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Iot Based Temperature, Mask Scanning Entry Barrier

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ABSTRACT
The novel Coronavirus had brought a new normal life in which the social distance and wearing of face masks plays a vital role in controlling the spread of virus. But most of the people are not wearing face masks in public places which increases the spread of viruses. This may result in a serious problem of increased spreading. Hence to avoid such situations we have to scrutinize and make people aware of wearing face masks. Humans cannot be involved for this process, due to the chance of getting affected by corona. Hence here comes the need for artificial intelligence(AI), which is the main theme of our project. Our project involves the identification of persons wearing face masks and not wearing face masks in public places by means of using image processing and AI techniques and sending alert messages to authority persons and also temperature scanning. The object detection algorithms are used for identification of persons with and without wearing face masks which also gives the count of persons wearing mask and not wearing face mask and Internet of Things (IOT) is utilized for sending alert messages. The alert messages are sent to the authority persons through mobile notification and Email. Based on the count of persons wearing and not wearing face masks the status is obtained. Depending upon the status warning is done by means of using buzzer and LED's.

KEY-WORDS: Covid-19, Face-mask detection, Machine Learning, Raspberry Pi, Sensors, Temperature detection, Tensor flow.

I. INTRODUCTION:

Now that many shops, offices and institutions are re-opening again after the Corona lockdown, many businesses are faced with **the need to provide the best possible protection for their staff and customers.** Face masks and body temperature checks play an important part in the protection effort. While this is already done routinely and at a large scale at airports or railway stations, many businesses and institutions are struggling to meet the challenge. Face mask monitoring often requires additional staff resources. At the same time, body temperature checks by staff come with certain risks in terms of hygiene and data privacy.

The first step to detect covid is by scanning for fever. Also we need to monitor every person for a mask. We have temperature checking systems for every entrances for scanning but manual temperature scanning has a lot of disadvantages.

To solve this problem we here propose a fully automated temperature scanner and entry provider system. It is a multi purpose system that has a wide range of applications. The system makes use of a contactless temperature scanner and a mask monitor. The scanner is connected directly with a human barrier to bar entry if high temperature or no mask is detected.

Any person will not be provided entry without temperature and mask scan. Only person having both conditions is instantly allowed inside. The system uses temperature sensor and camera connected with a raspberry pi system to control the entire operation. The camera is used to scan for mask and temperature sensor for forehead temperature.

The raspberry processes the sensor inputs and decides weather the person is to be allowed. In this case the system operates a motor to open the barrier allowing the person to enter the premises. If a person is flagged by system for high temperature

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or no Mask the system glows the red light and bars the person from entry. Also the face and temperature of person is transmitted over IOT to server for authorities to take action and test the person for covid. Thus the system provides a 100% automated system to prevent the spread of COVID.

OPERATION:

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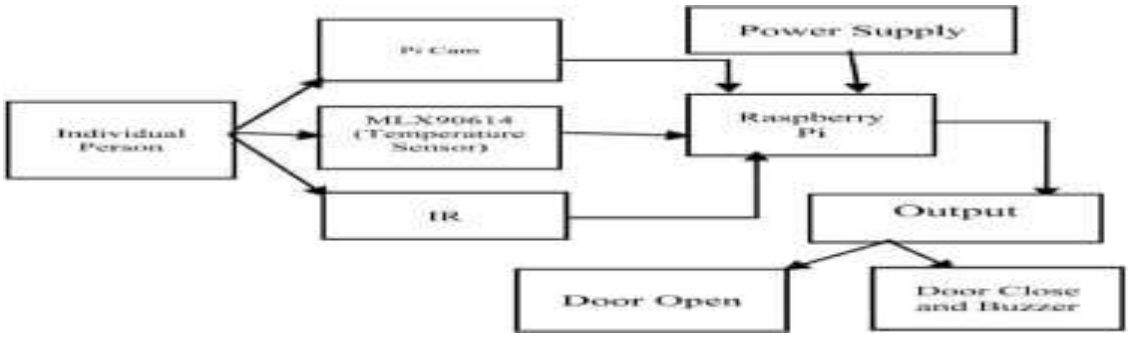

This system not only detects human temperature but also scans persons wearing face mask or not. When a passer without wearing face mask is approaching to the camera sensor, display shows the body temperature and sounds "ATTENTION, MASK NOT DETECTED" warning to remind the person detected at the same time.

Of course the setting of "Wearing mask or not " can be based on officer's preference to make an adjustment. If a potential person is close to fever temperature and exceeds the specific temperature is detected, camera will make a quick response and will sound "WARNING, TEMPERATURE OUT OF RANGE" to inform officer by alarm message.

Moreover, there is another powerful function cooperating with body temperature detection, "Face Recognition with face mask". Through the wide angle of lens, face captured by the camera will be instantly processing face matching with internal database. Whether wearing face mask, camera can still recognize to identify the personnel identities.

PROPOSED CIRCUIT DESIGN:

A. MLX90614 Temperature Sensor:

The temperature sensor (MLX90614) acts as an infrared non-contact temperature reader that reads the temperature without contacting them. Fig 4 shows MLX90614 temperature sensor. Both the Signal ASSP and the IR Sentiment Detector Chip are in the same TO-39(is a type of 'metal can' (also known as 'metal header') package for semiconductor devices.). The thermometer's noise reducer amplifier, with a 17-bit ADC, and powerful DSP efficient unit is used which helps in achieving more correctness. The sensor does have a digital System Management Bus (SMBus) output, with PWN which has been factory calibrated and prepared.

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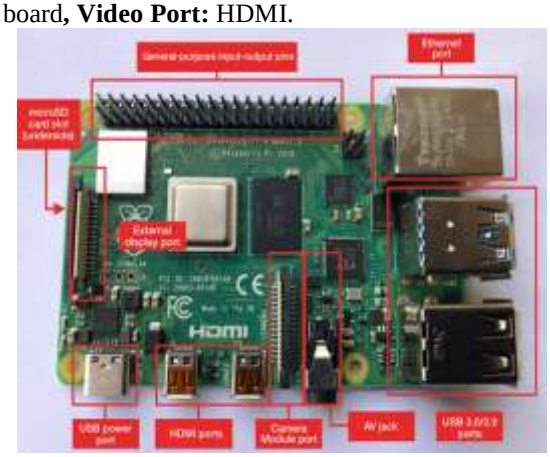
B. Raspberry Pi:

The Raspberry Pi is a low-cost tiny computer that connects to a computer monitor or television and operates with a regular keyboard and mouse as shown in Fig . It is a handy little gadget that focuses on teaching people of all ages about scripting languages like Scratch and Python. It can perform all the functions of a desktop computer, such as internet surfing and viewing greater-definition clip, worksheets, and playing games. It has been used in several digital devices, including tweeting birdhouses, music machines, and detectors, as well as weather stations and infrared cameras since it is capable of interacting with the outside environment.

Installed memory:1GB,**Number of cores:** Quad-core, **Processor speed:** 1.4 GHz, **Style:**Single-board**, Video Port:** HDMI.



C. IR sensor:

An infrared (IR) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment. Infrared radiation was accidentally discovered by an astronomer named William Herchel in 1800. IR is invisible to the human eye, as its wavelength is longer than that of visible light (though it is still on the same electromagnetic spectrum).

Infrared sensors are used to count and monitor the number of people who enter and leave the room. The IR sensor's operating voltage is 5VDC, and the I/O pins are 5V and 3.3V compatible. It comes with a variety of options. Fig 3 depicts an IR Sensor that features a built ambient light sensor and a mounting hole, as well as an adjustable sensing range of up to 20cm.

SOFTWARE DESIGN

VNC Viewer:

Virtual Network Computing (VNC) is a graphical desktop sharing application that lets us monitor the desktop interface of one machine with another computer or mobile device remotely. The VNC viewer transmits to the VNC server with a mouse, keyboard, or touch case, receiving updates back on the display. Working directly on the Raspberry Pi is not always convenient. You may also want to include a remote control from another device to work on it. VNC uses Real VNC, which is used with the Raspberry OS. It comprises VNC Viewer, which allows users to remotely access a Raspberry with desktop, and a VNC server enables to monitor the Raspberry Pi remotely.

It must be enabled first before using the VNC server. The VNC server provides the users with wireless monitoring to the Raspberry graphical desktop, which enables communication. However, the VNC server can be used to access the graphic remote if the Raspberry is headless and doesn't have a graphic screen.

Tensor Flow:

TensorFlow is a machine learning software library that is open source and free. It was created to perform large numerical computations without regard for deep learning.

This TensorFlow can be used for a variety of activities, but it is primarily focused on deep neural network inference and training. TensorFlow also supports traditional machine learning. Google's

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TensorFlow is a Python library that allows for quick numerical computation. Deep learning models are either generated directly using TensorFlow, which is also a base library, or they are created to simplify the process by using wrapper libraries built on top of TensorFlow.

TensorFlow enables the creation of dataflow graphs and structures to determine how the data flows through the graph by receiving inputs as a multi-dimensional tensor array. It allows building a flow chart for these inputs which is carried out on the one end and is performed on the other.

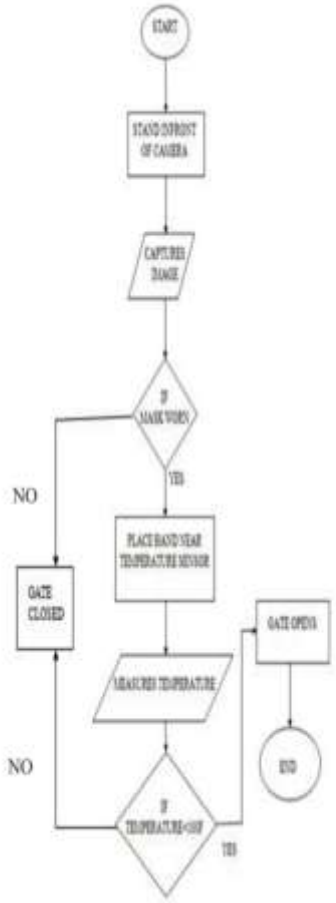

fig. Flowchart

SCOPE OF THE PROJECT:

Other Public Places Designed for lobbies and indoor entrances, the solution package consists of a freely place able pillar with built-in touch screen display unit, complete with integrated IR-thermometer (thermoscan) and dual video camera.

The solution interfaces seamlessly with existing door opener mechanisms to provide fully automated controlled access.User interaction is very easy and straightforward: graphical instructions shown on the touch screen guide users through the scanning process, which takes only a few seconds. The result is instantly shown on the screen. If both requirements are met, access is granted.

Persons who are not wearing a face mask are requested to do so by acoustic and visual prompts. In case the scanned temperature is in the fever range, the device automatically triggers a call to service staff. In case of problems, users can also initiate a support call via the terminal**.**

Railways Entry, Airport Entry,Offices Entry, Museums and Amusement Parks.

SYSTEM OVERVIEW:

Shows the overview of the connection structures that make up the solution. Any person attempting to enter the building should first pass through infrared sensors, which are used to track and manage the individual count of people entering the room and later exiting. Body temperature is tested only when the people's total count inside a room is less than the given limit. The MLX90614 body temperature sensor is used for this purpose. If the person's body temperature is too high, the door will not open; if the person's temperature is average, the door will open and proceed to the next level, i.e., mask detection. The Raspberry Pi single-board computer with Raspberry Pi Camera is used for this function. If an individual wearing a mask is detected, the door will be opened. If the individual is discovered without a mask, the door will not open. To ensure the guidelines and safety for indoor workers during this COVID-19, this IOT solution based comes into action.

II. CONCLUSION:

New developments and the availability of smart technologies force to the creation of new models, which will help meet the needs of developing countries. In this work, an IoT-enabled to monitor body temperature and detect face masks that can enhance public safety. This will help to reduce manpower while also providing an extra layer of protection against the spread of Covid-19 infection. The model uses a real-time deep learning system using Raspberry pi to detect face masks, and temperature detection as well as monitor the count of people present at any given time. The device performs excellently when it comes to temperature measurement and mask detection, the trained model was able to achieve a result of 97 percent. The test results demonstrate a high level of accuracy in detecting people wearing and not wearing facemasks, as well as it also generates alarms monitored and recorded. Furthermore, there are numerous techniques to enhance performance

to improve results. Future development will include improving the accuracy of these steps, using a combination of various features, and improving performance, as well as producing a mobile app with a user friendly interface for monitoring.

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