A Front-line Preventive Approach to COVID-19

Sakshi Sharma
ECE, FET
MRIIRS
Faridabad, Haryana, India

Ritick Sethi
ECE, FET
MRIIRS
Faridabad, Haryana, India

Kuldeep Pandey
ECE, FET
MRIIRS
Faridabad, Haryana, India

Prerna Kakkar
ECE, FET
MRIIRS
Faridabad, Haryana, India

Dr. Abhiruchi Passi
ECE, FET
MRIIRS
Faridabad, Haryana, India

Abstract:- The coronavirus has created an international pandemic that was started in late 2019 and is currently ongoing. The effect of covid-19 is very detrimental and seen in every sector and the fright of covid is seen in every human being. The virus has changed the world drastically. The current study is aimed to investigate the causes, precautions, preventive measures, clinical symptoms, the boom of technology in the time of the pandemic, and different projects, models, and apps made to help people in the pandemic. The technology has played an outstanding role in maintaining social distancing, detection of face masks, and thermal screening to check body temperature. We have the right type of innovation and we have executed it to an extraordinary broaden. The systems that have been made with the help of sensors and microcontrollers can be very serviceable in the current scenario and upcoming wave of the virus.

Keywords:- *Covid-19, Microcontrollers, Innovation, Face Mask, Social Distancing, Technology.*

I. INTRODUCTION

Today the world is suffering from the Coronavirus which is also known as covid-19. It is an acute respiratory illness. It all started in Wuhan (China) on 31st December 2019, and then the virus opens out very rapidly and has driven its way to every part of the world by early 2020. On 30th January 2020, an outburst was declared in the entire world by the World Health Organization (WHO) and by march 2020 every country started taking precautions and imposing complete or partial lockdown in their country, to cut down the human interaction and outspread the coronavirus.

According to several researches, general public can get contaminated from this virus in many ways, mainly from person to person contact via the spread of contaminated droplets, originating from the oral and nasal passages. When the infected person coughs or sneezes, the droplets containing strains of the virus come into contact with the environment, and when a normal healthy person inhales the infected droplets then he also becomes infected and in this way, the cycle goes on and the virus spreads from one person to another. The other ways of getting the virus are by getting in contact with the infected plane, etc. As few theories were being proved by the scientist that, this germ is active for different time on different surfaces like plastic three days, copper four hours, and as long as twenty-four hours on papery surfaces.

Coronavirus was declared as a life-threatening virus and unfortunately, there was no medication for this virus in the starting, which terrified human beings, but now there are some medications and vaccines that can help in building people's immunity and help in fighting the virus but that does not mean that we are completely safe from virus and we can roam around freely without any protection.

When the government-imposed lockdown in different parts of the country, then many people have become homeless and jobless as they didn't have any form of work to do, their daily wages have stopped and many small businesses and shops came to an end. People are living a life, full of fear in their hearts of spreading the coronavirus amongst them and their loved ones. The hunger aspect of human beings has put the people in the situation to come out of their homes and work to earn for survival for their families.

Keeping in mind the outcomes of lockdown, the government put some relaxation but the relaxation in the lockdown leads to a greater number of people coming out from their shelter and getting in contact with such surfaces where there is the presence of coronavirus. Although accidentally, but this has increased their chances of coming in touch with the covid19 patients, which has led to a tremendous increase in the number of covid19 patients.

The contamination rate during this outbreak may increase due to lack of sanitation and sterile procedures.

Right now Total cases worldwide are 21.9 Cr of which total deaths are 45.5L and in India, the total cases are 3.31Cr and total deaths 4.22L. Although the mortality rate is comparatively very low in comparison to the recovery rate.

After several months In May 2020, we observed a second wave of covid -19 which was more dangerous and had a worse effect than the first one and it has infected a lot of youngsters and again the government has to imply emergency lockdowns to control the second wave as the cases were increasing at a vert faster rate worldwide. The reasons for the second wave could be the carelessness of people in terms of maintaining proper sanitization and social distancing.

Technology has played a major role in the time of pandemic like we have shifted to work from home, schools and colleges adopted online learning, usage of electronic money increased. People have avoided going to markets and shifted to online shopping for groceries, medicines, and clothes. Many apps and products were created with the help of technology to help the general public. Technology has shown a boom and advancement.

The saying prevention is better than cure goes correctly with our current situation.

II. LITERATURE SURVEY

Due to the increase in cases of covid-19, a practical based solution should be proposed to save guard people against such diseases. The studies done to date reveal the following points.

Sharnil Pandya, Anirban Sur, and Ketan Kotecha suggested a model named smart epidemic tunnel, it is a covid-19 disinfectant aiding IOT- based sensor fusion technology. Their suggested approach aims to safeguard a person by employing an automatic sanitizer spray system that has a sanitizer sensing unit based on human body detection. When a person is detected by an ultrasonic sensor at a distance of 1.5 feet, the user is cleaned with a sanitizer spray. The smart tunnel that has been demonstrated runs on a solar cell during the day and switches to a solar power bank mode at night. [1].After that in june 2020 M. Biswal, R. Kanaujia, A. Angrup, and P. Ray recommended a tunnel for disinfection. In densely populated areas like marketplaces, workplaces, retail centres, and hospitals, these tunnels are placed outside. The tunnels can be traversed on foot or even by two-wheeled vehicles. The sodium hypochlorite solution will be sprayed in a fog through these channels. These small, portable buildings can be static or dynamic in nature. They are built of steel and poly vinyl chloride (PVC) and range in size from 16 to 25 feet. In the static version, the patient spins inside the station for 10 to 15 minutes while being sprayed with disinfection from nozzles placed around the entire perimeter. The walk-through route of the dynamic type is sprayed with disinfection as the person travels along it for 16 to 25 feet. The disinfecting spray is activated anytime a human enters these tunnels thanks to infrared detectors (sensor-based). [2]. In 2020 Devdutt and Dr. Abhiruchi passi has explained a system called Manav rakshak . It is a wearable smart device that will help in maintaining social distancing. This is a kind of wearable id card that has different sensors like ultrasonic sensor, buzzer, batter, and ATMEGA 328P microcontroller. this system is designed such that whenever this system comes in close proximity of a person who is less than 1.5 meters then the microcontroller will activate the buzzer and the buzzer will produce a sound to indicate that you have to maintain distance.[3] In 2021, Minh Long Hoang, Marco Carratu, Vincenzo Paciello, and Antonio Piertrosanto show off an IoT-based MEMS accelerometer-based indoor condition monitor and activity recognition alarm system for those under quarantine due to COVID-19. They have used thermal sensor in the form of smart gadgets to monitor the real-time temperature. They tried to form a wearable smart IoT solution using Arduino (ESP8266), Infrared Thermometer, Contact Thermometer, Ambient Sensor, LCD Screen, and using MQTT technology to access data any time anywhere. They are measuring the real-time temperature of the user wearing the specially designed watch and uploading the data on the cloud using ESP8266 (Wi-Fi module), which will alert the user through an application specially designed for the purpose to connect with the wearable gadget. And keep a check on the real-time temperature reading being received from the gadget the user is wearing. [4]

Also in year 2020, Ashish Shrivastava suggested an IoT based Sanitation disinfection tunnel. The Arduino Board, PIR/ULTRASONIC Microwave motion sensor, Relay, High-Speed Motor, Mono Block Motor, High pressure DC Pump Motor, RO Pipe, T Connector, 0.1 mm BRASS NOZZLES, and Sodium Hypochlorite Solution are used to offer excellent exposure to the Sanitizing Chamber. It is intended to offer everyone entering this chamber in 15 seconds the greatest level of protection. This tunnel could be able to stop the COVID-19 virus from spreading. They have combined water and sodium hypochlorite (NaOCl) for this (H2O), 1HP water pump, which is controlled by a PIR sensor using a Relay, whenever the PIR sensor detects a body, it will activate the combination of 5v + 12v relay, resulting in automatically turning on the Water pump which will through the water out through 0.1 mm Brass Nozzles fitted on the chamber. [5]. Meghana Shinde, Tanvi Sukhadare, Soham Vaidya, and Meghali Kalyankar explained the Face Mask Detection Alert System using Raspberry Pi. They have used ML, OpenCV, and TensorFlow to recognize face masks. This model can be used for security purposes. In the proposed system they have used CNN for face detection and MobileNetV2 to detect people in a video frame. The face detection system is performed on raspberry pi and the proposed algorithm for the face mask detection system consists of preprocessing and training the CNN[6]

It is also shown that temperature measured under the arms or in the mouth is slightly different from that on the forehead. The body temperature is observed to be lowest at 3 am to 4 am and highest at 4 pm to 5 pm. the table shows the reading or values measured by a thermal camera while doing thermal screening

Table 1: measurements made by a thermal camera

Current Temperature	Armpit/Mouth	Forehead
Normal temperature	35.9 to 37.0	35.8 to 36.9
High temperature	37.1 to 37.5	37.0 to 37.5
Low fever	37.6 to 38.0	37.6 to 38.0
High fever	38.6 to 39.4	38.6 to 39.4
Very high fever	39.5 to 42.0	39.5 to 42.0

III. CLINICAL SYMPTOMS OF THE VIRUS

The incubation period lasts up to 14 to 15 days and once the person is infected by the virus then the body can take 4 to 5 days to show proper symptoms like Fever, cough, sore throat, fatigue, body pain, no sense of taste, and smell, headache, shortness of breath or it can be asymptomatic also in which the person is infected by the virus but the body does not show any such common symptoms. The symptoms can be mild or can lead to acute pneumonia, heart failure, multiple organ damage, respiratory distress syndrome, and then eventually death. Different bodies produce different symptoms. The symptoms can be more fatal and dangerous for the person who has a history of diabetes, blood pressure, and diseases related to the heart and lungs. The early-stage symptoms of the virus are not well defined, as the symptom of fever and cough are also associated with other diseases.

IV. DIAGNOSIS

Study design and samples, measurement and scoring system, statistical analysis. Reverse transcription-polymerase chain of events (RT-PCR) tests can detect coronavirus using samples taken from the throat and the nose. Today, fast RT-PCR test kits are also available and provide results right away. Some other diagnoses include laboratory findings and radiological findings which tell the extend of virus present in someone's body. CT scans are also used to diagnose the coronavirus.

V. PREVENTIVE MEASURES

It is known that the spread of coronavirus can be minimized by taking necessary precautions and in this social distancing was the most important precaution as when you stay away from an infected person then the chances of you inhaling the virus becomes low. People are advised by the government to maintain at least a 2-meter distance from one another.

Other than social distancing the personal protective types of equipment were also important like maintaining hygiene and cleanliness, washing your hands frequently and not touching unnecessary things outside your house, proper sanitization, quarantine was also a successful method of stopping the virus's spread.

- Schools and educational institutions were closed and they all switched to online mode of study to maintain social distancing and not come in contact with each other.
- Mass gatherings and functions were abandoned.
- No national or international flights or trains were running as borders were closed.
- The people who traveled from other cities or countries were asked to be quarantined and were not allowed to meet anyone for 14 days.
- Many hotels and institutions were changed into hospitals to get more space and beds.
- Wearing a mask becomes mandatory whenever a person goes out of his house.

- Individuals are advised to avoid touching their nose, mouth, or eyes in public places.
- Sanitize your hands and surfaces like your doors, bags, keys, and mobile phones.
- Thermal screening is done using thermal guns.
- Avoid shaking hands.
- PPE kits were introduced, test centers were placed in every city and villages

VI. CONCLUSION

Although the government is doing a lot to control the pandemic but it is our duty also to take care of our hygiene and follow all the norms given by the government and make use of different products or systems which are available in the market for our safety. The pandemic created an outbreak and challenges to the public, economy, and health care department. The technology is growing with the current situation and helps us to handle future outbreaks. we know the high-risk factors and precautionary measures to handle such situations further. The virus is more dangerous to older people or patients with underlying medical conditions. The studies showed that there can be a third wave of covid-19 so we have to be prepared to tackle the situation. It was crucial to stop the spread of the disease in the absence of effective treatment and a reliable vaccination. More of the models that people suggest should be put into practise.

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