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Development and Implementation of Non-Contact Automatic Body Temperature Monitoring System with Sanitization

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Abstract: ***Due of the COVID-19 pandemic, hand washing and hand sanitizer use are the primary preventative measures for good health and hygiene. Our study will concentrate on the creation and use of a sanitised non-contact body temperature monitoring system.***
When the pandemic is active and until it is finished, a technology called the smart door thermal scanner with non-contact sanitizer is utilised. The suggested system will first identify the individual approaching the gate, then use an infrared temperature sensor to measure his body temperature and show it on an LCD screen. In order to prevent entry into the gate when the temperature is higher than usual, the buzzer is activated and the gate is locked. Through the Wi-Fi module, the person's information is gathered and delivered. The suggested system sanitises the person's hands using non-contact type sanitizers and the gate opens automatically if the person's body temperature is normal. The information of the person may be accessible at any time using IOT platform (Blink app).

Keywords: about four key words separated by commas

1. INTRODUCTION

A global catastrophe has been caused by the coronavirus, which is now considered to be a pandemic internationally. By placing the human at the heart of the problem, the virus causes intense dread, uncertainty, and an emotional impact on us that is unprecedented for our generation. Of course, physical confinement is making things worse on top of that. Hospitals and medical staff are under a great deal of strain as a result of the nationwide rise in death rates. The World Health Organization notes that some of the most crucial preventive steps that must be done to end this pandemic are routine temperature checks and the use of alcohol-based sanitizers to destroy virus. Fever is the most typical covid-19 symptom that we are focusing on in this endeavour. According to the Centers for Disease Control and Prevention (CDC), often washing the hands is the greatest strategy to stop the spread of illnesses and lower the chance of becoming ill.
Nowadays, security guards at shopping centres, workplaces, and other establishments take each visitor's temperature and spray sanitizer on them before they enter. It will be a laborious task to examine every person using this method when the pandemic time is through, especially at schools, universities, offices, factories, etc. The report suggests the idea of installing smart doors at building entrances in order to monitor the aforementioned problems.

The intended task is advanced with the help of the subsequent goals.

- To keep the occupants of buildings, schools, universities, and offices safe, automated visitor monitoring systems are used to determine whether or not visitors are infected. The paper makes a proposal on how to accomplish this automatic input.
- An infrared body temperature sensor automatically checks your body temperature. Blynk app data is updated with a list of people who have greater body temperatures so that additional measures may be taken.
- The use of an alcohol sensor to verify hand sanitization.

2. LITERATURE REVIEW

The goal of the research by Mohammed S. Jasses et al[1] is to use a Raspberry Pi device in a cloud-based system to track body temperature. In that study, body temperature is measured using a Raspberry Pi, and then the results are transmitted through wireless sensor networks. Collected information is then updated on the cloud-based websites. using this website to measure your body temperature.

S. M. Riazul Islam and colleagues [2] examine numerous IoT and eHealth procedures and guidelines from around the world to see how it could benefit fromsocio-economic situationon the basis of sustainable development. They also suggest a smart security model to reduce risks related to security, go over how various innovations could be used in a health care domain, and offer some directions for futuristic research on IoTbased systems.

Hasmah Mansor et al [3] examines temperature by utilizing the LM35 temperature sensor. This is connected to Arduino Uno. Then, a website is programmed with a SQL database,

further integrated it with Arduino board. Sensor's ouput is subsequently sent to the website. When checking in, anyone utilising this website may check their body temperature.

The vital health indicators are monitored by Shreyaasha Chaudhury et al. [4] who then communicate the data via wireless communication, which is then transmitted to a network via a Wi-Fi module.

P.Karthick et al[5] .'s system is intended for use in homes or hospitals for measuring and monitoring several parameters like ECG, body temperature, and blood pressure. The Internet of Things (IOT), which connects all objects through the use of modern technology, has been identified as the following technological revolution. The outcomes can be recorded and shown on an HMI interface display using a Raspberry Pi. Additionally, utilising IOT and a GSM module, the findings can be relayed to a server and sent by text message. Family members or medical professionals can access the results by logging into a website.

After using the LM35 temperature sensor with NodeMCU, Shinde et al. (2019) put their data in the cloud[6]. While the LM35 is an economical choice for mass body temperature monitoring, its direct touch sensing function makes it a potential vector for viral transmission.

The illustration demonstrates the possible preventative actions during the global COVID-19 epidemic. Sanitizers have recently emerged as the most important commodities [7, 8]. According to the new guidelines set forth by the WHO, extreme sanitization is required to remain alive. The design provided the answer to the stated problem. To keep hands clean whenever a person wants to do so, without coming into contact with the sanitising machine, the design incorporates an automatic hand sanitizer and temperature sensing system [9]. The body temperature of the person is revealed by the temperature sensor upon contact [10].

3. METHODOLOGY

1. An IR sensor picks up human activity over the fence.

2. A sensor that monitors infrared temperatures gauges body temperature

3. An LCD display shows the user's body temperature.

4. If the person coming has a higher body temperature than normal, the smart door will sound a warning through the buzzer to prevent the gate from opening, and his identity card (an RFID reader card) will be scanned to send his data to the Blynk app over NodeMCU. After then, they are split apart from the group.

5. If the individual entering has a normal body temperature, the system uses non-contact sanitizers to disinfect their hands. After the Alcohol Sensor has verified that the person's hands have been properly cleaned, the gate will automatically open.

The block diagram below (Figure 1) and the circuit implementation are used to carry out the aforementioned steps. Figure 2 also provides the circuit implementation.

One can check their body temperature by utilising an infrared temperature sensor. To gauge a person's body heat in this instance, an IR temperature sensor is utilised. On the LCD panel, each person's body temperature will be shown. His identity card (a RFID reader card) is scanned using an RFID reader if the temperature is high, and the buzzer is activated as a result. After then, that individual is cut out from the group. Because NodeMCU has an integrated WiFi module, the scanned data is transferred to the Blynk app through NodeMCU. If the individual entering has a normal body temperature, the device uses a tiny submersible water pump to sterilize their hands using non-contact sanitizers. The door opens automatically when the alcohol sensor double-checks whether the person's hands have been sanitized or not.

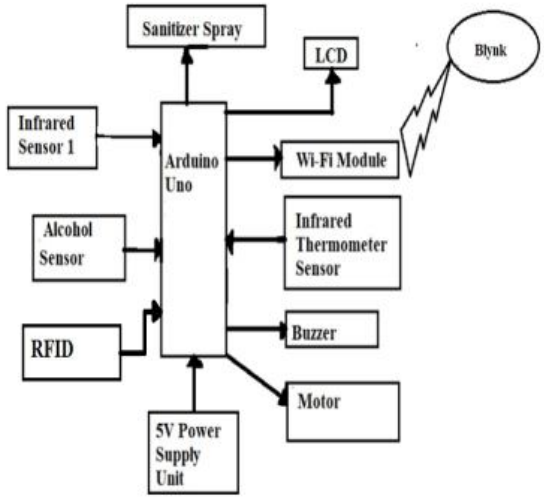

Figure 1 Block diagram of the system proposed

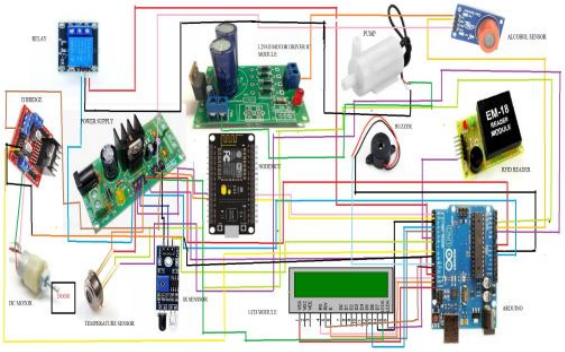

Figure 2 Circuit Implementation

4. PROCESS FLOW

The process flow provides an orderly explanation of the system's operational state. The temperature is monitored and hands are cleaned as soon as the individual exits the door.

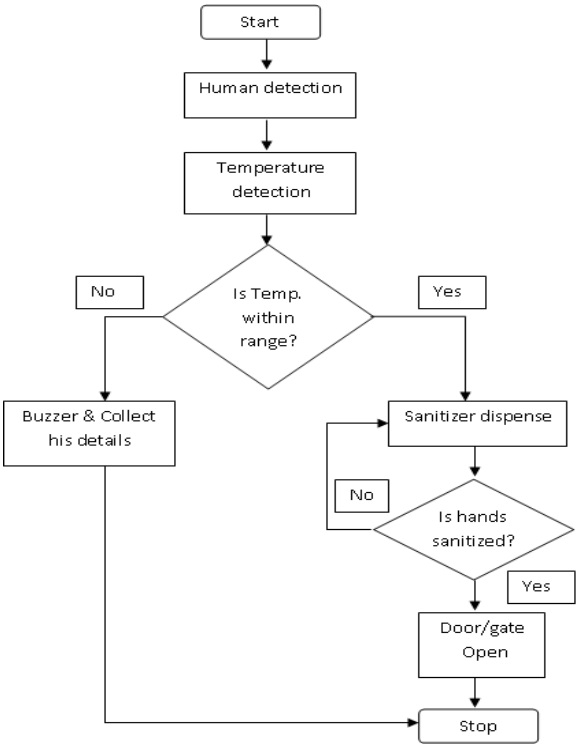

Figure 3 Proposed system

The process flow described above provides an orderly explanation of the system's operational state. The movement of the person trying to open the door will be picked up by the IR sensor. The infrared temperature sensor then determines his body temperature. The buzzer sounds if the body temperature is higher than the target temperature; otherwise, the sanitizer is dispensed. Finally, the door will open on its own.

5. Results And Discussion

The Arduino Uno is used as a microcontroller in the proposed work to calculate the distance between the sensor and the hand placed below it. If the distance is less than 5 cm, the pump runs for 30 seconds through a relay and pumps out a small amount of liquid alcohol-based hand sanitizer while simultaneously sensing the distance every 1000 milliseconds. The suggested model and LCD display are shown in Figures 4 and 5 under various situations.

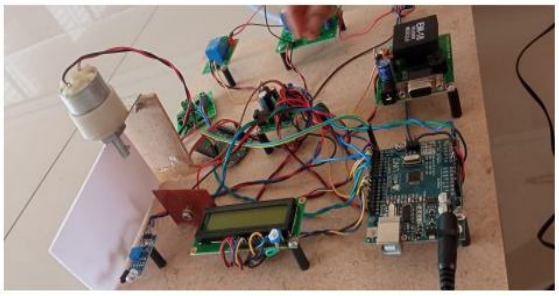

Figure 4 Model of a proposed work

Figure 5 Various conditions are displayed on LCD display

6. CONCLUSION

The system is largely built with the goal of developing entirely automated features that minimise person-to-person contact, ultimately halting the transmission of the COVID19 virus. These features will also prevent sick people from entering crowd areas, thereby lowering the risk of the disease spreading. Given that hand sanitization is required at all access points, the system unquestionably aids in implementing hand hygiene without any difficulties. Due to its touchless feature, which completely eliminates the possibility of cross contamination, it is much safer and more advisable. This technology is simple to use, inexpensive, and open to everyone. The gadgets all communicate effectively. Here, it may be determined that the system has been executed successfully and that the goal has been attained without any deviations.

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AUTHOR

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