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Auto Temperature Detector at Any Entrance using Arduino

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Abstract— COVID 19 has made a huge impact on the society, where many restrictions have been made only particular number of users allowed in a room in offices, shops, etc. to maintain the necessary measures like social distancing, along with social distancing regular temperature check at entrances of malls, the office is mandatory. In this project stimulate a room where such necessary measures are taken. In this we make use of a laser diode and receiver to detect the entrance of a person, when the project detects entrance of the person it will check the temperature of the person, if the temperature is less than the set temperature the person is allowed otherwise the entry is not allowed.

Keywords— Arduino, IR Sensor, MLX90614, Servo motor SG90.

I. INTRODUCTION

During the pandemic, all the offices were closed because of Coronavirus. This project can be quite useful to the offices because it can be installed outside the office and it will help to sense the temperature of every person who

is entering in the office. It, has an IR sensor that will detect the person coming and will start the whole project by showing an alert on the LCD. That is, if any person is detected by the IR sensor it will show 'alert ', After that, it will give input to the temperature sensor. Before any person enters the office, the temperature sensor will sense the temperature and show it on the LCD in both Fahrenheit and Celsius. If the temperature of the person is more than 37.5degree Celsius or 99.5Fahrenheit then the servo motor connected to the door will remain close, the piezo will also start sounding and the alerting led will be stay off. And if the temperature of the person is less than 37.5degree Celsius or 99.5Fahrenheit then the servo motor connected to the door will be turned on, the piezo will turned off and the alerting led will stay off.

II. EXISTING WORK

In this work, the system is used to detect the temperature only, and we check the temperature manually. There are some drawbacks in this case, the system uses microcontroller including low accuracy and long measuring period.

In this case the system uses microcontroller operation to an IR sensor it may difficult to check body temperature in a timely manner automatically and accurately. In this system, the temperature sensor is used as an input source and is analyzed by the microcontroller. The microcontroller reads only digital signals, but the temperature sensor produces an analog signal. So, to convert that signal, we use an analog-to-digital converter. After analyzing the digital signal, the temperature is displayed on the LCD display.

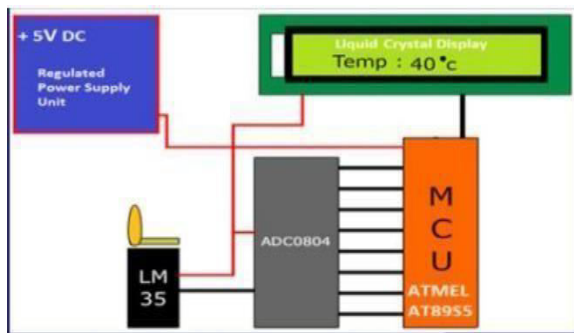


Fig. 1. Block diagram of Existing Work

III. PROPOSED WORK

In this work, we can avoid human contact and manual errors, and we can also increase the speed of the operation by using Arduino. In recent days, regular temperature checks have become mandatory to avoid human contact. We have used the temperature sensor, IR sensor, buzzer, LCD, servo motor and Arduino.

In this proposed system, there are two cases.

Case1: When the person wants to enter the room, the IR sensor detects the person's entry and turns on the temperature sensor. The temperature sensor checks the temperature and it is analyzed by the Arduino. If the

temperature is lower than the set temperature, the gate will be opened to allow that person, when the person cross the gate the IR sensor2 will detect the person and close the gate.

Case2: When the person wants to enter the room, the IR sensor detects the person's entry and turns on the temperature sensor. The temperature sensor checks the temperature and it is analyzed by the Arduino. If the temperature is higher than the set temperature, the person will not be allowed to enter, and the gate will remain closed, the servo motor is still turned off, the buzzer will sound to alert you.

IV. BLOCK DIAGRAM

The block diagram of proposed work as shown below;

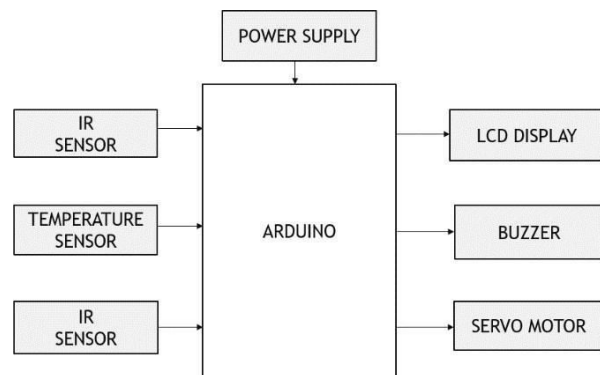


Fig. 2. Block diagram of Proposed Work

ARDUINO

The Arduino is a small, consistent and open-source development Arduino board based on ATmega328P or ATmega628. The operating voltage of Arduino is 5V and it has 14 digital pins and 8 analog pins.

The digital pins are used to interface sensors by using them as both input and output pins. The analog pins are used to read the values of sensors of the input and output pins. The input voltage is in between 7 to 12V.



Fig. 3. Diagram of Arduino

IR SENSOR

An Infrared Sensor is an electronic device that can measure heat and detects the motion of the object. It emits the light in order to detect or sense the objects around the surroundings. In this sensor Infrared Light emitting diode is used as emitter, and photodiode used as a detector.



Fig. 4. Diagram of IR Sensor

The IR sensor includes five important parts - IR Tx, Rx, Operational amplifier, trimmer pot (variable resistor) & output LED. The operating voltage is 5volts and the range is up to 20cm.

TEMPERATURE SENSOR

The MLX90614 is an Infrared thermometer for non-contact temperature measurements. The temperature sensor uses IR rays to measure the temperature of the object without any physical contact. It consists of serial

data and serial clock pins and are used for I2C communication. The distance between the object and sensor should be 2cm to 5cm approximately.



Fig. 5. Diagram of Temperature Sensor (MLX90614)

MLX90614 is an Infrared thermometer for the noncontact temperature measure. Both the IR sensitive thermopile sensor chip and the signal exertion ASSP are integrated in the same TO-39 can. Thanks to its low noise amplifier, 17-bit ADC and important DSP unit, a high delicacy and resolution of the thermometer is achieved. The thermometer comes plant calibrated with a digital PWM and SMBUS affair. Thanks to the low noise amplifier, high resolution 17-bit ADC and important DSP unit of MLX90302 high delicacy and resolution of the thermometer is achieved. The recommended object and ambient temperatures are stored in RAM. MLX90614 with resolution of 0.01 °C. They may be accessed through the device's 10-bit PWM (Pulse Width Modulated) output via a two-wire serial SMBUS compliant interface (0.02°C resolution).

LCD

A Liquid Crystal display is a thin, flat display made up of any number of color or monochrome pixels arrayed in front of a light source or a reflector. Each pixel consists of column of liquid crystal molecules suspended between two transparent electrodes, and two polarizing filters, the axes of polarity which are perpendicular to each other. Without the liquid crystals between them, light going

through one would be impeded by the other. The liquid crystals twist the polarization of light entering one filter to allow it to pass through the other.



Fig. 6. Diagram of LCD

BUZZER

A buzzer is an audio signaling device which may be in the form of mechanical, electromechanical, or piezoelectric. The main function or operation of this is to convert the audio signal to sound. The Buzzer has two pin configurations, a positive pin and a negative pin. The frequency range of the buzzer is 3,300Hz. The operating voltage ranges from 3v to 24v.



Fig. 7. Diagram of Buzzer

SERVO MOTOR

A servo motor is a linear or rotary actuator which provides fast precision position control for closed loop control applications. Servo motors have high speed response and are designed with long router length and

small diameter. It can also push or rotate an object with great precision. It consists of AC and DC motors. The operating voltage is 5v and operating speed is 0.1s.



Fig. 8. Diagram of Servo Motor

POWER SUPPLY

The power supply is an electrical gadget that provisions electrical capacity to the electrical burden such as computers, laptops etc., The main operation of the power supply is to convert electric current from a source to the current voltage. The power could be Ac to Dc or Dc to Ac.

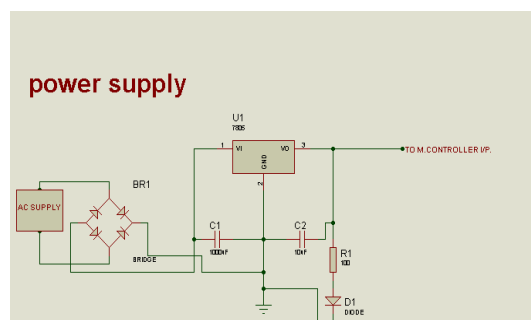


Fig. 9. Circuit diagram of Power Supply

V. CIRCUIT DIAGRAM

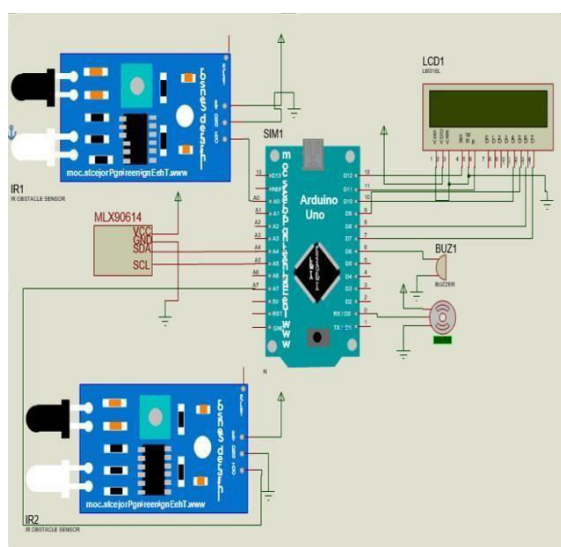


Fig. 10. Circuit diagram of Auto temperature detector system

In the proposed system, the major components are Arduino, IR sensor, contact less temperature sensor (MLX90614), buzzer, LCD display, and servo motor. The IR sensor1 is connected to the Arduino pin A0 and the IR sensor2 is connected to A7. The contact less temperature sensor (MLX90614) is connected to pins A4, A5. The buzzer is connected to pin 6. The servo motor is connected to pin RX. The LCD display is connected to pins 7,8,9,10,11,12. And the applied power supply is somewhere between 7 and 12.

VI. WORKING

The heart of the system is Arduino, the microcontroller. The signal attained from the IR detector is being connected to the leg A0 of the Arduino. Originally the presence of any human is detected by the IR Sensor, which can be achieved by seeing any moving object. The estimation of temperature is done by using contactless infrared temperature detector (MLX90614). Whenever the affair from the IR sensor is plant to be high, also

the measure of temperature is being considered for deciding whether to open the door or not. The passengers pass one by one. The inputs to the Arduino are the IR Sensor, MLX90614. The affair of the Arduino is given to LCD and the Micro Servo motor SG90. The periodical timepiece and periodical data of the MLX90614 temperature detector are connected to pins A5, A4 independently to the Arduino. The communication is grounded on the I2C protocol. The temperature being measured by MLX90164 is checked by the Arduino detects the temperature to be within the limit. Whenever the Arduino detects the temperature to be within the limit set by the stoner, also the Arduino sends palpitation range modulated signal to the servo motor, being connected to leg D0. Then the servo engine pivots from 90 degrees to 180 degrees to open the entryway for permitting an individual person. After the person enters the room, IR sensor2 produce signal to Arduino immediate the door has to be closed so that the coming arriving persons entry can be confined. This is done by rotation of servo motor from 180 degrees to 90 degrees. Hence the door can be closed. This is applicable in the case of single door entry. In case of temperature value measured is plant by the Arduino to be outside the set limit, then there is no movement of the door. Rather, the Arduino activates the Led to glow or the buzzer as a sign of indication of the high temperature human body being detected by the proposed system.

VII. RESULT

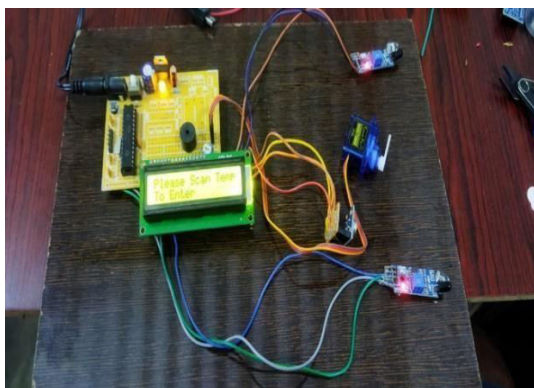


Fig. 11. The final result of the proposed work

VIII. CONCLUSION

It can be deduced that the evolution of the gate based on temperature detection can reduce the risk of transmission of viruses. It can also identify the individuals with symptoms, and it has immediate social consequences. This is somehow done to guarantee that the guests follow the prosperity conventions set up by the public authorities and to anticipate the spread of COVID-19 in open zones. The proposed arrangement is intended to be cost-efficient and simple to use for fever veiling and using an IR sensor to get the quick output of the customers. The estimation framework will be installed in the room's passageway, and the temperature sensor will be calibrated so that the limit temperature is set to the normal temperature in degrees Celsius. Hence, a smart gate can be designed which would have situation.

IX. FUTURE SCOPE

The proposed compact module can be used in real-world applications such as railway and office entrances, among others. This could be achieved by developing the module with appropriate design and suitable structure. An automatic hand sanitizer and also, the mask detector can be incorporated

into the proposed system so that better precautions can be taken during the pandemic situations. It may be made at home for a very low cost and installed everywhere, office educational institutions, public transportation and conventional business. There is a higher need for contact less body temperature monitoring devices as a result of rise of the covid 19 disease.

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