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AUTOMATIC TEMPERATURE DETECTION FOR ENTRY FOR COVID SAFETY

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Abstract: In view of current situation the COVID-19 has become ubiquitous in every corner of the world. Every individual need to be cautious to overcome the spread of the COVID-19. It has become necessary to predict the COVID symptoms in order to allow the people at the public places and the entrances. One of the early symptoms of covid-19 is high body temperature. It would be difficult to check temperature of everyone, there might be a chance of being in contact with the person which is harmful. An automatic temperature scanning gate is presented to verify the body temperature of any intruder. The main objective of the system is to monitor the human body temperature when the presence of human is detected through the PIR sensor. In normal situation the gate is closed. If the module senses any high temperature (more than 37 degree Celsius), buzzer is activated indicating the detection of covid symptom. Otherwise, the gate is opened, thus allowing the person into the room. The opening and closing operation of the gate is performed by a servo motor. And the LCD displays the persons temperature, being detected by Infrared sensor. In this project an attempt will be made to develop a prototype for Automatic temperature detection system for entry for covid safety.

Index Terms -: Arduino, Temperature Sensor, MLX90614, Servo Motor (L293D), Bluetooth.

I. INTRODUCTION

In this project we will provide service to a room where necessary precautions needed to be taken. The pair of laser diodes with photo detectors can be used to detect the entry of the person. once entry is detected near door the temperature of the person will be checked and if its not above set threshold, then only he will be allowed to go ahead. also the number of entries will be set. e.g. if number of entries is set to 5, then 5 person will be allowed to enter after checking temperature. 6th person will be denied to enter.
The aim of the proposed method is to make use of an infrared temperature measurement solution which is of low cost and can be used by many people which would ensure an accuracy of probably detecting the infected people in prior. At the public places and at the entrances, people
were allowed to enter after scanning their body temperature. It would be difficult to check temperature for all the individuals without missing anyone and there might be a chance of being nearer to the person, which is harmful. Hence, the proposed system could detect the body temperature and open the doors for those temperature is within a threshold limit there by reducing human intervention and if it indicates the temperature greater than the threshold there would be a buzzer/led glow as a sign.

II. LITERATURE SURVEY

1) Nevad petrovic ,Dorde kocic “IOT-based systems for covid-19 indoor safety monitoring.” Conference: IcETRAN 2020 ,At: Belgrade, Serbia

2) Giselle ann alcoran –alvarez, dave u .alvarez marc brian Garcia.” Automated social distancing gate with non-contact body temperature monitoring using arduino uno “.International Research Journal of Engineering and Technology (IRJET). Volume: 07 Issue: 07, July 2020(A buzzer alarms when the detected body temperature is above normal to signal the gate personnel for immediate action. Arduino Uno runs the sensors, speaker and buzzer.)

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4) Dwi Iskandar, Erik Wisnu Nugroho, Dewi Rahmawati, Ikhwan Rozikin.” Automatic Door Control System With Body Temperature Sensor”. International Journal of Computer and Information System (IJCIS). : Vol. 02, Issue 04, September 2021

III. BLOCK DIAGRAM

Arduino takes input from temperature sensor and LDR and process it too decide whether the person has come infront of laser 1 and laser 2 and depending on the temperature of that peron we will decide whether to open the door or not. Figure 1shows the overall block diagram for the social distancing and body temperature monitoring. The main blocks are the Arduino R3, infrared sensors, buzzers, ultrasonic sensor, infrared thermometer sensor, power supply and LCD display. The functions of each block will be explained in the next section.

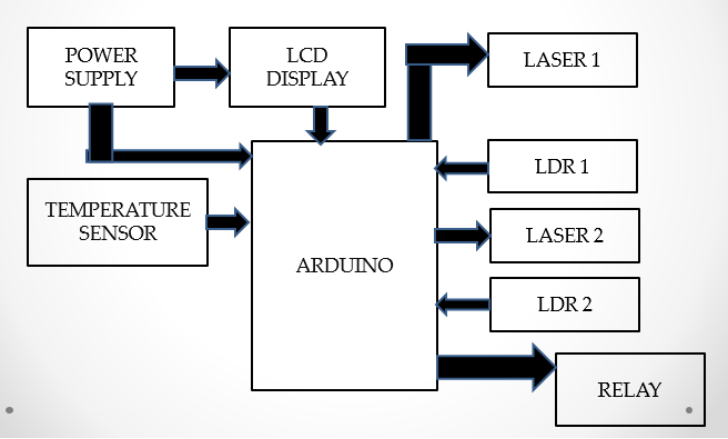

Fig 1: block diagram of automatic Temperature detection for entry for covid safety.

IV.COMPONENTS REQUIRED

4.1. ARDUNIO UNO R3

The Arduino Uno is an open-supply microcontroller board which depends on the Microchip ATmega328P microcontroller and has been created with the aid of Arduino.cc. It could be programmed by the use of the Arduino IDE through a kind B USB cable and could be controlled with the aid of the USB link or via an outdoor 9V battery, but could recognize the voltages between 7V- 20V. The word Uno represents one in Italian and was modified to mark the launch of the software Arduino. The Uno board is the initial one in a sequence of Arduino boards based on USB and starting version 1.0 of the Arduino IDE were the reference variations of Arduino, which have now been advanced to more recent releases. The ATmega328 would be pre- programmed having a bootleader, allowing importing of new code with no use of an outside hardware programmer.

4.2. Bluetooth(HC-05)

HC-05 is a Bluetooth device used for wireless communication. It works on serial communication (USART).It is a 6 pin module.The device can be used in 2 modes; data mode and command mode.The data mode is used for data transfer between devices whereas command mode is used for changing the settings of the Bluetooth module.AT commands are required in command mode.The module works on 5V or 3.3V. It has an onboard 5V to 3.3V regulator.As the HC-05 Bluetooth module has a 3.3 V level for RX/TX and the microcontroller can detect 3.3 V level, so, no need to shift the transmit level of the HC-05 module. But we need to shift the transmit voltage level from the microcontroller to RX of the HC-05 module.

4.3. MLX90614 IR TEMPERATURE SENSOR

is an Infrared (IR) virtual Temperature Sensor that may be used to measure the temperature of a specified item starting from -70° C to 382.2°C without contact. This sensor makes use of infrared rays to find the value of temperature of an object with none physical touch and does communication to microcontroller by making use of the I2C protocol. And this has become viable with a regulation known as Stefan-Boltzmann regulation, as per this law each one object and the living beings emit infrared energy and the depth of this emitted IR power could be proportional to the temperature of the object emitting radiation. So, this sensor would calculate the temperature of an item via finding the amount of infrared energy being emitted from the body. The MLX90614 includes two gadgets embedded as a single sensor, one of it acts as a sensing unit and the other tool acts as processing unit. The sensing unit an Infrared Thermopile Detector (MLX81101) which senses the temperature and the processing unit is a Conditioning ASSP referred to as MLX90302 which could convert the signal from the sensor to a digital value and does communication through the use of I2C protocol. MLX90302 has a low noise amplifier, 17-bit ADC and a powerful DSP which allows the sensor to have high accuracy and better resolution.

4.4. MOTOR IC(L293D)

L293D is a dual H-bridge motor driver integrated circuit (IC).Motor drivers act as current amplifiers since they take a low-current control signal and provide a higher-current signal. This higher current signal is used to drive the motors.L293D contains two inbuilt H-bridge driver circuits. In its common mode of operation, two DC motors can be driven simultaneously, both in forward and reverse direction. The motor operations of two motors can be controlled by input logic at pins 2 & 7 and 10 & 15. Input logic 00 or 11 will stop the corresponding motor. Logic 01 and 10 will rotate it in clockwise and anticlockwise directions, respectively. Enable pins 1 and 9 (corresponding to the two motors) must be high for motors to start operating. When an enable input is high, the associated driver gets enabled. As a result, the outputs become active and work in phase with their inputs. Similarly, when the enable input is low, that driver is disabled, and their outputs are off and in the high-impedance state. They are designed to drive inductive loads such as

relays, solenoids, dc and bipolar stepping motors, as well as their high-current/high-voltage loads in positive-supply applications.

4.5. RESISTORS

A resistor is a 2-terminal electrical component and also a passive element that could provide resistance being a circuit element. These are known to reduce the flow of current and also provide lower voltage in the circuits which include these. These can be used for adjusting the signal levels, to bias the active elements and can be sued for termination of transmitting lines.

4.6. LED

A semiconductor light source which would emit radiation of light whenever flow of current occurs through it. The energy is emitted in the form of photons representing the light. It was because of the recombination of the electrons with the electron openings.

V. CIRCUIT DESIGN

We propose a very cheap solution for measuring human body temperature. Our solution is based on usage of, perhaps one of the most commonly used and cheapest infrared temperature sensors on the market, MLX90614, designed to measure skin temperature with an accuracy of +/- 0.5 o C, in range of 0-60 o C.

In the proposed scheme (Fig.3) we have the following main components: • Arduino Uno board • MLX90614 infrared temperature sensor • HC-SR04 ultrasonic distance sensor •Motor ic L293D

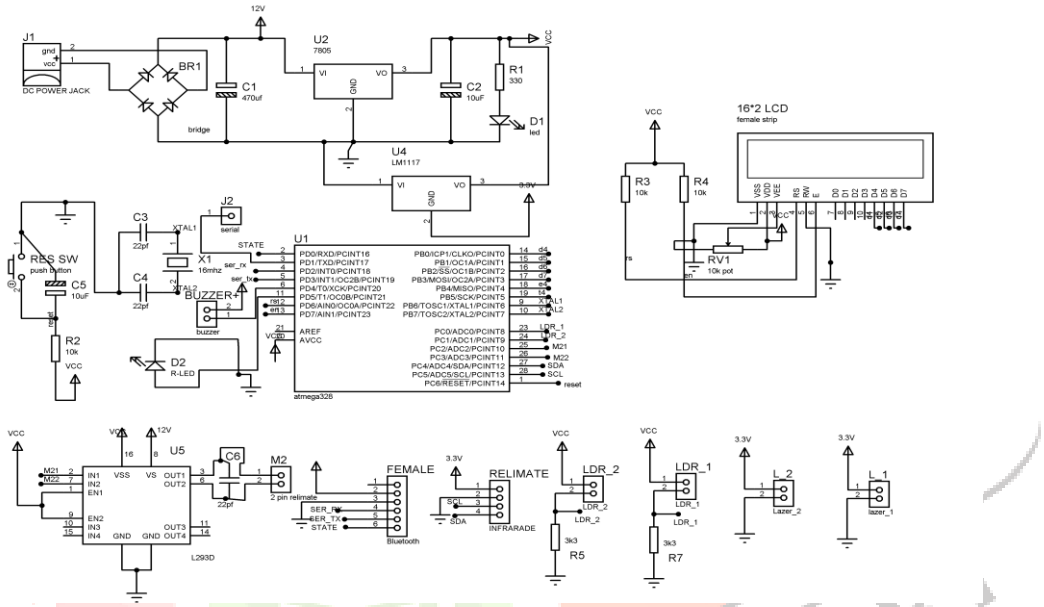

Fig 2: Circuit diagram of automatic Temperature detection for entry for covid safety.

VI. WORKING PRINCIPLE

In this project we simulate a room where such necessary precautions are taken, we make use of a laser diode and receiver to detect the entrance of a person, when person passes through LDR system the temperature sensor senses the body temperature is less than the set temperature the person is allowed entry otherwise the entry is denied. If the room is full, the next person is not allowed to the rooms the system will shows room is full. If the person with high fever is want enter the room the system show the high temperature and the entry is denied.

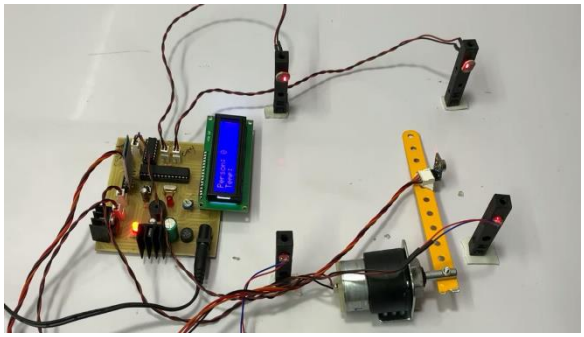

Fig 3: Photograph of built hardware for automatic Temperature detection for entry for covid safety.

VII. ADVANTAGES

The testing of the person for the presence of low and high temperature is easy using this model. There will be no contact between the person and the temperature measuring sensor. The person need not open the door by being in contact with the door. The test being done is fast. There would be no manual errors due to the automatic checking of the temperature.

VIII. DISADVANTAGE

It requires power supply to be connected to make it perform the task which is desired by the user. The failure of a single component affects functionality of the overall system being designed. It is somewhat costlier than the normal thermal scanner which is being used now-a-days.

IX. CONCLUSION

It can be deduced that the development of smart gate/door based on temperature detection could help reduce the risk of spreading the virus. It also helps in identifying the individuals with the symptoms. It decreases the intervention of human detector. It has the immediate societal impact. The plan of reasoning based keen entry way has been introduced which was prepared by temperature sensor. This is somehow served to guarantee guests follow wellbeing conventions set up by the public authority and to forestall the spread of COVID-19 in open zones. The proposed arrangement is intended to be cost proficient and simple to use for fever screening, using a MLX90614 infrared temperature sensor that offers quick input to the client. The estimation framework is appropriate for establishment in an indoor fixed position, similar to the passageway at the entry of a room. Adjustment was performed on the sensors and the fever limit utilized in the calculation was set to a certain normal temperature in degree Celsius. Hence, a smart gate/door can be designed which would have the immediate societal impact in the present situation.

X. FUTURE SCOPE

The proposed small module can be implemented in real life applications such as at the Railway entrances, Office entrances etc. This could be achieved by developing the module with appropriate design and suitable structure. An automatic hand sanitizer and the also the mask detector can be incorporated into the proposed system so that better precautions can be taken during the pandemic situations.

XI. REFERENCES

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