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AUTOMATIC SANITIZATION TUNNEL WITH TEMPERATURE MEASUREMENT

Rutvij Mahamuni*[1], Rutuparna Patil[2], Sarvesh Patil[3] , Shashikant Kale[4]

*[1]*Student, Instrumentation Department, AISSMS IOIT, Pune, Maharashtra, India*
*[2] *Student, Instrumentation Department, AISSMS IOIT, Pune, Maharashtra, India*
*[3] *Student, Instrumentation Department, AISSMS IOIT, Pune, Maharashtra, India*
*[4] *Assistant Professor, Instrumentation Department, AISSMS IOIT, Pune, Maharashtra, India*

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Abstract: The COVID 19 pandemic scenario has affected the world when it was least expected. Hence, we were left with no pre-existing or readymade solutions to fight this disease. The concept of our project, Automatic Sanitization Tunnel with Temperature measurement is also on similar lines. To study about this concept we had to search for previously carried out works. But upon study, we found that no material on direct topic is available. Hence after brainstorming on our concept, we figured out various systems involved in out project and started searching for pre-existing works on those systems. In this process we came across study of contactless body temperature measurement. Also we came across a project which was on similar lines as ours but with different design and construction. In this literature survey review, we discuss the works contributed by various authors till date.

KEYWORDS:*COVID-19, temperature measurement, Sanitization, Precautionary measure, literature*

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I INTRODUCTION

In this project, we aim to build an Automatic Sanitization Tunnel with Temperature Measurement. For the background study, we looked up for the available literature on the subject or previous trials in making such system. In this COVID-19 pandemic scenario, we have understood the importance of regular sanitization of our hands and temperature monitoring. However, the virus can be present anywhere on body. So sanitization of hands is a very basic protection method, especially while visiting places with large number of people coming into contact (eg. Banks, schools, colleges, government offices, etc.). Also the manual temperature measurement methods put the operator in the risky zone with infected person, if any. To overcome these challenges, we are concentrating on following applications:

1) Contactless Temperature monitoring
2) Automatic full body sanitizer spraying
3) Sanitizer level monitoring

We intend to find literature sharing similar aim or trials of the systems working on similar lines

II LITERATURE SURVEY

1. In this paper by Mr. Leo Louise[1], the author has described how Arduino can be used in study purposes and as an affective research tool. Arduino is an open source microcontroller board capable to be programmed, executed and altered whenever and as many times as necessary. It was created in 2005 as a platform for hobbyists, students and professionals to work with sensors and actuators. It can be programmed using Arduino IDE software which enables user to write code into, compile and upload to board and also access the serial monitor. Arduino board can be programmed using C or C++ language in Arduino IDE. Mainly, there are three types of Arduino boards based on the size and applications. Almost all boards use Atmel made ATmega328 microcontroller. However there are modules known as shields which are used for special applications. Some main shields are Ethernet shield, Wireless shield and Motor Driver shield. In terms of hardware, any regular Arduino board consists of a microcontroller, an external power supply, a USB port of communication, Analog and digital I/O ports, PWN pins, Input supply, output supply, ground pin, Reset button and in-built LED. The programming of Arduino takes place in two parts mainly, i.e. void setup (), where the pins are designated and initialized, and void loop (), where the functioning program is written which keeps executing in a loop.
   Because of its simplicity, ease of operation and compatibility with multiple OS, Arduino boards are preferred on a large scale for making small and medium scale projects. The author has explained all the necessary parameter about the Arduino microcontroller very neatly in this paper.
2. This research paper by Md.Abdullah Al Mamun et.al [2] describes making of Arduino based contactless thermometer. This project was built, taking into consideration the norms of social distancing, which are necessary during the COVID-19 pandemic situation. The contactless temperature measurement was one of the key features in this project. The project was built using an Arduino UNO, MLX90614 temperature sensor and OLED display. The author also incorporated a LED/IR light for accurate targeting for temperature measurement. MLX90614 sensor was used because of its small size which was necessary factor in designing. The programming was done in such a way that when initialized, the OLED display and

temperature sensor are initialized and the process goes into a loop. In this loop, the temperature sensor monitors the temperature continuously and displays it on the OLED display. The initialization of the system was controlled using a push button switch. Although there are viable solutions available in market, this device can prove to be a good and economical DIY project. Also making such a device from scratch also enables for the approach towards a wider future scope.

3. This paper by Goda Vasanthrao et.al describes the construction of a sanitization and disinfection tunnel considering the COVID19 pandemic situation. The system uses Arduino UNO board, PIR sensor, TMP36 temperature sensor, LCD display, DC motors and relay. The proposed system consists of PIR sensor for human presence detection, temperature monitoring and alarming, temperature display and sanitizer spraying using DC motor. The author describes various types of Arduino board, a reference to research paper by Mr. Leo Louise. The author proposes using Arduino UNO board to control the whole system. A relay and buzzer is connected to the Arduino board to control motor for spraying sanitizer and to sound an alarm in case of high temperature detection. A PIR sensor detects human presence and then the temperature sensor is initialized. The measured temperature is displayed on LCD screen. In case temperature higher than normal, an alarm is sounded, as it is one of the important factors in COVID19 screening. The person with normal temperature is then allowed into sanitization area where the person is sprayed with sanitizer. There is also a conveyor system equipped with UV lights and blower. The belongings of the person can be placed in the conveyor which is made virus free using UV rays, which have the potential ability to eliminate virus threats. The air blower is used to blow off any dust particles on the objects. Author aims that when the temperature of person is below 99 degree Fahrenheit, alarm will be OFF and person will be sanitized. When temperature exceeds 99 degree Fahrenheit, the alarm will be sounded and the sanitization will not be initialized. This solution, when implemented would serve a mass people because of its ease of construct and flexible nature. Also it has a plethora of options for consideration in future scope. However this system needs to be constructed in such a way that it can be easy to install in any possible premises where a crowd in intended.
4. In this paper by Asif A. Rahimoon et.al the author has described design and construction of a contactless body temperature measurement system. To process the data and signal conditioning, the author has proposed the use of Arduino microcontroller. Normal human has body temperature in range of 36.5-37.5 Deg Celsius. It is one of the factors in screening methods for various diseases and health conditions. Body temperature can be measured orally, Axillary or Rectally. It also depends on metabolism and emotional states. In the proposed system, the author has focused on using Arduino CT-UNO microcontroller. It is based on Arduino MEGA microcontroller. There are two temperature sensors used in this system, namely, LM35 (contact type) and MLX-90614 (contactless type). These two sensors measure the environment temperature for reference and body temperature for actual measurement. There is also Arduino Wi-Fi shield used which helps in uploading the recorded data to cloud based server for record keeping purposes. The system described by author can be a good futuristic approach in field of Biomedical Engineering as it has scope for cloud data storage along with vital function of temperature measurement.
5. In this paper by Bin Ning et.al, author discusses on contactless measurement of body temperature. It consists of the development of infrared temperature measurement. It gives benefits like non-contact, quickly and accurately measuring of moving and high temperature objects. We can develop a Infrared thermometer for high temperature object under the premise of high measuring accuracy and low cost. A quick and accurate measurement of the surface temperature for an object was realized using this method.
6. In this paper, author describes the purpose of the presented IoT based sensor-fusion assistive technology for COVID-19 disinfection termed as “Smart epidemic tunnel” is to protect an individual using an automatic sanitizer spray system equipped with a sanitizer sensing unit based on individual using an automatic sanitizer spray system equipped with a sanitizer sensing unit based on human motion detection. The presented research work discusses a smart epidemic tunnel that can assist an individual in immediate disinfection from COVID-19 infections. The authors have presented a sensor-fusion-based automatic sanitizer tunnel that detects a human using an ultrasonic sensor from the height of 1.5 feet and disinfects him/her using the spread of a sanitizer spray. Findings The investigation results validate the performance evaluation of the presented smart epidemic tunnel mechanism. The presented smart tunnel can prevent or disinfect an outsider who is entering a particular building or a premise from COVID-19 infection possibilities. Furthermore, it has also been observed that the presented sensor-fusion-based mechanism can disinfect a person in a time of span of just 10 s. It also provides daily, weekly and monthly reports of the counts of individuals, along with in-out timestamps and power usage reports. The presented system has been designed and developed after the lock-down period to disinfect an individual from the possibility of COVID-19 infections. The presented smart epidemic tunnel reduced the possibility by disinfecting an outside individual/COVID-19 suspect from spreading the COVID-19 infections in a particular building or a premise.
7. In this paper by Vikramsingh R. Parihar, et.al the author has described a system to monitor a remotely located patient’s heartbeat and temperature using wireless sensors and based on ATmega328 (Arduino Uno). This system is designed while fixating on target of real time monitoring of a remote patient. The system consists of sensors which measure the above mentioned vitals of the patient and are interfaced with the microcontroller. The readings measured by the sensors are

displayed on the LCD monitor. The data of readings gathered by sensors is then sent to the microcontroller. The microcontroller then wirelessly transmits the data to remote receiver like doctors or the data keeping and report generation system where it is again displayed to the final user. This system has many advantages in monitoring patients who are being attended at home. Also this system can be beneficial for critical patients, where doctors need to receive immediate reports of changes in vital levels, remotely.

8. In this article by Kyi Kyi Khaing et.al, authors describe about importance and design of a system based on ATmega328 microcontroller for controlling temperature. Temperature control is used in various devices and environments. They believe that with the advancements in technology, the temperature can be precisely monitored and controlled even more easily and flexibly than before. They aim of accomplishing the target of building such a system by using the LM35 sensor for temperature measurement and interfacing it to Arduino microcontroller. The sensor will measure the temperature and send the data to microcontroller accordingly. The microcontroller will then take necessary actions to regulate the temperature. They intend to design this system as a replacement to conventional PID temperature controllers and overcome their shortcomings. Also use of Arduino would hugely facilitate easy modifications in programming at any required instance.

III CONCLUSION:

While going through the literature, we came across numerous solutions offering clues about designing a system which would fulfill our aim. Also we got an insight about the future scope available for such a system. It also emphasized on our challenges of maintaining the cost to make the system economical while enlightening us with various ways to do the same. However, we didn't get any clear idea about making this system suitable to be used in variety of public places and thus designing it to withstand weather as well as public behavior. Still, we think we have scope for innovation to keep the cost further in check while making the system a perfect and all round economical solution for precaution against COVID-19.

REFERENCES:

1. Leo Louis, "Working principle of Arduino and using it as a tool for study and research" IJCACS Vol 1, No2, April 2016
2. Md. Abdullah Al Mamun et.al, "Design and development of Arduino based Contactless Thermometer." IITM Journal of Management and IT, Vol 11, Issue 1, January-June 2020
3. Goda Vasanthrao et.al, "Temperature Detection and Automatic Sanitization and Disinfection Tunnel-COVID 19" The International journal of analytical and experimental modal analysis, Vol 12, Issue 6, June 2020
4. Asif A. Rahimoon et.al, "Design of a contactless body temperature measurement system using Arduino", Indonesian Journal of Electrical Engineering and Computer science, Vol.19, No.3, September 2020
5. Bin Ning, et.al, "Research on Non-Contact Infrared Temperature Measurement", International Conference on Computational Intelligence and Computer Engineering, **DOI:** 10.1109/CISE.2010.5677034, December 2010
6. Shravil Pandya et.al ,"Smart epidemic tunnel: IoT-based sensor-fusion assistive technology for COVID-19 disinfection", DOI: 10.1108/IJPCC-07-2020-0091, August 2020
7. Vikramsingh R. Parihar et.al, "Heartbeat and temperature monitoring system for Remote Patients using Arduino", IJAERS, Vol 4, Issue 5, May 2017
8. Kyi Kyi Khaing et.al, "Automatic Temperature Control System using Arduino", Article in 'Advances in Intelligent Systems and Computing', March 2020