

Automatic Temperature Detection Doorbell For COVID-19

Abstract

The COVID-19 pandemic has brought about a complete shakedown on our world on the basis of human life, property and economical crisis. The lockdown all over the globe has caused major panic and discomfort at every household and their doorstep. Social distancing is the one of the best method to escape from COVID-19. But we can't avoid some emergency visits to some homes. But what if we could be precautious at that very doorstep by a smart doorbell which will let you know the body temperature of the visitor without touch. This Automated temperature and buzzing system contains sensors which will measure the temperature of the person in front of an entry point. If the temperature of the person is below 37.6 degree, below the acceptance limit, will blink and automatically the door bell will buzz and the person enters without touching any surface, common walls or doors. After this process one can enter the gates of offices, mall, house, college entrance and hospitals. This device will be operated by motion of hand. The backbone of this project is based on Internet Of Things (IOT). It is equipped with temperature sensor to detect human temperature and PIR motion detection sensor for no human contact. The software used behind is Arduino IDE and Autodesk Fusion 360 to make it user friendly. The Doorbells are among the most germ-infected objects in houses, hospitals, factories, and elderly homes. This product will provide an extra layer of safety from covid-19 infection by making automatic decisions through the developed system as vaccines are still away.

Introduction

In the year 2020, Covid-19 virus has infected mankind on this earth and as per studies, corona viruses stay on surfaces for nearly 24-48 hours. In these situation to stay safe we have to follow various precautions. Washing our hands regularly, wearing masks in public, and avoiding touching surfaces. We can't have the same old habits of eating, travelling, buying or even doing our routine works. Today homes have become offices and the internet is only saviour. During lockdown the trend of ordering online and home delivery of various things groceries, electronics, books has increased. Though ecommerce companies claim that their employees take all safety measures from sanitizing to social distancing but when they come to house they have to touch the doorbell and their temperature needs to be scanned. Also the doctors, government officials have to go door to door for testing the local communities. So, touching surfaces is one we should avoid.

When we arrived at Infront of a house, first we search the doorbell button/ calling bell button. And press the button. But in this special situation this doorbell button can cause the virus to spread and enter our homes. When some infected person presses the button, the virus will hold on that button and when a non infected person touch this button the virus spread to that person. We can avoid this danger by using this Automated temperature doorbell which will scan the temperature of the visitor in front of an entry point and will ring the bell. If body temperature is normal it will ring the bell, otherwise an alarm will appear and notify the owner.

Technology Stack

Software Requirements

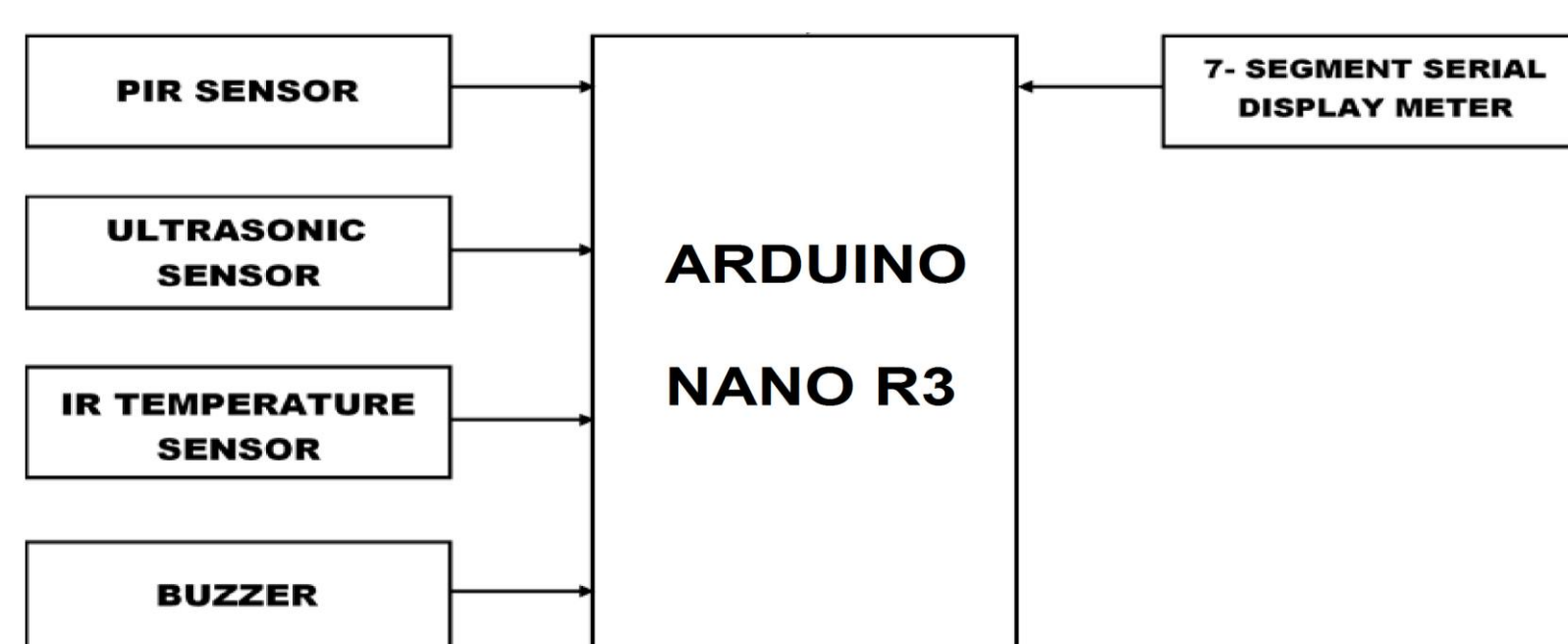
- Arduino IDE
- AutoDesk Fusion 360

Hardware Requirements

- Arduino Nano R3
- Buzzer
- IR Temperature Sensor
- 7- Segment Serial Display
- Ultrasonic Sensor
- Arduino Nano R3
- MP3 Player Mini

Methodology

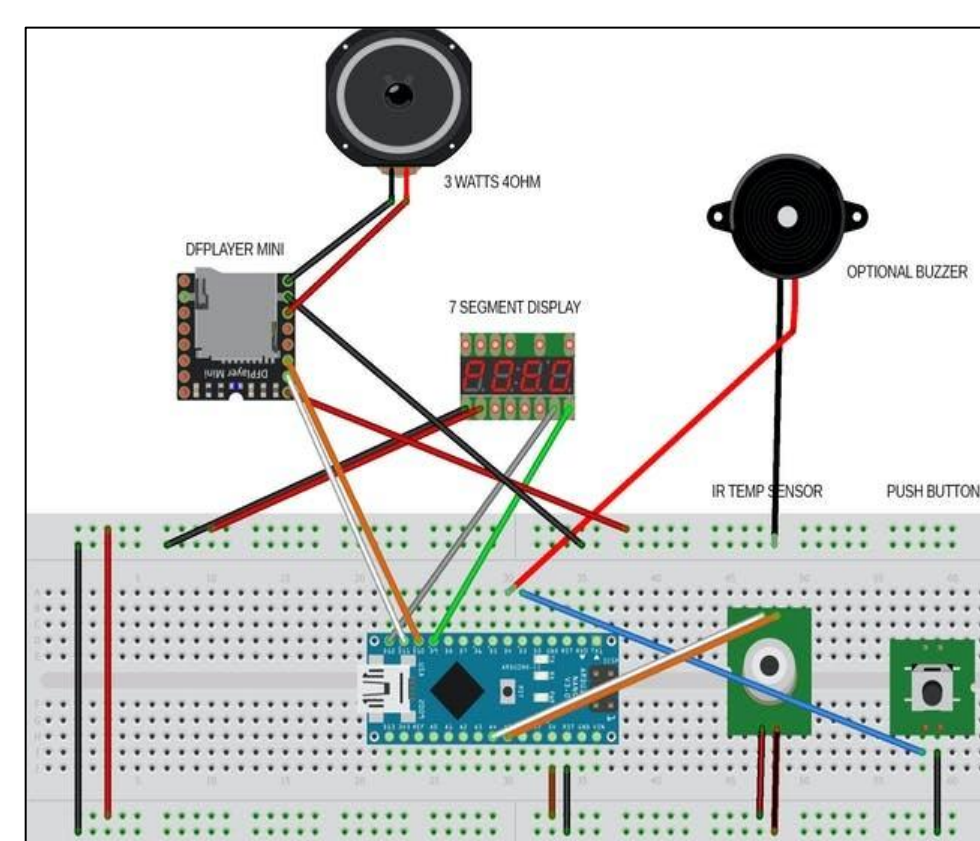
The entire process starts when a visitor approaches the doorstep. When show our hand Infront of IR Sensor, The sensor will send signal to Arduino board. And Arduino drive the relay. Relay is connected with doorbell. And finally the bell will ring. At that point, a hidden IR thermometer measures body temperature, the temperature is displayed in the 7 segment display screen and compared with standard fever temperatures. If visitor body has no temperature, the doorbell will ring, otherwise an alarm will alert you about a potentially infected visitor.



Figures

A 5V Supply is given to Ultrasonic sensor and Arduino board from the Ultrasonic Sensor the signal is generated and that is converted in the distance by the coding and controller system, is attached to digital pin number 7.

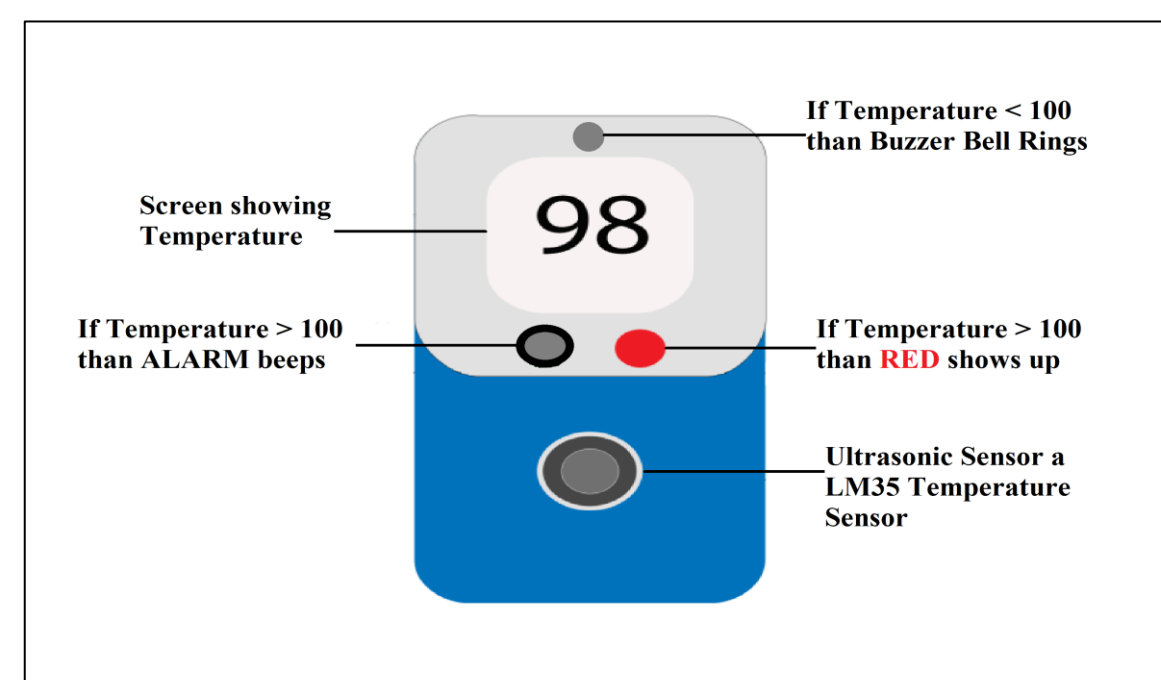
IR temperature sensor is connected to Ground and 3.3V input supply for sensing the temperature from the body, it is connected with the RGB led, on the controller board and internally in the code the parameters are given regarding the temperature values high and low. Buzzer is connected to Ground and digital pin number 7 where it will follow the signal reading from the ultrasonic sensor and it will start buzzing. RGB Led is connected to digital pin number 2, 3, 5. It will ring the buzzer bell if temperature of person is below 37.6 degree Celcius and will blink red and initiate the alarm if temperature is higher than 37.6 degree Celsius. A 7- Segment Serial Display Screen to read the temperature is connected to Arduino by Ground and 5V input supply. Ultrasonic sensor operates when in range of 1 foot. The Alarm speaker wires are connected to digital pin number 15. The battery pins of the doorbell circuit to the 3.3 V and ground.



Connections

- // IR Temp sensor SDA A4 SCL A5
- // 7 Seg Display Clock D12
- DIO D9
- // Buzzer GND and D4
- // Button GND and D3
- // MP3 Player

Results



Checking the temperature by using a hot beverage to simulate high fever



Applications

- This system can be used at every possible entry point to check the body parameters, it is majorly used in offices and crowded places where maximum number of people are visiting in a single day.
- Even at the hospitals there are different covid wards where sudden temperature check is needed, where some time it is the most important product which is very useful .It can also be installed at the society entrance gate and thus rules of social distancing will be followed. Thus this device is easy and safe to use.
- Guest, house workers and even delivery person can be checked for the symptoms of COVID-19 before entering the house.
- Spread of virus can be reduced by the touchless doorbell.

References

- [1] N. Radhakrishnan, "Iot Based Wireless Automated Bell Ringing System in an institution."The Journal of creative behavior volume 8(3):2320-2882, Mar. 2020,
- [2] T Kusmanto, B. Yudha and A. Susano, "Utilisation of Arduino Uno R3 AND RTC DS3231 As Bell Automatic School Bell", 2nd International Conference On Community Service Programme Lembaga Penelitian dan Pengabdian Kepada Masyarakat Universitas PGRI Semarang
- [3] Burgoji Santhosh Kumar, "Implementation Of Automatic College Bell Ringing System Using Arduino", ISSN: 2393-8374, VOLUME-5, ISSUE-4, 2018.
- [4] R. Giorgi, F. Khalili, and M. Procaccini, "Axiom: A scalable, efficient and reconfigurable embedded platform," in IEEE Proceedings of Design, Automation and Test in Europe (DATE), Florence, Italy, mar 2019, pp. 1–6
- [5] R.L. Hyoung, H.L. Chi, "Development of an IOT based visitor detection system," IEEE Trans
- [6] S.N. Jyothi, V. Vijaya, "Design and Implementation of real Time security Surveillance system using IOT," IEEE Trans.
- [7] Alessandro Sforzin, Mouryo Conti, Felix Gomez Marmol and Jens Matthaias Bohli, International IEEE conferences on Ubiquities Intelligence and Computing, Advanced and trusted computing, Internet of people, and smart world congress, IEEE
- [8] M. Virginia, P. Vamsrikrishna, "Surveillance and monitoring System using Raspberry-Pi and simple CV", IEEE
- [9] Chao-Huang Wei and Shin-An Chen. "Video Door Phone Surveillance System Using power line Communication Channel", International Journal of Computer and Electrical Engineering, Vol. 5, No. 4,
- [10] B.P. Priya, M.C. Viraj, "Smart Motion Detection System using Raspberry-PI," International Journal of Applied Information System (IJAIS)

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