Contactless Temperature Monitoring Gate

Gunjan Sureka, Chetana Bhajbhuje, Priti Paunikar, Pooja Charde, Shruti Badwaik , Prof. Pankaj Taklikar

Department of Electronics & Telecommunication Engineering

S.B.Jain Institute of Technology, Management & Research, Nagpur.

1. Introduction

The main objective of the system (temperature scanning gate) is to monitor the human body temperature when they passed through the gate. In a normal situation, the gate is always open. If the gate senses any symptom (body temperature more than 99°F), the gates automatically reject the entry by closing the gate. The gate also provides a warning while the body temperature of a person is high. A body Temperature based access control system is very essential nowadays.

A major challenge to prevent the COVID19 infection is imposing social distancing, especially in public places. Thus, we have come up with a combined system of automated social distancing gate and body temperature machine using Arduino-driven ultrasonic and infrared thermometer sensors.

Our world is affected by covid-19. This temperature screening gate is useful for public places such as bus stops, hospitals, restaurants, airports, grocery stores, and shopping malls, etc. The implementation cost of this gate is also cheap (compare with the heat camera).

We planned to install this entry gate system to the college entry gate. Every student will enter college only after measuring body normal temperature. If anyone has a fever the system will turn of the siren. Gate will not be opened for the person with a fever. This way our goal is achieved.

2. Abstract

The recent advances in electronics and microelectronics devices allow the development of new low-cost monitoring tools used by peoples for health preventive purposes. Fever the most common symptom of covid19. One person with fever can infect even hundreds of people.

For this, we have designed a system to measure temperature on the entrance and the system named "Contactless Temperature Monitoring Gate". It can be installed anywhere as an entry gate. It is based on a contactless infrared temperature sensor and microcontroller board.

Sensors used in medical equipment convert various forms of human body vital signs into electrical signals. Therefore, the healthcare monitoring systems considering non-invasive and wearable sensors with integrated communication mediums allow an efficient solution to living a comfortable home life. This paper presents the monitoring of human body temperature contactless by means of Arduino controller with different sensors. The proposed system is comprised of an Arduino controller, Ultrasonic sensor HC-SR04, GY-906 MLX-90614ESF temperature sensors. The obtained result has shown that real-time temperature monitoring data can be transferred to an authentic observer by utilizing internet of things (IoT) applications. The findings from this research indicate that the normal temperature is about 98°F and the temperature greater than this value is an infected body.

3. Past Work Done

Today, with the COVID-19 pandemic, non-contact body infrared thermometers have are easily and widely available in the market. The accuracy of these thermometers has been proved already to fit health care needs in people for obtaining body temperatures [1][2][3].

We have carried a survey for two research papers.

- The paper titled as Implementation of Automatic Contactless Temperature Sensing and Door Access authorized by Vinod BG & by Tejas A published in the year 2020 by the International Journal of Advanced Research in Computer and Communication Engineering (IJARCCE) suggests that if the automated thermal screening process is used in such place, it not only makes the screening process fast but also stops the possible spread of infection to a great extent. The manual system in which monitoring was required, needed lots of money to maintain and was expensive, using the above system the users can cut the cost and dependency on the manual system.[5]

- Another paper titled as Design and Development of Arduino Based Contactless Thermometer is authorized by Md. Abdullah Al Mamun, Mohammad Alamgir Hossain, M. Muntasir Rahman, Md. Ibrahim Abdullah & Md. Shamim Hossain published in the year 2020 by the IITM Journal of Management and IT states that the system depicts the development of a contactless thermometer. This system will help for making any contactless thermometer and measuring temperature without contact. In addition, the contactless thermometer is more advantageous in the application, especially in the medical field. [6]

4. Methodology
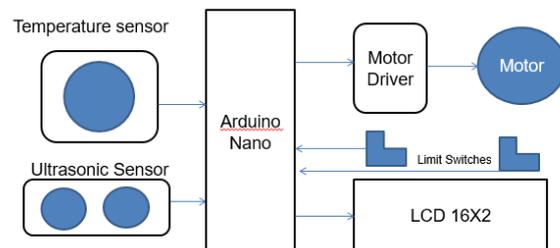
Figure 1: Block diagram for contactless temperature monitoring gate
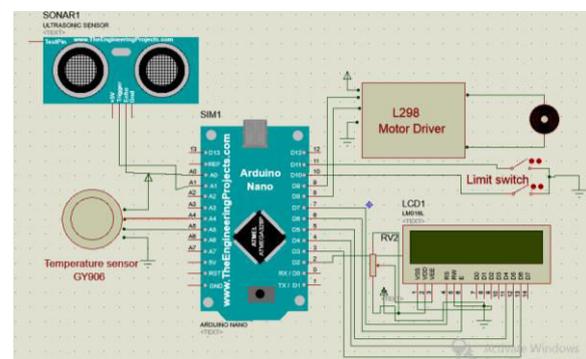
Figure 2: Circuit Diagram

- **Algorithm**

- Start
- Wait for Hand to get detected to start reading temperature.
- Read temperature and compare it with threshold temperature.
- If no fever detected open the door.
- Else turn off the siren.
- Repeat from the 2nd step.

- **Description**

- Firstly, the Ultrasonic Sensor detects the object &the IR temperature sensor reads the data from the body.
- The received data is then sent to the arduino for further processing. Now the Arduino displays the data on the LCD.

- Also, it accordingly gives the instruction to the motor driver to open or close the boom barrier.
- If the temperature sensed is high, the barrier will get the instruction to remain closed and the buzzer will ring too.

5. Result

• It is most useful for the public places in the current pandemic situation of covid-19 running out in the world.

• This temperature screening gate is useful for every public place such as bus stops, hospitals, restaurants, airports, grocery stores, and shopping malls, etc.

• As a result we have successfully developed a Temperature based gate control system.

• Temperature is detected precisely.

6. Conclusion

The COVID-19 pandemic is considered the most crucial global health calamity of the century and also the greatest challenge that humankind is facing. The common symptom of infection is Fever. If a screening is done the possible spread of the virus can be controlled to a certain extent. This system enables a fully automatic contactless screening for door access. The thermal screening process nowadays is done manually and it not only becomes very difficult when it comes to large scale but there can be negligence of the guards too. In places like airports, railway stations, and metro stations thousands of people arrive and depart which are hotspots for the spreading of the virus. This system can be embedded into already existing automatic doors or glass doors with very few modifications.

We can conclude that our system will be effecti

7. References

1) E. Chiappini, S. Sollai, R. Longhi, L. Morandini, A.Laghi and C.E. Osio, "Performance of noncontact infrared thermometer for detecting febril children in hospital and ambulatory settings. J Clin Nurs., vol. 20 no. 9-10, May 2011, pp. 1311- 1318.

2) M.U. Selent, N.M. Molinari, A. Baxter, A.V. Nguyen, H. Siegelson, C.M. Brown, "Mass screening for fever in children: a comparison of 3 infrared thermal detection systems," PediatrEmerg Care, Vol. 29, no. 3, Mar. 2013, pp.305- 313.

3) C.G. Teran, J. Torrez-Llanos, T.E. TeranMiranda, C. Balderrama, N.S. Shah, P. Villaroel, "Clinical accuracy of a non-contact infrared skin thermometer in pediatric practice," Child Care Health Dev., vol. 8, no. 4, Jul. 2012, pp. 471-476.

4) https://create.arduino.cc/projecthub/roboticsbangladesh/con-tactless-temperature-monitoring-gate-e2f149?ref=search&ref_id=automatic%20temperature%20check&offset=3

5) "Implementation of Automatic Contactless Temperature Sensing and Door Access" by Vinod BG & Tejas A Publisher: IJARCCE, ISSN 2278-1021 [online] available at: https://ijarcce.com/papers/implementation-of-automatic-contactless-temperature-sensing-and-door-access/

6) "Design and Development of Arduino Based Contactless Thermometer" by Md. Abdullah Al Mamun, Mohammad Alamgir Hossain, M. Muntasir Rahman, Md. Ibrahim Abdullah & Md. Shamim Hossain Publisher: IITM Journal available online at: https://www.researchgate.net/publication/

342304809_Design_and_Development_of_Arduino_Based_Contactless_Thermometer

7) "Design of a contactless body temperature measurement system using Arduino" by Asif A. Rahimoon, Mohd Noor Abdullah & Ishkrizat Taib available online at: https://www.researchgate.net/publication/344027413_Design_of_a_contactless_body_temperature_measurement_system_using_Arduino

8) https://nevonprojects.com/auto-temperature-detector-for-entrance-for-covid-safety/

9) "COVID-19 tracker," Republic of the Philippines Department of Health, 23 July 2020, https://www.doh.gov.ph/covid19tracker.

10) Healthy Pilipinas, Philippine Department of Health, 24 July2020,https://covid19.healthypilipinas.ph/?la ng=en./

11) "Coronavirus disease (COVID-19), Situation Report-185," World Health Organization, 23 July 2020, https://www.who.int/docs/defaultsource/coronaviruse/situationreports/20200723-covid-19-sitrep185.pdf?sfvrsn=9395b7bf_2.

12) T. Saminathan, A. Musipatla, P.M. Varma, P. S. Khan, P. and G.M. Kumar, "IoT Based Automated Waste Segregator for Efficient Recycling," International Journal of Innovative Technology and Exploring Engineering, vol. 8, no. 6S, Apr. 2019, pp. 164-166.

13) S.M. Samreen, B. Gadgay, V. Pujari and B. Pallavi,"Automatic Metal, Glass and Plastic Waste Sorter," International Journal for Research in Ap

14) V. Shastri, S.M. Tayde, A. Pahchare and A. Maharashtra, "Automated Waste Monitoring and Segregation for Efficient Recycling," International Research Journal of Engineering and Technology, vol. 6, no. 12, Dec. 2019, pp. 1128-1133. plied Science and Engineering Technology, vol. 5, no. 6, Jun. 2017.

15) V. Mishra, D.K. Mishra and Trivedi, "Health Monitoring System using IoT using Arduino Uno Microcontroller," International Research Journal of Engineering and Technology, vol. 6, no. 8, Aug. 2019, pp. 739-744.

16) N.D. Shinde, M. Yerankar, O. Shinde, A. Aute, and J. Jeyavel, "Heartbeat Monitoring System With Temperature Sensor," International Research Journal of Engineering and Technology, vol. 6, no. 4, Apr. 2019, pp. 2138-2141.