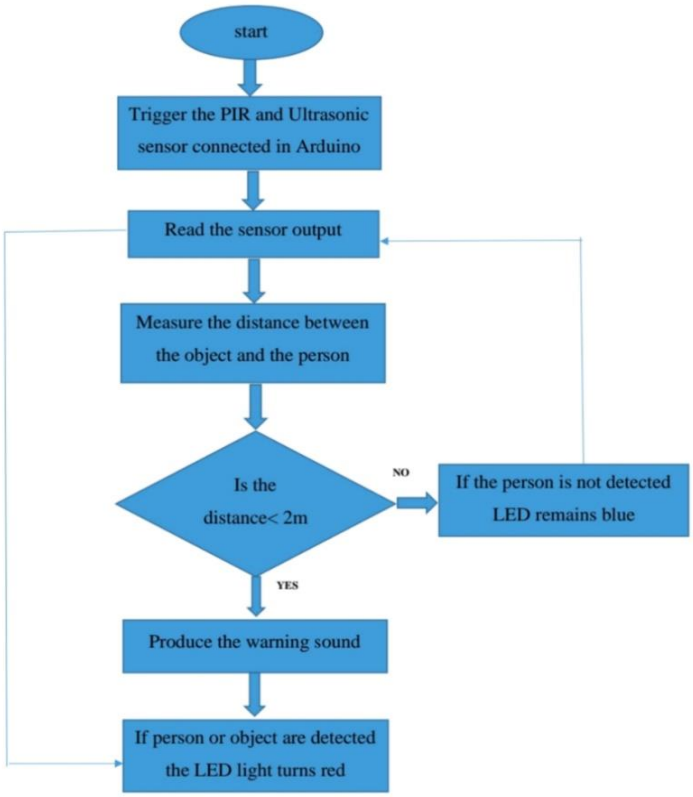

Figure 2. Flow chart

3.2: PIR Sensor-

A passive infrared sensor (PIR) is an electronic sensor which is used to detect motion. The sensor measures infrared (IR) light radiating from objects in its field of view. Mainly they have used in PIR based motion detectors. When a person in the field of the sensor moves, it detects a sudden change in infrared energy and the sensor is triggered (activated). It acts as a switch. They don't detect or measure Heat, but they detect infrared radiation emitted from objects. These sensors commonly used in security, lighting, and alarm systems. The range of PIR sensors is approximately 6 meters, depending on conditions.

3.3: Arduino nano-

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P released in 2008. It offers the same connectivity and specs of the Arduino Uno board in a smaller form factor. This project gives detailed information about an Arduino Nano board, and it is one kind of microcontroller board which is designed by the Arduino team. This microcontroller is based on Atmega168 or Atmega328p. It is fairly similar to Arduino Uno board but when it comes to pin-configuration and features, this nano board has replaced Arduino Uno due to small in size. As we know that while designing an embedded system small size components are preferred. Arduino boards are mainly used to build electronic projects. embedded systems, robotics, etc. But the nano boards are mainly introduced for the beginners who are not from the technical background.

3.4:Ultrasonic sensor-

US transmitter Receiver pair, IR sensor module, IR sensor pair, IR Analog distance sensor, As shown above the HC-SR04 Ultrasonic (US) sensor is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. As shown above the **HC-SR04 Ultrasonic (US) sensor** is a 4 pin module, whose pin names are Vcc, Trigger, Echo and Ground respectively. This sensor is a very popular sensor used in many applications where measuring distance or sensing objects are required. The module has two eyes like projects in the front which forms the Ultrasonic transmitter and Receiver. The sensor works with the simple high school formula that **Distance = Speed × Time**

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IV. IMPLEMENTATION

Figure 2 represents After compiling the code into the Arduino Nano we have connected the ultrasonic sensor and Arduino Nano. The 5V pin of Arduino Nano is connected to the VCC of the ultrasonic sensor. The GND pin of Arduino nano is connected to GND of the Ultrasonic sensor. The D11 pin of Arduino Nano is connected to the Echo pin of the ultrasonic sensor. The D12 pin of Arduino Nano is connected to the Trigger pin of the ultrasonic sensor. The figure represents the implemented output. A 9V battery positive terminal is connected to the 5V pin of the Arduino nano and the negative terminal is connected GND pin of the Arduino Nano. The buzzer positive terminal is connected to D5 pin of the Arduino nano and negative terminal of the buzzer is connected to the GND pin of Arduino nano As soon as power is applied to the PIR and ultrasonic sensor, it starts to detect, if there are people within 2 meters of the user, then the user will hear a buzzer alert and blinking of LED.

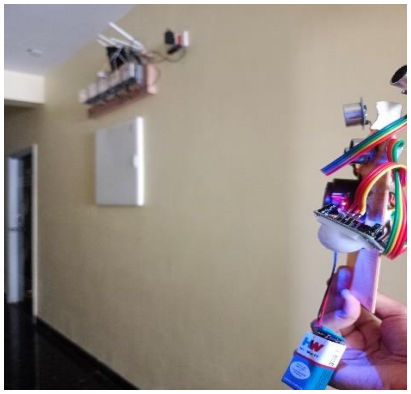

Figure 3 .No person is detected

When there is no person or object closer to the device the LED turns to blue colour.

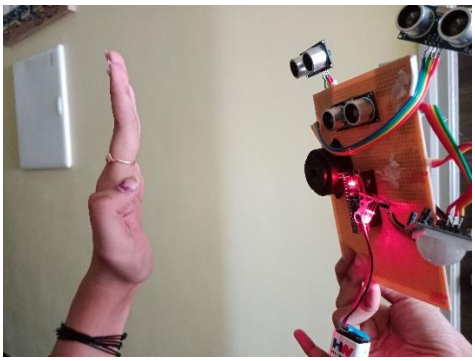

Figure 4. when person is detected

When person or object comes closer to the device the LED turns red .

V.CONCLUSION

Maintaining social distance is the most effective strategy to keep COVID-19 from spreading. As a result, the created SD-Tag is an effective social distance monitoring system that can be used both indoors and outdoors to reduce the spread of infectious diseases. COVID-19 is a virus that can be found in public places. 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. Using this proposed system can measure the distance between two subjects. This product is not only meant for usage in pandemics and in another field as well. As can change the inputs (the distance) in Arduino code it is used to measure even very long-distance or even a very short distance. As WHO prescribed to maintain 2 feet of distance, have given it has the input. Can modify the distance value at any time.

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VI.RESULT

Lockdown cannot be implemented permanently, and this is not the ultimate solution to stop the spread of the COVID-19 virus. Despite lockdown, we need to concentrate on such a machine due to which we can minimize the spread of the virus. Hence, this suggested device will be a preventive measure to avoid the spread of the virus by using every individual in a vicinity. This device can be used by any individual. And we need to maintain social distancing in the proximity along with mask and sanitization practice. But maximum people are not suffciently assured about maintaining social distancing. To this problem, the solution is provided through the PIR device. This device continuously monitor and alert to reduce the possibility of being infected. This will be a very useful and better solution to minimize the possibility of being infected because of ignorance of social distancing.

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