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IoT Based Automatic Hand Sanitization, Temperature Detection and Mask Detection to Prevent Covid -19

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ABSTRACT

In the present scenario due to Covid-19, the need for face mask detection applications, temperature detection and hand sanitizing are now in high demand for railway entrance, airport entrance, office entrance, museums and amusement parks, other public places and enterprises to ensure safety. These steps are now done in manual way by which the personnel may get in contact with the other personnel while sanitizing and checking temperature might not be accurate. To mitigate the problem, aiming to increase Covid-19 entrance safety, covering several relevant aspects: Contactless temperature Sensing, Mask detection, Automatic hand sanitizing.

Keyword : Face mask detection, Temperature detection, Automatic hand sanitization

I. INTRODUCTION

The purpose of the project is to detect the person perfectly wearing mask or not and temperature detection of the person if the both are correct then the door allows the person in and there will be automatic sanitization. These consists of temperature sensor and raspberry Pi model 3b+, Pi camera. This paper used by [1].

The system uses a temperature sensor and camera connected with a raspberry pi system to control the entire operation. Camera detect the face and shows the square bracket around the human face and then upper side shows the label mask detected or not. In this project temperature sensor mlx90614 is used to measure temperature. If temperature is greater than 35 degree celsius and human face detect with or without mask then first camera captures the image and send mail to authenticate person or owner of the system. In mail alert! high temperature detected subject and attachment of capture image of face detected. This paper used by [2].

In this project another board for hand sanitization is used. Arduino is used as a main controller and interface to ultrasonic sensor and motor. If ultrasonic sensor detect object within 10cm then motor start for 5 second by using this human sanitize the hand. This paper used by [3].

II. PROPOSED SYSTEM

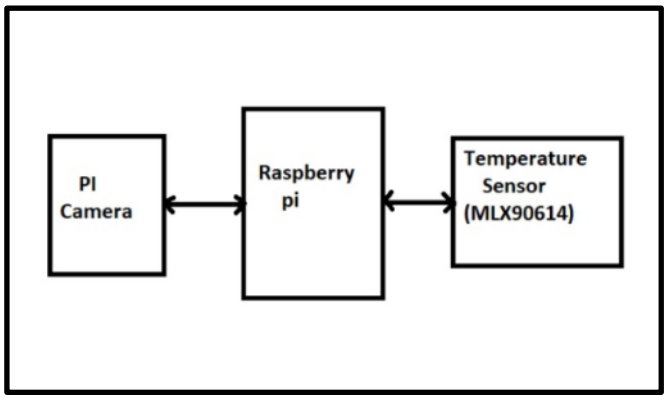


Fig 1.1 Block diagram of face mask and temperature detection

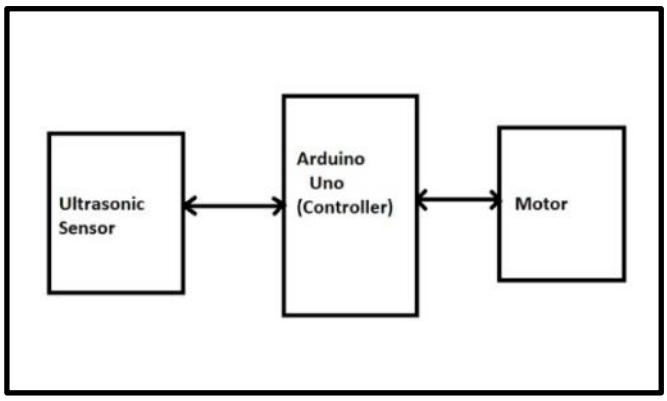


Fig 1.2 Block diagram of automatic hand sanitization

III. System Description

Block diagram of face mask and temperature detection is show in fig 1.1. Camera detect the face and shows the bounding box around the human face and then upper side shows the label mask detected or not. In this project temperature sensor mlx90614 is used to measure temperature. If temperature greater than 35 degree celsius and human face detect with or without mask then first camera capture image and send mail to authenticate person or owner of the system. In mail alert! high temperature detected subject and attachment of capture image of face detected. This paper used by [1][2][4][5].

Block diagram of automatic hand sanitization show in shown in fig 1.2.Three components are required for making this project on automatic hand sanitization they are ultrasonic sensor, arduino uno, and motor.In this project have another board for hand sanitization. I have use arduino for main controller and interface to ultrasonic sensor and motor. If ultrasonic sensor detect object within 10cm then motor starts for 5 second. Using this human sanitize the hand. This paper used by [3].

IV. Hardware Components

4.1 RASPBERRY PI

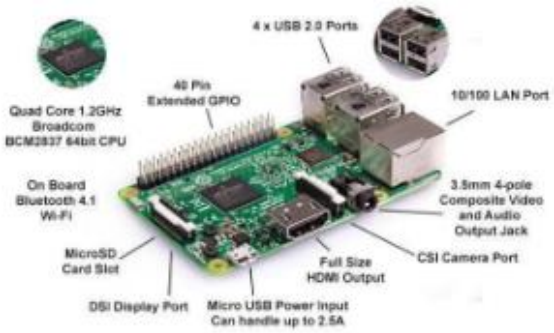


Fig 1.3 Raspberry Pi

The Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016. See also the Raspberry Pi 3 Model B+, the latest product in the Raspberry Pi 3 range.

4.2 Features:

- Quad Core 1.2GHz Broadcom BCM2837 64bitCPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy(BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports

- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

4.3 Pi Camera:-

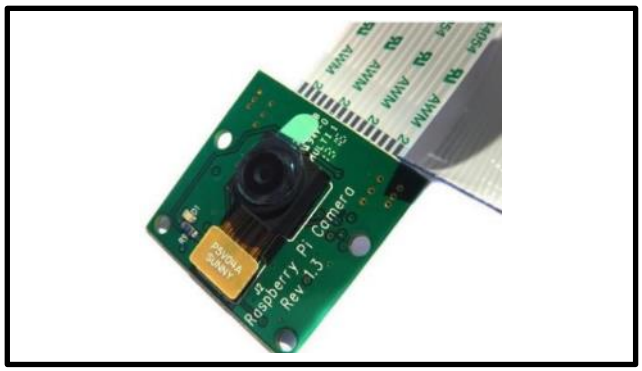
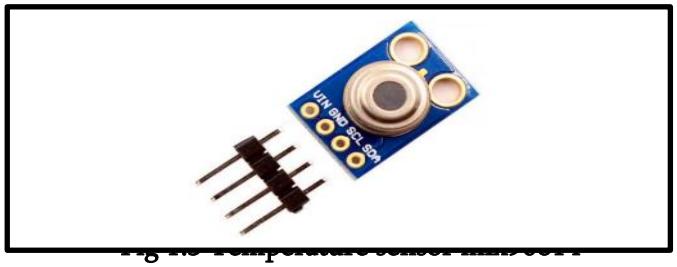


Fig 1.4 Pi Camera

The Raspberry Pi camera board plugs directly into the CSI connector on the Raspberry Pi. It's able to deliver a crystal clear 5MP resolution image, or 1080p HD video recording at 30fps, Latest Version 1.3, custom designed and manufactured by the Raspberry Pi foundation in the UK, the raspberry pi camera board features a 5MP Omnivision 5647 sensor in a fixed focus module. The module attaches to Raspberry Pi, by way of a 15 pin ribbon cable, to the dedicated 15-pin MIPI Camera Serial Interface (CSI), which was designed especially for interfacing to cameras. The CSI bus is capable of extremely high data rates, and it exclusively carries pixel data to the BCM2835 processor. The board itself is tiny, at around 25mm x 20mm x 9mm, and weighs just over 3g, making it perfect for mobile or other applications where size and weight are important.

4.4 Non-contact Temperature Sensor Mlx90614



The MLX90614 is a Contactless Infrared (IR) Digital Temperature Sensor that can be used to measure the temperature of a particular object ranging from -70° C to 382.2°C. The sensor uses IR rays to measure the temperature of the object without any physical contact and communicates to the microcontroller using the I2C protocol.

4.5 Ultrasonic sensor

The HC-SR04 Ultrasonic distance sensor consists of two ultrasonic transducers. The one acts as a transmitter which converts electrical signal into 40 KHz ultrasonic sound pulses. The receiver listens for the transmitted pulses. If it receives them it produces an output pulse whose width can be used to determine the distance the pulse travelled.

4.6 Motor

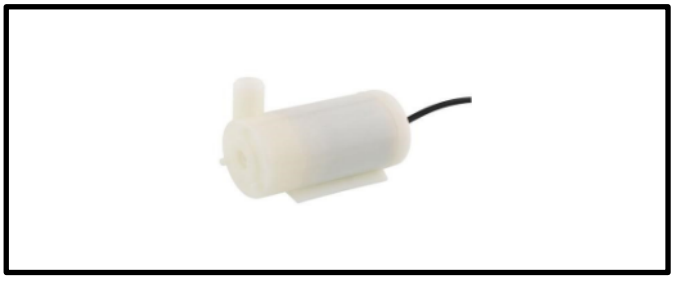


Fig 1.7 Motor

4.7 Arduino Uno

Fig 1.8 Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.

V. Results and Analysis

Software used- Remote desktop connection. Using this the face is efficiently detected with mask and without mask.[6].

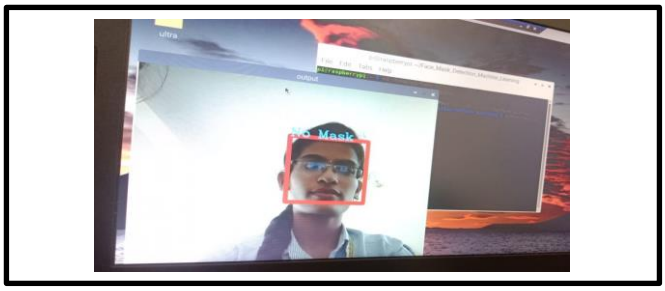


Fig 1.9 Without mask

Fig 1.10 With mask

Fig 1.11 Automatic hand sanitization

6. Hardware Result

Fig 1.12 Hardware result

VI. Conclusion

A fog- cloud combined IOT for covid-19 prevention and control by implementing five NPIs, including covid-19 symptom Diagnosis is implemented. The face is efficiently detected with mask and without mask.

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