

NON-CONTACTABLE DETECTION AND SANITIZATION OF COVID-19, AUTOMATED ATTENDANCE SYSTEM

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Abstract- The outbreak of the novel coronavirus has made a significant impact on public health. Many organizations are working on vaccine for diagnosing coronavirus thereby, few institutions were successful and few failed. Since there is no treatment to cut down spreading. Prevention and precautions are the best ways to reduce the widespread of the virus. Organizations like Offices, Schools, colleges, universities have a great risk of widespread where large group of people gather in one building or classroom. In note of Health, Education, Professional and Non-professional work-life taking proper precautions and prevention methods in those organizations will reduce the impact of spreading of virus and opening the doors for normal life as before pre-COVID-19. The technologies like Internet of things, Usage of various sensors are growing rapidly in reducing the impact by various preventive, predictive, methods. Covid-19 spreading mainly from person to person, including people who are near to each other. COVID-19 affected patients are Symptomatic and asymptomatic, Symptomatic persons can be diagnosed by predicting based on symptoms whereas asymptomatic should be taken care. Non-Contactable Covid-19 detection and prevention system reduce the impact of the widespread of the virus on our day-to-day life for both kind of COVID-19 effected patients.

Keywords: Proximity Sensor, Infrared Radiation, Object detection, Infrared Thermometer Sensor

1. INTRODUCTION:

Coronavirus is a large family of viruses that causes illness ranging from the common cold to severe diseases as Middle East Respiratory Syndrome and Severe Acute Respiratory Syndrome. A novel coronavirus was identified in 2019 in Wuhan, China. This is a new coronavirus that not been previously identified in humans. Symptoms of COVID-19 are different types Asymptomatic and symptomatic, severe illness which may cause death, and few faces no health issues. Virus can spread through air when people are near to each other, sometimes through the surfaces which are contaminated. In some of the cases post recoveries of the covid-19 people are again getting affected by virus which results in the failure of antibodies in the patient's body. Therefore, it is not sure that once a patient is diagnosed virus does not affect, it may attack any person at any stage. Keeping in note of all the serious health concerns many countries have opened doors for technology that help in detection of the covid-19 affected persons and management of the patients

in the treatment clinics in order to save many innocent lives like doctors, sanitation workers, and institutions and organization where people with large gatherings occur such as hospitals, schools, offices, universities, colleges, Airports, Bus stand, railway stations etc. The outbreak of the covid-19 has challenged all the technologists to come up with the better ideas and innovations that help in the prevention of the covid-19.

In this paper, we have proposed a methodology for detecting the covid-19 affected patient by collecting the information about them using IOT devices. By applying this detecting system, it supports the doctors and health-care professionals to identify and detect the suspected case based on sensing devices, collecting the information and provide them proper medication by isolating as soon as possible.

2. PROPOSED WORK:

As said “**prevention is better than cure**”. Following prevention methods would take part in reducing the spread of the novel coronavirus. One of the first and foremost prevention method is sanitization, this helps in killing the virus but not as good as does by soap and water, WHO recommends using hand sanitizers is appropriate when there is no availability of the water and soap. It is recommended to apply hand sanitizer whenever hands are not dirty and greasy. Applying sanitizer before or after touching any public or private property so that one does not spread virus or do not get virus into their body.

This paper explains about how students are sanitized before entering the classroom without any intervention of the human which is only possible by using sensor-based hand sanitization. This works as whenever a hand is placed near to the sanitizer alcohol based liquid flows out hence sanitizing both hands without any contact of the sanitizer bottle which results in reducing the spread of the virus. There are various detection methods followed during the pandemic. Here is the basic and important detection method which checks out the human temperature where the result is used in predicating the chances of been attached by the virus symptoms of the coronavirus include high fever, cold, dry cough and breathlessness. 95% of the cases are mild and diagnosable. Scientifically it is said that normal human temperature is around 98.6-degree Fahrenheit sometimes a bit lower around 97.9-degree Fahrenheit. Temperature varies from person to person based on height, weight, and other body factors. If one having temperature greater than or equal to 100-degree Fahrenheit is considered as fever. One can check the temperature using the mercury thermometer or any other gauge that scales the human body temperature. Since we all know how dangerously covid-19 is spreading using a normal thermometer would put one in risk since it scales the temperature by placing it under arm or tongue. However, that will be cleaned or sanitized after every use. But using such thermometer in public is time taking and impossible to clean for every use. So, using non-contactable temperature has come into spotlight, using infrared thermometer would scale the human body temperature without any contact with body thereby reducing the process of cleaning and sanitizer for each use. Using such kind of non-contactable thermometer will reduce the spread of the virus and helps in the detection of the human body temperature which can be further used in the analysis of the symptoms of the coronavirus.

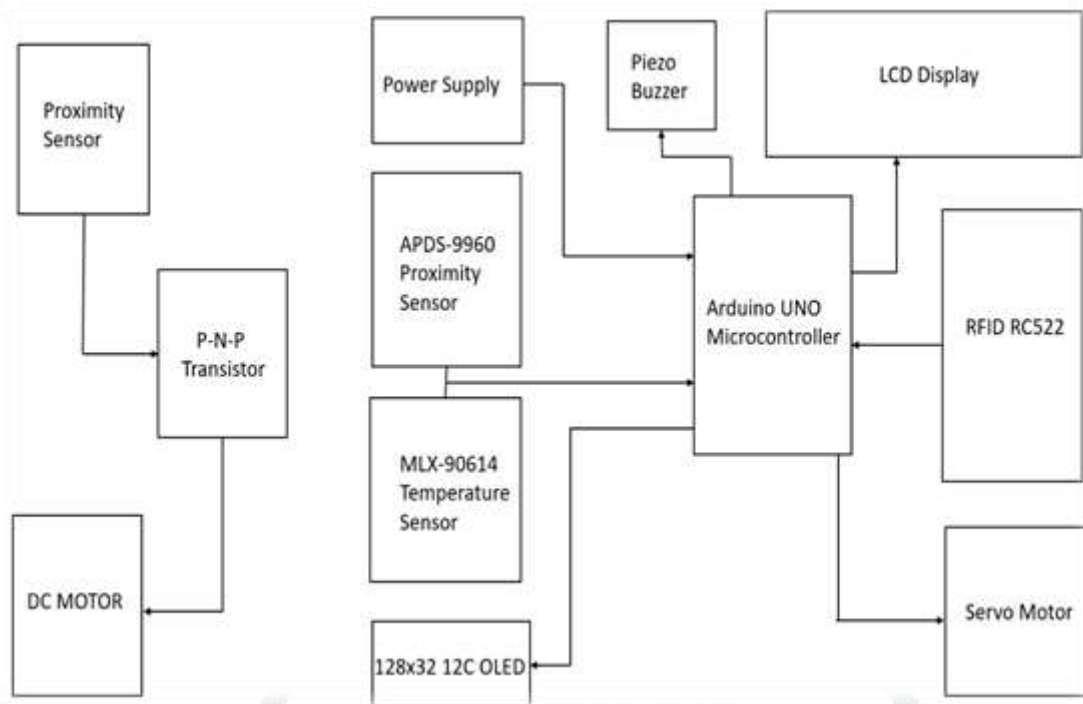


Fig 2.a. Blockdiagram of proposed work

Most of schools, colleges, universities enroll their students and provide them with the ID cards. ID cards are used in order to access to certain areas in the schools and colleges in order to regulate the violations. Schools and universities are open towards new technologies of attendance marking system. Keeping in this note designing an automated attendance system by use of ID cards while making few mandatory steps in terms of covid-19 in order to mark the attendance. This model ensures each student follows prevention and detection process in order to mark attendance using RFID based attendance and pass the requirements to open the gate to enter the class. Students who have not met the requirements are not allowed to enter the classroom and required action will be taken by concerned team if any student fails to meet the required temperature readings and marking attendance. Here the model is designed to carry out the process smoothly using various sensors and controller boards automatically and raise a buzzer if any student fails to meet the requirements without any other person involvement so as reducing the social engagement resulting in reducing the spread of the covid-19 virus. Hence, savings students and faculty from coronavirus.

3. ARDUINO UNO: Arduino UNO is an open-source microcontroller board the board consists of an Atmel 8-, 16- or 32-bit AVR microcontroller and shields communicate with the Arduino board directly over various pins, but many shields are individually addressable via an I²C serial bus—so many shields can be stacked and used in parallel. The board gets powered or energized using this USB board and it is also responsible for loading the Sketches from IDE to the board and the power port helps to power through AC-to-DC adapter or battery. It is manufactured by Atmel Corporation.



Fig 3.a Arduino UNO

We can visible this micro controller with 28 pins on the board. A bootloader is programmed priory which helps in uploading Arduino program without using external hardware programmer and makes Arduino board use easily and Arduino UNO has 6 analog pins. These pins are not used to measure the current it only measures voltage due to high internal resistance. Although these pins are analog the same pins are also used for digital input or output and there are 14 digital pins digital 0-13. They support both output and input. Digital pins provide 40 milliamps of current at 5v when connected as output. Most important of digital pins is some of the pins can be connected as pulse width modulation (PWM). Those pins are 3, 5,6,9,10,11. These pins are represented by the symbol “~” and the letters TX, RX implies transmitter and receiver respectively.

4.1 AUTOMATED ATTENDANCE SYSTEM- Most of schools, colleges, universities enroll their students and provide them with the ID cards. ID cards are used in order to access to certain areas in the schools and colleges in order to regulate the violations. Schools and universities are open towards new technologies of attendance marking system. Keeping in this note designing an automated attendance system by use of ID cards while making few mandatory steps in terms of covid-19 in order to mark the attendance. This model ensures each student follows prevention and detection process in order to mark attendance using RFID based attendance and pass the requirements to open the gate to enter the class. Students who have not met the requirements are not allowed to enter the classroom and required action will be taken by concerned team if any student fails to meet the required temperature readings and marking attendance. Here the model is designed to carry out the process smoothly using various sensors and controller boards automatically and raise a buzzer if any student fails to meet the requirements without any other person involvement so as reducing the social engagement resulting in reducing the spread of the covid-19 virus. Hence, savings students and faculty from coronavirus.

4.2 SENSOR BASED HAND-SANITIZATION- COVID-19 can attack people from others who are affected by the virus. The virus can transmit from one to other person via small droplets from the nose or mouth which are spreading when a person who are having COVID-19 coughs or exhales. Therefore, it is important to stay more than 1 meter away from a person who is sick and sanitizing frequently whenever one encounters the objects or surfaces that are used by others or which are in public areas. Generally, alcohol-based sanitizers are filled in bottles because they can be carried remotely while one moving from one place to other when there is no availability of water and soap. Using a pressable sanitizer bottle so that liquid flows out the bottle hence sanitization is done, but there is a risk of transmitting the virus using such sanitizer bottles. Here comes the challenge of bring a non-contactable hand sanitizer equipment. The main aim of this paper is to bring up non-contactable hand sanitizer which is a prevention method and sensing distance range is about 2-30 cm which cost about 600 Rupees [6].

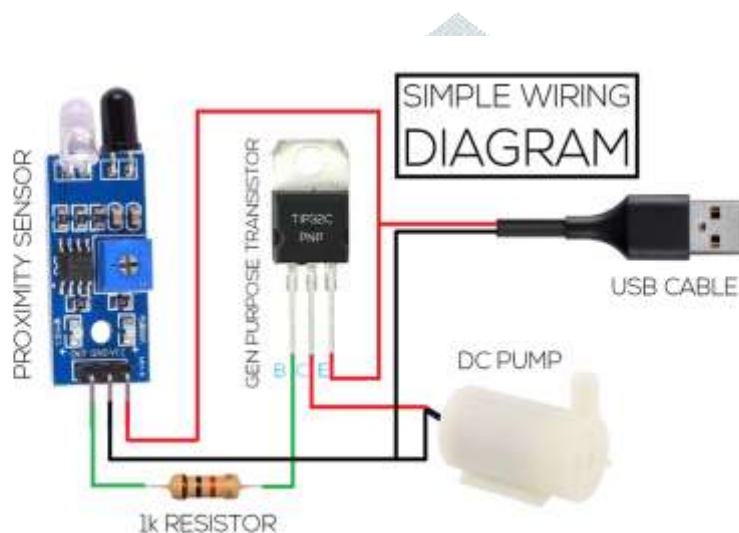


Fig.4.2. sensor based automatic hand sanitization circuit diagram

4.3 WORKING: Here from the circuit diagram, we can see the output pin of the sensor connected to a 1kohm resistor while been connecting to the base of the transistor TIP32C PNP. The collector pin is connected to the DC pump while the emitter is given with the positive voltage supply and sensors pin-2 is grounded, pin-3 is given with 5v supply, hence completing the circuit by adjusting the sensitivity at the sensor nob. Here in the circuit digital output can handle a few milli-amps current connecting directly would damage the sensor. The sensors digital output is high by default when no object has been detected and low when an object is detected, so we need a inverter to make the circuit work properly, thereby using a PNP transistor would solve the problem and powered the IR sensor starts detecting the object whenever an object is detected the dump sucks the liquid in the bottle.

4.4. NON-CONTACT INFRARED THERMOMETER- Fever is one of the body's first responses to infection, and it is normal in illnesses such as Covid-19. Keep tracking of our body Temperature which helps us early detection of Covid-19 and to make decision whether to go workplace or not. The device which measures the temperature is called Thermometer.

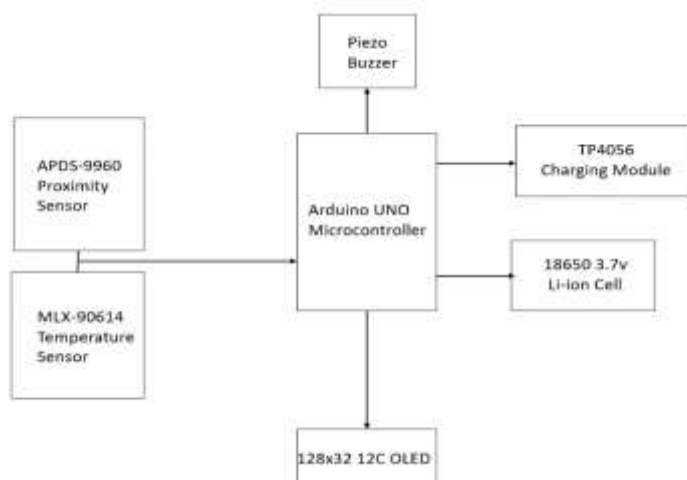


Fig 4.4 Block diagram for Infrared thermometer

4.5. RFID BASED AUTOMATED ATTENDANCE SYSTEM: Radio Frequency Identification RFID is a contactless device. It works on radio frequency. It is applicable in many sectors like Animals Monitoring, Courier Services, Access Control, Library, Tollgate, Auto identification etc. [9].

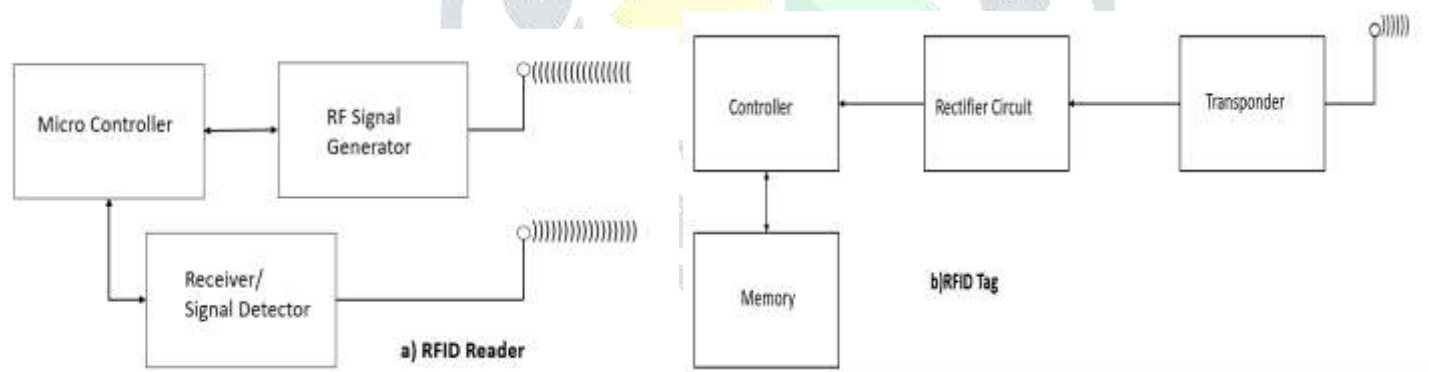


Fig 4.5 Working of RFID reader and tag.

A radio frequency module, an antenna and a control unit that produces a high frequency electromagnetic field make up an RFID reader. The tag is normally a passive component consist of a microchip and antenna, so when it comes closer to the electromagnetic field of the transceiver, induction creates a voltage in its antenna coil, which provides power to the microchip.[8]

5. Operation of the System-The proposed methodology overcomes by continuous detection and sanitization of covid-19 and automated attendance for the students, faculty in schools, colleges, universities etc. which is useful for each classroom in schools and colleges at low cost. In this method we used the system of techniques available for detection of covid-19 symptoms using a non-contact thermometer using infrared technology.

In the novel system the student is continuously monitored, and the acquired data is used in prevention and detection of covid-19 using Infrared radiation-based networks which further integrated with RFID technology-based attendance system. In future we can expand this system by using Inter of things (IOT) technology through this technology we can monitor everyday health analysis of each student which can be used analysis. They are implemented in the advanced Raspberry pi controller. IR based hand sanitization is contact less sanitization which operates on Infrared radiation object detection. Whenever an object is detected alcohol-based sanitizer flows out hence sanitizing without any human intervention or touching the surface.

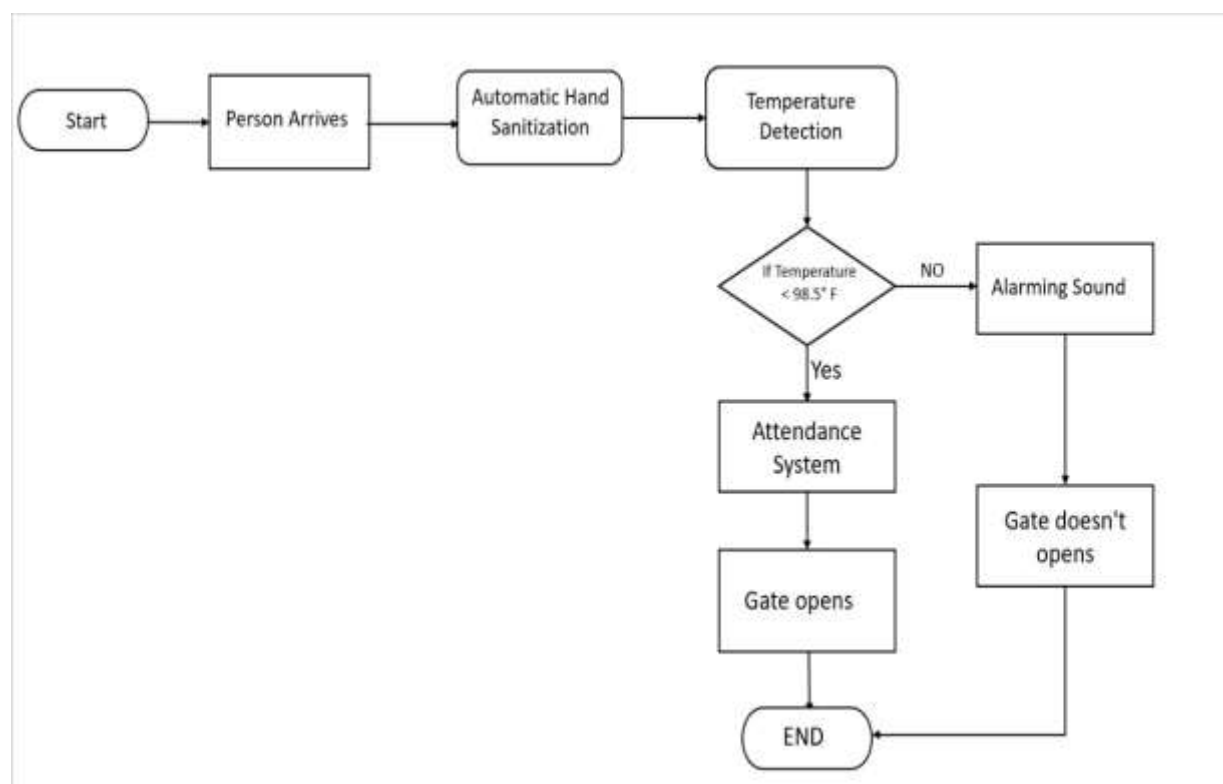


Fig.5. Flow Chart for the proposed design.

6 .RESULTS AND DISCUSSION:

This section describes important results obtained for proposed automated detection and sanitization of covid-19 with automated attendance system. The designed system makes the entire process of detection and sanitization rapid, easier, and cost effective, in addition making this method as a mandatory procedure to be followed to enter classroom thereby marking the attendance using RFID technology. This proposed system at very low cost treating of infection, spread, treatment and has diverse socio-economic impact.

Student Name	Temperature Sensed	Status	RFID Number	Status	Result
Suresh	97.4° F	Allowed	120215689	Matched	Present
Akhil	93.5°F	Allowed	123456789	Matched	Present
Sayyad Aleem	102.87°F	Not Allowed	-----	-----	Absent
Pooja	95.2°F	Allowed	987654321	Not Matched	Absent
Srinivas	103.0°F	Not allowed	-----	-----	Absent
Ram	91.4°F	Allowed	235551543	Not Matched	Absent

Table-I Here are few results obtained for this design.

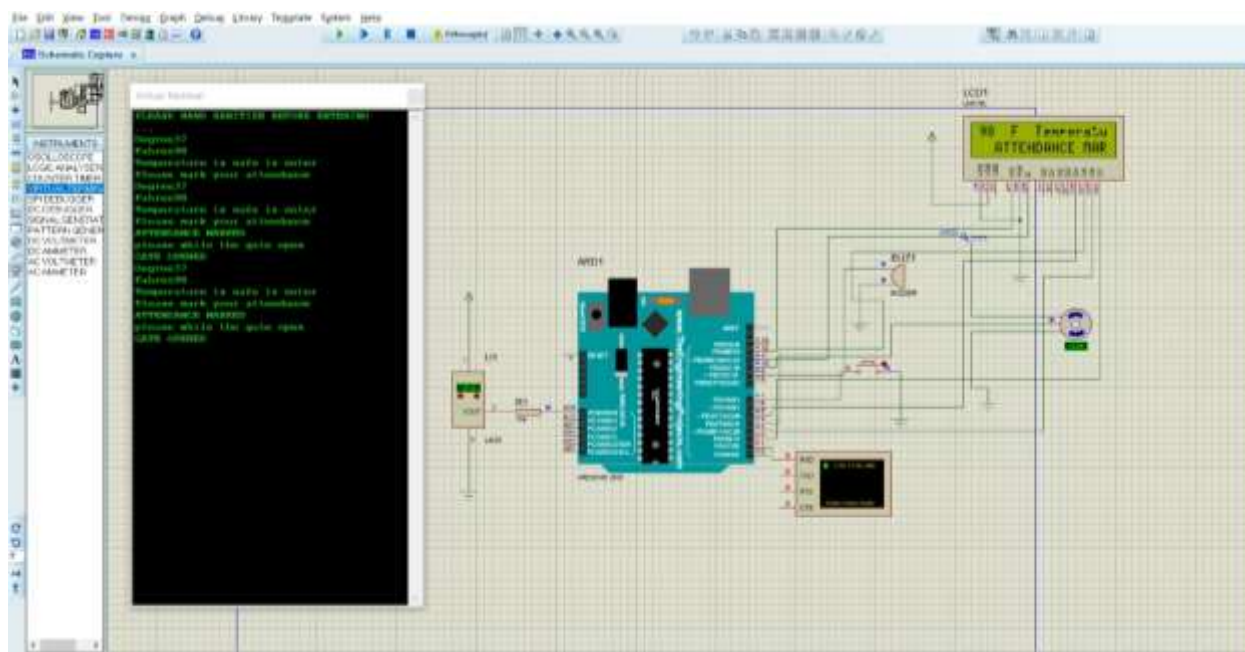


Fig.6. Proteus Circuit design with simulation.

Here is the sample circuit designing on the proteus software, this simulation clearly explains the logic how the proposed system works. Due to the limitation of components and libraries of the proposed design on the proteus software, so to explain the overall design the circuit has been designed components that give expected output which are available on the proteus software.

Here reading is taken through LM325 temperature sensor and compared with standard value. Instead of the RFID Reader module a switch is taken manually with a buzzer, servo motor gate, LCD display.

Based on the temperature and value of the switch respectively process will be taken further and hence completing the circuit design.

10. CONCLUSION AND FUTURE SCOPE

10.1 Conclusion:

Remote and portable advancements are key segments that would help organizations to detect the symptoms of the covid-19 in addition with detection prevention is the only way to reduce the spread of the covid-19. This will not just serve to decrease the weight on the spread of the virus however would likewise enhance analysis of the health monitoring of students. These remote correspondences would not just give us sheltered and exact observing additionally the opportunity of development. For a student who is as of now determined to have illness, their health condition must be checked constantly. By using the system, the healthcare can monitor, diagnose, and advice students or faculty all the time. Hence, the healthcare professional can monitor the student's health and reducing the spread of coronavirus.

10.2 Future Scope:

The Future work of the project is to the system more advanced. In the designed system would be connecting more sensor using IOT technology which measures various other health parameters and would be beneficial for student monitoring i.e., connecting all the objects to internet for quick and easy access. Establishing a Wi-Fi mesh type network to increase in the communication range.

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