



COVID-19 PREVENTION AND DETECTION SYSTEM FOR COLLEGE CAMPUS

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Abstract: As of 2020-2021 is concerned, major problem the globe is facing is uncontrollable spread of Covid-19 Pandemic. Coronavirus is the new virus that has been identified in humans which is the cause of disease called COVID-19. Within no time the virus had spread all over the world and was declared as the Global Pandemic. The virus can easily pass from person to person which make it spread rapidly. To stop it's spread it very important to detect it and also take as much as preventing measures possible like maintaining proper social distancing and avoid unnecessary touch on any surface and time to time sanitization of hands. One of the common and major symptom of Covid-19 is fever hence the human body temperature is one of the major parameter to detect the infection in the person, if the person is infected by corona virus the body temperature increases. Here we describe the design of automatic contactless temperature detector. This temperature would not include any human interference for measuring the temperature. The body temperature is automatically monitored and the alert message is generated if the person's body temperature is high. We also discuss the design of Automatic contactless sanitizer dispenser, which will avoid the touching of sanitizer container and it will prevent the spread. Here we also design a robot that will be used to monitor whether the social distancing is maintained in the campus or not.

Keywords: avoid unnecessary touch, automatic contactless temperature detector, sanitizer container, human body temperature, social distancing, body temperature increases

I. INTRODUCTION

The whole world was supposed to take a very big step to control its spread of Covid-19 and the only way was the Lockdown. As states and communities are implementing reopening plans during the COVID-19 pandemic and once the lockdown ends the schools, offices, colleges, malls, etc. will reopen and it will become very essential to detect the body temperature of every individual before entering the campuses as fever is one of the major symptom of Covid-19 infection. Non-contact temperature devices may be used as part of an initial check at entry points to identify and triage people who may have elevated temperatures. So, the article presents the Automatic contactless temperature detector. Automatic contactless thermometers may be used to measure a person's temperature. An elevated temperature is one way to identify a person who may have a COVID-19 infection. This will detect the body temperature without any physical contact. The similar product is available by the name of Temperature detecting gun, but one of the major limitations of that product is it requires a human to operate it and that particular person needs points the gun on the forehead of the opposite standing person, this may risk the life of that particular person so to overcome this problem we have designed an automatic system that does not require any human interference. It will automatically detect the presence of the human in front of thermometer and it will detect the temperature and if the temperature is greater than the normal body temperature the buzzer will ring and the alert will be generated.

To prevent the spread of Corona Virus proper sanitizing is also important so a contactless hand sanitizer dispenser is designed that will operate automatically without making any physical contact with the person using it, so it will prevent the spread because of touch and also provide proper sanitization.

The major preventive measure to prevent the spread of this deadliest virus is maintaining proper social distancing. A robotic car is designed which will be connected by the Wi-Fi provided in the campus and it will be rotated in the campus to monitor whether the social distancing is maintained or not if the car find a group of people together a message will be generated to please maintain social distancing, a camera module will be used such that the person monitoring through car can see the position of car and the campus the car visits.



II. LITRATURE SURVEY

The article describes the Contactless temperature detection of human body using MLX90614 temperature sensor, Arduino Uno as controller and OLED to display the temperature. The article explains the working and connection of Contactless temperature detector. When an authorized person takes the temperature detector near the other person then the MLX90614 temperature detector calculates the temperature and display the temperature. If the temperature exceed the normal body temperature the LED would glow [3].

An article describes the block diagram and working of automatic hand sanitizer dispensing machine which uses Arduino Uno microcontroller and a Ultrasonic sensor is used for obstacle (hand) detection. If the hand is present in the distance less than 7 cm then the Arduino gives a 100ms pulse from it's digital output pin and the pump run. The 3 to 12 V submersible type pump pumps out the sanitizer for every interval of 1 sec(1000ms) [4].

Paper describing surveillance and monitoring system. In this system person can monitor in that place where camera are located by seating at one place person can track what is happening. Project uses internet to communicate between user and robotic vehicle. It is dependable connection. Raspbian OS has installed because the image and video can be seen directly on smartphone. camera is placed over it. We can control and able to move this robotic vehicle from web browser over internet. It can also be controlled through webpage. The webcam will capture data through its surrounding and send it through internet to the user then user will control that robot through webpage available at user end [5].

III.SOFTWARE USED

- Arduino IDLE
- Python
- VNC Viewer

IV.HARDWARE USED

- Raspberry pi
- Arduino Uno
- MLX90614 Contactless temperature sensor
- Ultrasonic Sensor
- IR Sensor
- NOT IC
- Submersible Pump
- TIP 32C Transistor
- BC547 Transistor
- 5V Adapter
- L329D Motor Driver
- Speaker
- Class D amplifier
- Rpi Camera module
- Motors
- Piezo Buzzer
- LED
- Connectors

V. BLOCK DIAGRAM

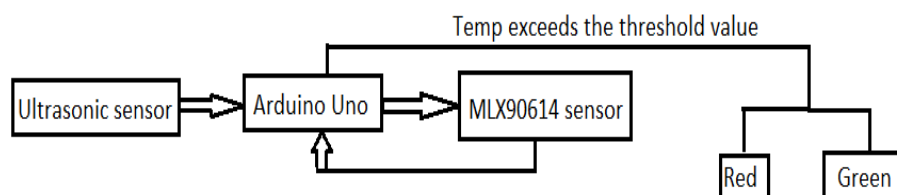


Fig. 1 Block Diagram of Automatic contactless temperature detector

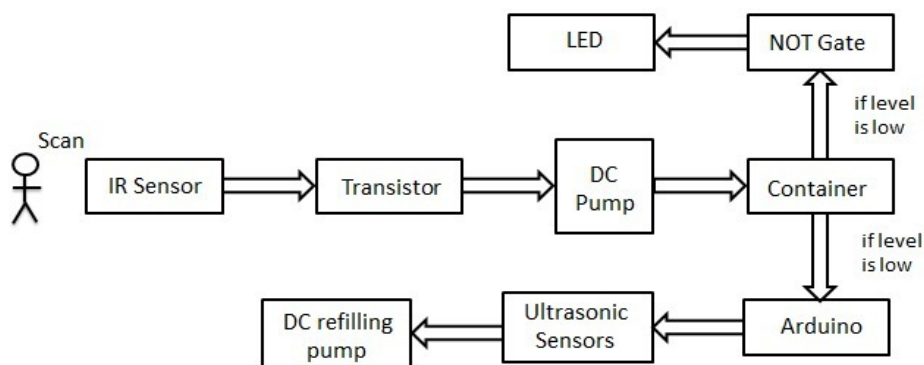


Fig.2 . Block diagram of Automatic hand and foot ware sanitizer dispenser

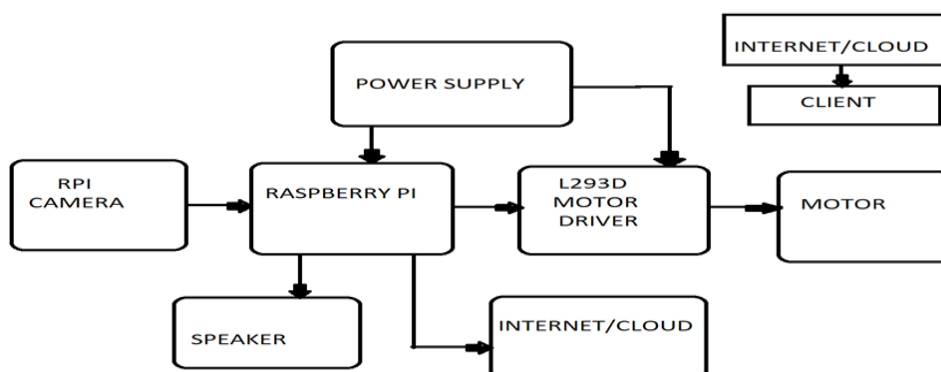


Fig. 3. Block diagram of Social distance maintaining robot

VI. WORKING

Sensor is used to measure the distance between the person and the thermometer. The Arduino is programmed in such a way if the distance measured by ultrasonic sensor is less than 3-4 cm, an Arduino pin gets high which is connected to the supply pin of MLX90614 so that it starts detecting the temperature. If the body temperature detected by the temperature sensor is in safe range, then green LED would glow else if the body temperature is above the normal body temperature then the buzzer will ring and red LED would glow to generate alert signal. This is how the system works totally automatically and without making any physical contact.

Transistor is used as switch, as soon as IR sensor detect the presence of hand the transistor start working in ON mode (closed switch) and the output of the transistor is given to motor that is submerged in the sanitizer. The level indication system is installed here, as the level of sanitizer goes down LED would glow. This is done by using a NOT IC. level indication wire is given as the input to NOT IC pin 1, if the sanitizer is present till that level, input to the NOT would be high and the output would be low and vice versa. Auto-refilling system consist of an ultrasonics sensor, which is placed at the top of sanitizer container. When the level of sanitizer goes down, ultrasonic sensor will detect the distance and an Arduino uno pin gives logic 1 as output and the motor turns ON and refilling starts. Similarly, when level goes up sensor will detect the distance and that particular pin of Arduino goes low and motor stops.

Initially all the required software is configured in raspberry pi. After creating and running the python scripts user can watch live video streaming and control the movement of the car over the internet using the buttons in the GUI application created in python. If we see that social distancing is not followed user can alert people using the speaker through pre-recorded audio stored in raspberry pi from the application itself



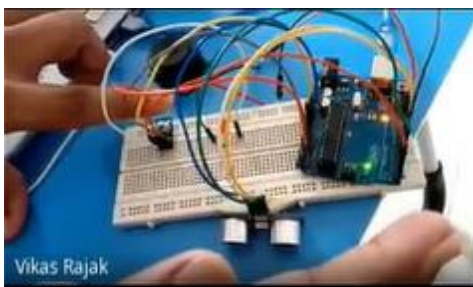
VII . ADVANTAGES:

- The Temperature detection and sanitizer dispenser system is fully automatic and touchless.
- The system works on less voltage(5V), hence saving energy.
- The systems are portable.
- Not whole systems work all the time, full systems starts only when it detect the presence if human in front of it.
- Automatic hand and footwear sanitizer dispenser consist Level indication system installed in it which will allow auto-refilling of sanitizer container when it gets empty, also refilling automatically stops when container gets filled.
- The robotic can be controlled from any place.
- Size of robotic car (not too small nor too big) makes it portable.
- There is no need of saying message for social distancing, it is pre recorded in system, just by clicking on play button application message will be played.
- The application can be used from Computer as well as from mobile phone according to convenience.
- Low cost and simple design.

VIII. LIMITATIONS

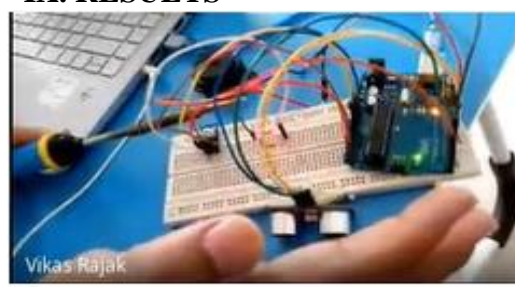
- The ultrasonic sensor and IR sensor of Automatic contactless temperature detector and automatic hand sanitizer dispenser respectively will continuously be operated irrespective of any person is available or not in front of it.
- The system is to be installed in place where sunlight can't come as IR gets affected by Sun Rays.
- The MLX90614 is a distance sensitive device, so the person needs to be very accurate with distance.
- The robotic is unable to detect the number of person, hence a dedicated person is needed to detect the number of person via camera installed in car.

IX. RESULTS



```
COM4
body temp = 35.01°C
body temp = 36.17°C
body temp = 36.77°C
body temp = 36.77°C
body temp = 36.69°C
body temp = 36.55°C
body temp = 36.57°C
```

Figure 4: Results for normal body temperature



```
COM4
Warning...HIGH TEMP...body temp = 37.97°C
Warning...HIGH TEMP...body temp = 38.17°C
Warning...HIGH TEMP...body temp = 38.19°C
Warning...HIGH TEMP...body temp = 38.13°C
Warning...HIGH TEMP...body temp = 37.97°C
Warning...HIGH TEMP...body temp = 38.17°C
Warning...HIGH TEMP...body temp = 37.75°C
```

Figure 5: Results for elevated body temperature



Figure 6: Contactless sanitizer dispenser

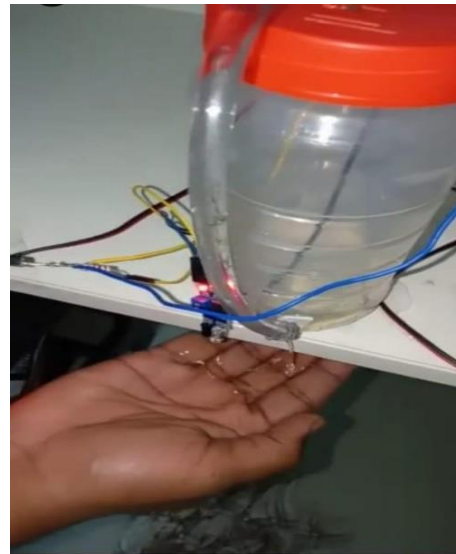


Figure 7: Contactless sanitizer dispenser

CONCLUSION

As there are many contributes to overcome this global pandemic we as an engineering students would like to present an idea how the sanitizing process can be made more protective as the person appointed for sanitizing purpose may come in contact with an infected person so to avoid this the touchless automatic hand sanitizer and temperature detection system can be implemented. An automatic contactless temperature measurement system is proposed which can measure the body temperature automatically if the person is in range of distance less than 8 cm. this system can be effectively installed at various campuses for proper detection of Covid-19 detection. The system is accurate if the distance is proper and can be easily installed at any place and height and is very portable. This system would be very much useful when the schools , colleges, offices would reopen.

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