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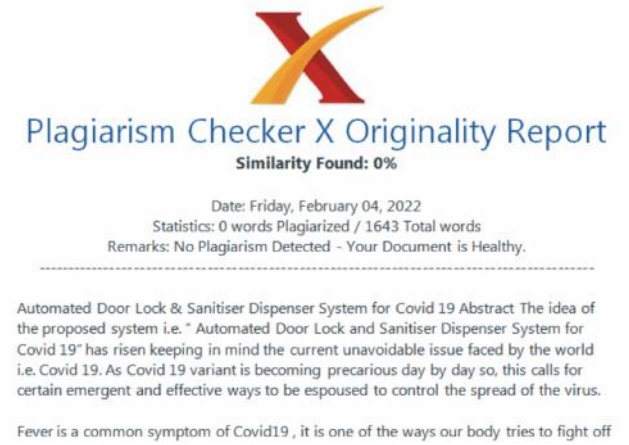

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Automated Door Lock & Sanitiser Dispenser System for Covid 19 Abstract The idea of the proposed system i.e. " Automated Door Lock and Sanitiser Dispenser System for Covid 19" has risen keeping in mind the current unavoidable issue faced by the world i.e. Covid 19. As Covid 19 variant is becoming precarious day by day so, this calls for certain emergent and effective ways to be espoused to control the spread of the virus.

Fever is a common symptom of Covid19 , it is one of the ways our body tries to fight off

ABSTRACT

The idea of the proposed system i.e. "Automated Door Lock and Sanitiser Dispenser System for Covid 19" has risen keeping in mind the current unavoidable issue faced by the world i.e. Covid 19. As Covid 19 variant is becoming precarious day by day so, this calls for certain emergent and effective ways to be espoused to control the spread of the virus. Fever is a common symptom of Covid19, it is one of the ways our body tries to fight off infection, and fever can be detected by detection of body temperature. All of us are familiar with the method that's being adopted in public places like Malls, Airports, etc, that's the method of measuring temperature to detect if the person is infected with this particular virus (Coronavirus) and consequently preventing the spreading of this virus. A person with a body temperature of 100.6 degree Fahrenheit is considered to be a Coronavirus-infected patient. This temperature is two notches above the normal or standard body temperature i.e. 98.6 degree Fahrenheit. Health and hygiene goes hand in hand and good health requires fine hygiene methodologies. As proposed by World Health Organisation, sanitization of hands at regular intervals is necessary to fight the virus and for prevention of infection as well. Along with hand sanitization and temperature measurement, it is also important to prevent the entrance of an infected person in rush zone or a public place to prevent the spread of virus. So a simultaneous automated Door Lock and Sanitiser Dispenser System has been proposed that will work in accordance with the detected temperature values. Since the system is an automated one it reduces extra labour required for the monitoring and

manual measuring of temperature purposes, further it will help to maintain Covid-19 protocol and helps in preventing further increment in cases and hence contributing to health and society as well. This system can be used at office malls, Airports etc.

KEY WORDS

Covid 19, Health, Temperature, Automated, Sanistiser, Prevention.

INTRODUCTION

The outburst of Covid 19 has affected every aspect of human life, like our health, education, lifestyle, etc in one way or the other. The first case of Coronavirus was reported on 27th January, 2020 in Kerala. The current population of India is 1,397,124,166 and the number of Coronavirus cases reported is 33,894,312 with 449,883 deaths as reported on 7 October, 2021 by Worldometer elaboration of the latest United Nations data. So it can be inferred from the data i.e. the number of cases and the number of deaths, that there is requirement of some preventive methods to control this number and to prevent the spread of virus as much as possible. One such method to prevent or to control the spread of virus is method of measuring body temperature that is being adopted in public places. The method of manual temperature measurement is adopted in various public places to control spread of virus and its effect. Shih-Huai Hsiao. et al propose that not only temperature measurement is necessary but along with it, repeated temperature measurement is important. As our body is adapted to outdoor temperature and after entering indoor, our body takes certain time to adapt to the indoor temperature. During winters or during rainy season, if the temperature is measured at the entrance of the gate then the temperature reading is less and after certain time if the measurement is again taken the temperature reading is more than the one previously taken.Hence temperature measurement is important and along with it, the time, location, where temperature is being measured, should also be taken into consideration.

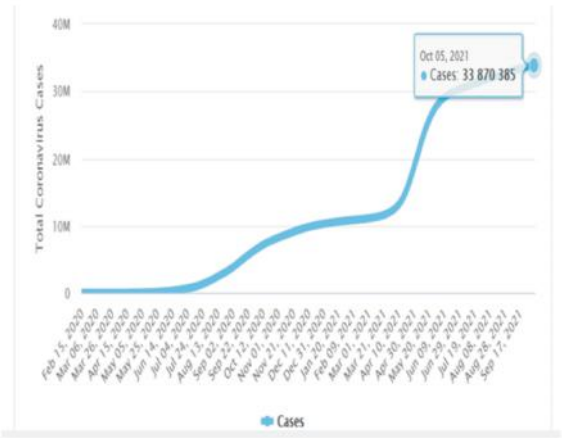


Fig.1: Total Coronavirus cases in India

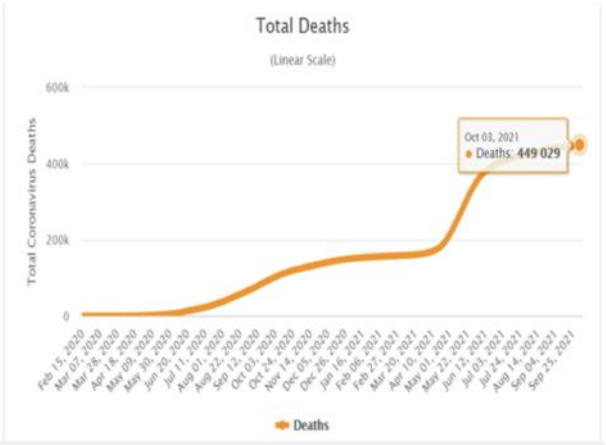


Fig.2: Total Coronavirus deaths in India

In the paper titled as "Noncontact body temperature measurement: Uncertainity evaluation and screening decision rule to prevent the spread of Covid 19", the author promotes the method of contact less temperature measurement devices, which is quite reasonable. As there is more risk of spread of virus, if the method of measurements involving contacts are being used. So the method of measurement should not involve contact. As hand sanitization prevents the risk of spread of virus, so a sanitiser dispenser system should also be there, and again this system should also not involve any contact. To prevent the entrance of infected patient in rush zone, there is a requirement of some obstacle. So a door lock system is suggested to make the system an automated one and for reducing the labor required for the monitoring purpose in the areas where there is need of implementation of such systems. The

proposed system could be proved to be very effective if the three system i.e. the temperature measurement system, the sanitiser dispenser system and the door lock system together work in sync with each other.

Objective

To discuss the design and validation of "Automated Door Lock & Sanitiser Dispenser System for Covid 19" and suggest some methodologies based on the research involved in the process for its real time implementations.

Experiment

Let us take an example to understand the importance of proposed system. Consider the situation, when such system is not implemented. Suppose there are three people entering the zone like any public place, it may be a mall, airport, hospital, etc. The situation is shown in below diagram.

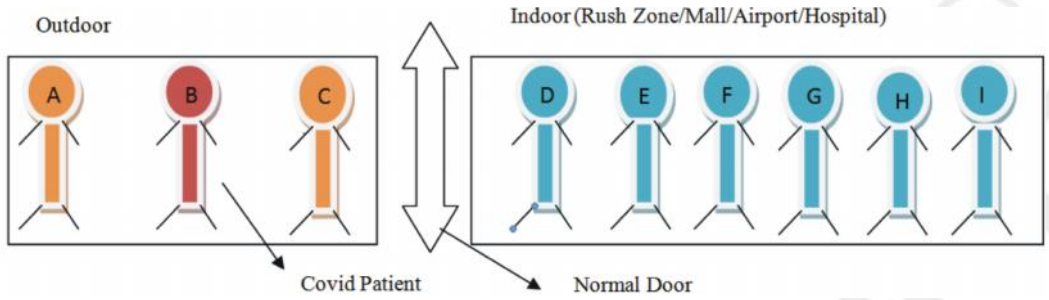


Fig.3: Area lacking automated door Lock which is controlled with temperature

B is the covid infected patient, A & C are patient at risk if they come in contact with B. So here two people are at risk. What will happen if the person enters the rush zone. The situation is shown as follows

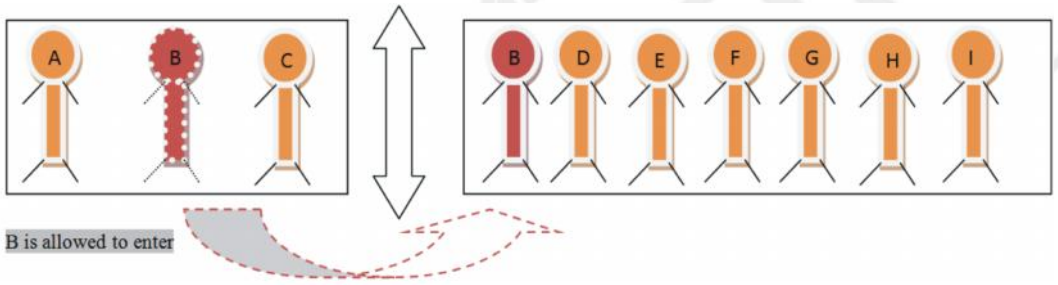


Fig.4: Area lacking automated door Lock which is controlled with temperature

Due to entrance of B in Rush zone, D, E, F, G, H, I are also at the risk of infection. Let us implement the proposed door lock system based on temperature detector. The system will not allow the infected person to cross the door lock system if he/she is infected with Coronavirus. Although it will not secure A & C from virus but as the system is not allowing B to enter, so D, E, F, G, H, I are safe. The situation is as follows:

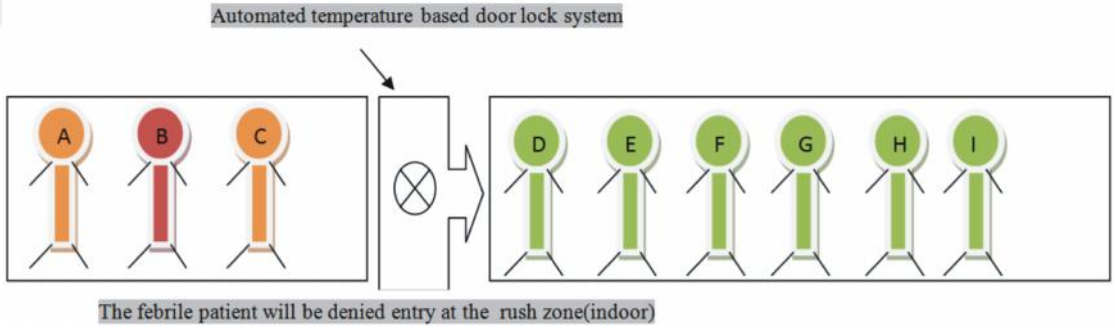
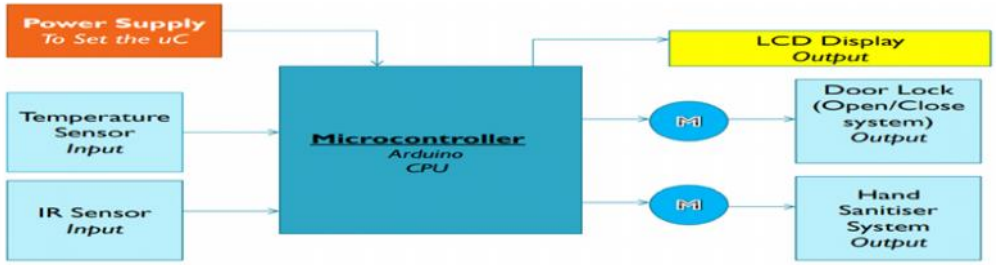


Fig.5: Area with automated door lock and sanitiser dispenser system.

Block Diagram



Working

This is a microcontroller based system where we are making a Covid-19 protocol follower, a door Lock system where a power supply is used to set the microcontroller (Arduino) which will make the overall system work, and the detectors (the sensors) are used to take input (like gestures). A temperature detector is used to detect the input temperature (temperature of person) and the LCD display will display the detected temperature based on the measured input, which will be made possible with the help of arduino programming, if the detected body temperature is above or equal to a certain specified value (the value we've assumed as boundary value for infected person) the door will remain closed, else, if the temperature is below this value the sanitizer dispenser will work by detecting the gesture of our hand using IR sensor and either a motor controlled with IC like L293D or a relay can also be used to control the operation of a door and a sanitiser dispenser. The complete system is automated and will work in sync. Since the system is automated it reduces extra labour requirement for the monitoring and measurement of temperature purposes, further it'll help to maintain Covid 19 protocol and helps in precluding more rise in cases and hence contributing to health and society as well.

Discussion and Key Findings

- Why Temperature Measurement? Fever is one of the ways our body tries to fight off infection. For the same reason fever is assumed to be a common symptom of Covid 19. Hence more emphasis is laid on temperature measurement based system.
- Why Sanitiser Dispenser System? As the system is designed to promote health of society so there must be some system to maintain the hygiene as well.
- Why Door Lock System? In order to make the system an automated one. To prevent the extra labour requirement the door lock system must exist in order to prevent the entrance of covid affected patient in rush/public zone.

If such systems are required to be implemented in real world situation and to increase efficiency and accuracy of such system then some of the points should be considered for the betterment of implementation:

- √ It is suggested that temperature measurement system should not be implemented exactly at the entrance.
- √ If the system is implemented exactly at the entrance then there would be requirement of repeated temperature measurement.
- √ The sensors used for the detection purposes must be chosen accurately on the basis of the distance between source and detector, its response time when the input is detected and after how much delay we are getting the output.

Limitation

As fever is one of the symptom of Covid 19, and body temperature measurement, although, being the important but not the sufficient parameter in determination of Covid affected patient. Hence such system cannot differentiate between the people who are normally suffering from fever and hence it can give false implications, even if the person is having a normal fever, he/she might be considered as covid affected patient.

CONCLUSION

There are no such automated simultaneous systems implemented in public places, till now, that work in sync and that provide multi tasking at the same time i.e.

a) A Temperature measurement system
b) A Door Lock System
c) A Sanitiser Dispenser System

The manual temperature measurement requires labour and time so there should be the system that reduce the labour and must be time saving. There is increased risk of spread of virus in manual temperature measurement. So there is a strong motivation to promote Non Contact Measurement Systems instead of pre existing clinical temperature measurement system.

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