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ARDUINO BASED TEMPERATURE DETECTION AND FACE MASK MONITORING SYSTEM

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Abstract: The novel coronavirus diseases have been increases day by day, wearing of facial masks and social distancing plays a crucial role in controlling the spread of virus. We find some people are not wearing facemasks in public places, seems rapidly increases the spread of virus and might results serious health problem. Hence, to avoid such situations we have to make people aware of wearing face masks, but an individual cannot involved for the process. Therefore, focusing on the situation here we came across the automatic machine, which is very easy to used and contactless device. We propose a fully automatic temperature and face masks monitoring entry systems. A person without scanning temperature and masks will not provide entry. The only person who wear mask and normal body temperature as per setup allowed inside otherwise not allow. The system uses temperature sensors and camera module connected with Arduino, which regulates the entire operations.

Keywords: Arduino, esp32 camera, ultrasonic sensor, mlx90614, coronavirus.

I. INTRODUCTION

Since the end of 2019, coronavirus infection disease has seen for the first time. The virus has spread all over the world and it has become world public health issue. The two major causes of virus spread are the respiratory droplets and physical contact between peoples. It shows that the virus effect different people in different ways. Some infected people will recover within a week without hospitalization, and for others it required special treatment. The older people and those with underlying medical conditions like diabetes, respiratory diseases, and some other disease are more likely to serious illness. An individual suffering from Covid-19 has become seriously ill or die at any age. The most common symptoms of virus are fever, cough, tiredness, loss of test or smell, headache, difficulties in breathing etc. it seems that the virus has classified into different categories. These viruses are more likely to cause serious illness. In 2021, a variant of a coronavirus emerged and was name omicron by World Health Organization. However, the normal life has been restore even in covid situation because several students or workers facing lots of problem, but restoring normalcy while ensuring the safety and security are not compromised at any cost in organization. In the current scenario, IoT offers various application such as mask, provisions for self-isolation at home while being monitor by medical facilities and smart ventilators, several smart health devices. Covid -19 causes major losses in human population across the world. However, the vaccine of covid has been introduced and is achieving an effectiveness against the symptoms, getting vaccinated against covid is a key part of prevention, but following the precautions like thermal screening wearing of facial mask, social distancing and hand sanitization plays a vital role in controlling the flows of such type of diseases. In this situation, the proposed model will certainly help to ensure the safety and health of peoples.

II. THE PROBLEM

Due to the spread of covid-19 also called coronavirus, has affected almost every aspect of people's lives globally. The government has set mandatory rules and made some procedures that followed by citizens, which includes thermal scanning, wearing of face mask and hand sanitization at the entry of crowded places, in order to control the flow of virus. The manual temperature scanning has many disadvantages, sometimes there will be a human error in reading values, and the manual system is not manageable in place where large number of people travels.

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III. PROPOSED SOLUTION

With the help of contactless temperature check-up and facemask detector door access system using mlx90614 sensor, esp32camera and Arduino along with other hardware. The system made automatic which can maintain the rules set by government to control the flow of diseases. The system is make user friendly, implementing this system in collages, airports, shopping complex and other places helps to restrict the entry of persons having fever and not wearing mask can avoid the spread of virus.

IV. BLOCK DIAGRAM

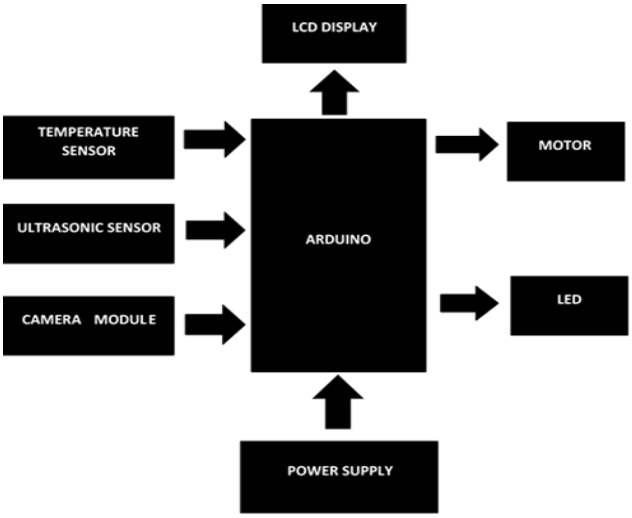

Figure. 1

V. BLOCK DIAGRAM DESCRIPTION

XIARDUINO UNO: It is a low budget microcontroller board, which is programmable. While associating microcontroller board with computer we use USB cables, it has 14 digit input pins and 14digit output pins. With the help of the board, we can make lot of electronics project. It used for easy programming and synchronizing of different analog and digital sensors and it is capable of sending and receiving data over the internet. The operating voltage of the board is 5volt. The board is able to read inputs and turn them into output, it light on a sensor, activate a motor, and turning on LED. We can work on it based on instructions set by user on microcontroller board.

Figure. 2

XIITEMPERATURE SENSOR: It is a contact less Sensor, which has features of measuring temperature of an object or a body between the ranges of - 70°c to 382.2°c. It uses the IR rays to measure the temperature without touching it. The sensor required the voltage to operate is 3v and 5v respectively. The Sensor consist of four pins namely VIN which is for power supply, ground, SCL and SDA. The signal pins SCL and SDA used for 12c protocol one for clock and another is for data transmission. The sensor does not require any other external device it directly connect with microcontroller device like Arduino.

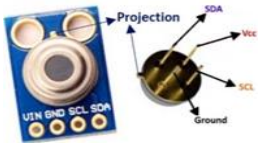

Figure. 3

XIIIESP32 CAMERA: Low cost microcontroller board has an integrated video camera and micro SD card on it. It is perfect for IoT device requiring a camera with functions like image capturing and recognizing. It has a Wi-Fi and Bluetooth, which is integrate on it. The Esp32 camera board has no USB port, so we cannot just connect it up to our computer for programming. We need external FTDL adaptor for programming the device. The module powered by using 5v pin on it.

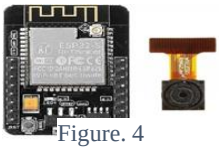

Figure. 4

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XIVULTRASONIC SENSOR: It is an electronic instrument, which generate ultrasound energy. The sensor is four - pin module, whose pin names are VCC, trigger, echo and ground respectively. The device has two eyes, which forms the Ultrasonic Transmitter and Receiver. It can measure the distance regardless of shape, colour or surface texture. When a transmitter reflected with an object, then it reflected back to the receiver and receiver detect the object sense the object.

Figure. 5

VI. IMPLEMENTATION

The system block diagram consists of Arduino which is the main unit of a system it receives its input signal from power supply, the esp32 camera which capture a person's face with mask and temperature sensor use IR energy to detect the temperature of person. The temperature readings and wearing of mask or not result shown textually on LCD screen. The external hardware required ultrasonic sensor for detecting distance of the object placed in the range of the sensor, led for altering purpose and servomotor for door access respectively. When the system starts it, detect temperature first using hand or forehead and after proceed for facemask scan of an individual. If a person were a mask and temperature normal or equal to set value, then the door opens for the person to go. If the person is having high body temperature, then system alerts with high body temperature textually on LCD screen. If there is no mask on the persons face, then the system alerts with textual response on LCD screen and person will not allow passing the entrance. We used software Arduino and c+ programming language to complete this work.

VII. RESULT

The result obtained that the temperature sensor can detect the temperature of human or not and the mask detector which scan the persons who wear mask or not, information will appear on the LCD screen in the written form.

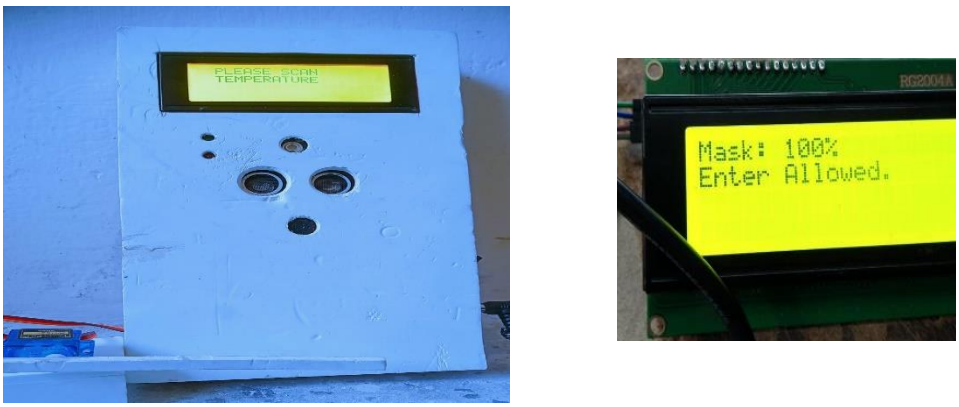

Figure.6 working of module

VIII. CONCLUSION AND FUTURE SCOPE

In this project, we have work on temperature scanning and face mask detection system we have use MLX90614 for scanning temperature of human body, ESP 32 camera for scanning the facemask and ultrasonic sensor for measuring distance of the object in the range of the sensor. LCD here display the value of measurement. Servomotor is for opening and closing of door. In this project if a person is not wearing a mask he/she may not be allow to enter through gate. If the person is wearing, a mask and have accurate temperature as per setup can only allowed enter. It will also contribute to public health care. Here, temperature and mask detection is accurate and beneficial to use. It is a cost effective project, which can used by many other substantial section. It will protect against the spread of COVID-19 infection. It can keep people safe from virus transmission.

In future, it is planning to experiment using different components for object detection on Arduino in order to achieve higher performance. Moreover, it can involve the identification of a person and the message to the persons mobile who were in high temperature and not wearing mask. Contact less temperature measurement system can be, portable, cost effective. This can keep people safe from virus transmission. Awareness of such kind of diseases.

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