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An AI(Artificial Intelligence) based Device for Covid-19 Fever Detection

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Abstract*—Coronavirus disease (covid-19) is a global pandemic, and every country is actively fighting against the virus. It is an effective way to prevent the spread of the virus in finding the person with abnormal temperature promptly to perform the further medical observation. However, the traditional method of temperature measurement has low efficiency and accuracy. Body temperature acting as important role in medicine, several diseases is characterized by a change in human body temperature. Monitoring body temperature also allows the doctor to track the effectiveness of treatments. But current continuous body temperature measurement system is mainly limited by reaction time, movement noise, and labour requirement. In addition, the traditional contact body temperature measurement has the problem of wasting consumables and causing discomfort. To address the above issues, we present a non contact, automatic system using a single thermal non-contact sensor. The Proposed Covid prevention method scans body temperature through MLX9014 Contactless Temperature Sensor and sends the data to Raspberry pi model 3+ architecture. Our application takes data from MLX9014 and analyzes it to see whether the temperature is greater than 37^0 Celsius , which then captures the image through pi camera.

***Keywords*—Raspberry pi model 3+, MLX90614 Contactless Temperature Sensor, pi camera model**

I. INTRODUCTION

The motivation behind this project is that if we can take the help of IOT to measure the skin temperature in a contactless manner based on the pi camera input, it would be helpful to increase our safety. If deployed correctly, the temperature detector could potentially be used to help ensure our safety. The model can be applied to the camera in densely populated areas, essential districts, large-scale industries to scan the people's faces to ensure whether they have the temperature on their face. It can be applying to communities, business buildings, schools, hotels, scenic spots, transportation hubs, and other public service places.[2]

Covid-19 is the major pandemic, we are facing these days, finding the person with abnormal temperature plays a major role in maintaining safety and avoiding the spread of Covid. So, to overcome this issue we need a device to find the body temperature of a person, increasing accuracy up to 75 % to 80 %.

The solution enables the user to identify individuals with an elevated skin temperature efficiently and effectively. An elevated skin temperature is an indicating symptom of an infectious disease. It is noncontact based which prevents the chances of cross-infection. [3]

II. METHODOLOGY

In our approach we try to build a model which takes input from the live camera image and detect the face and screen the body temperature. The accuracy to which the body temperature is predicted mainly depends on the sensor.

A. Raspberry Pi

The Raspberry Pi is a low cost, credit-card sized computer capable of computing, and uses Graze and Python languages. It can be plugged into a computer monitor or TV and uses a keyboard and mouse as input devices. It can replace a desktop computer, from browsing the internet, CAD modelling, frolicking high-definition video and games, and word-processing. To use a raspberry pi for various application an SD Card, display and connectivity cables, keyboard and mouse, power supply and internet connection are required.[4]

B. MLX90614

The MLX90614 is a Contactless Infrared (IR) Digital Temperature Sensor as shown in Figure 2.4.3 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.

C. Pi Camera

1) Insert pi camera module to raspberry pi.
2) Launch the Application

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III. IMPLEMENTATION

The following figure shows the system architecture and flow chart of this my application.

A. Flowchart

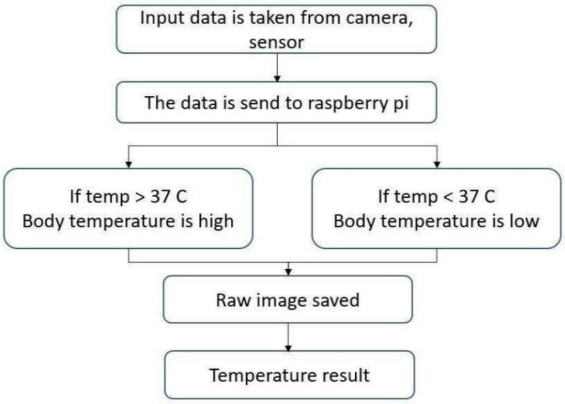

Fig. 1 Flow chart representing temperature detecting process

We have built a model that detects body temperature is measured using the contactless temperature sensor and displayed in monitor.

1) First input has taken from camera which identifies the person's faces.
2) Then sensor gets output from camera with the human image. Sensor used from detecting the temperature.
3) The data has sent to raspberry pi this is shows the temperature of the body we have taken two scenarios.
   a) If the person is body temperature value is less than 37 C, then it is normal.
   b) If body temperature value is great than 37 C, then it captures image and store in file with date and time in raw data.

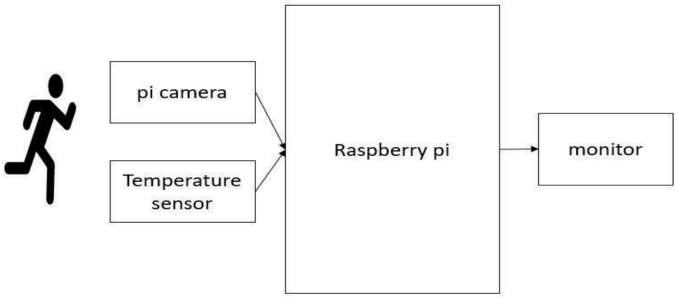

Fig. 2: Architecture of 001662

4) If a person pass through the PI camera input has been taken and sends to the Raspberry pi.
5) The temperature sensor used from detecting the temperature of the person and send to the Raspberry PI.
6) Raspberry pi data that shows the temperature of the body and displays on the monitor that has been taken two scenarios.

B. Result

The our AI application does all the necessary operations to read the sensor data, compare it with the threshold value, authorize the data, and then store the images with the date and time when temperature is high. At first, we will require libraries. Then, we create a function to capture the image which is sent data and stores the image with data and time.[5] Then, we make some settings with PiCamera. And at last, we have a while loop which will run infinitely. It will read the data from the MLX90614 temperature sensor and if the temperature exceeds the set value, then the capture_image() function is called to store the image capture.

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When the hardware and software are ready, just run the python code on your pi. It will print the value of temperature read from the sensor as shown below.

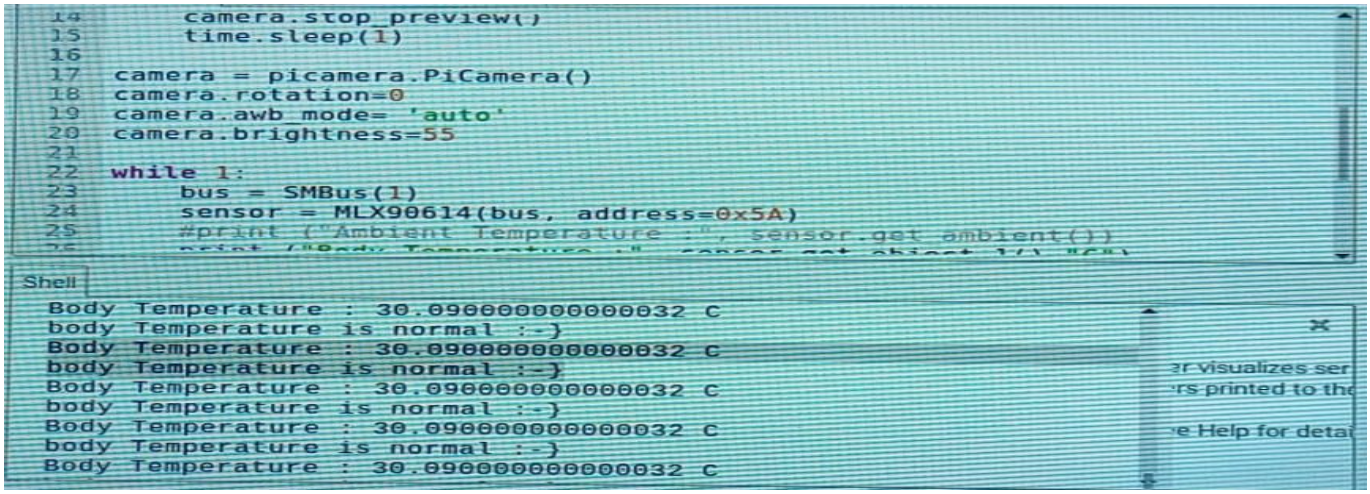

Fig 3: Body temperature values

If the body temperature exceeds the threshold temperature, then our application will take an image from the camera, save it on raspberry pi with date and time, display body temperature.

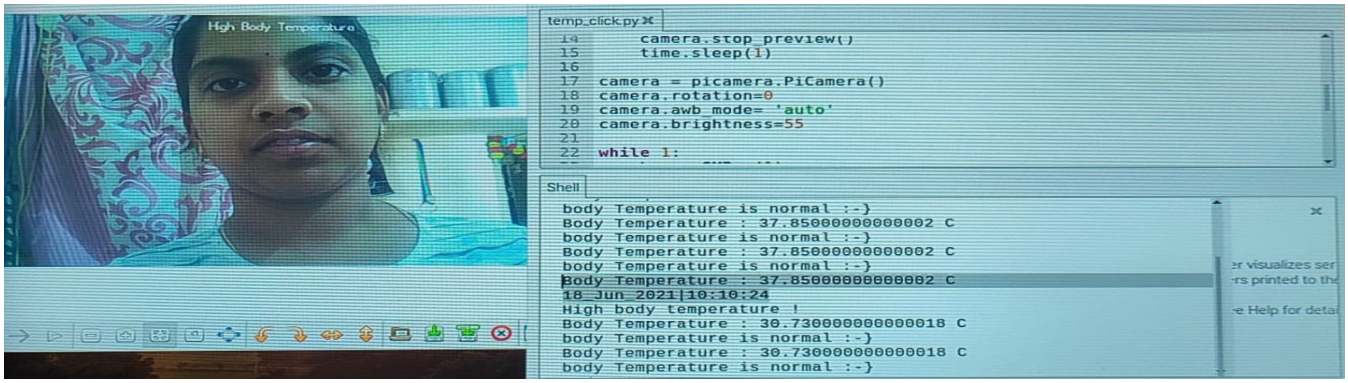

Fig 4: Body Temperature values with image

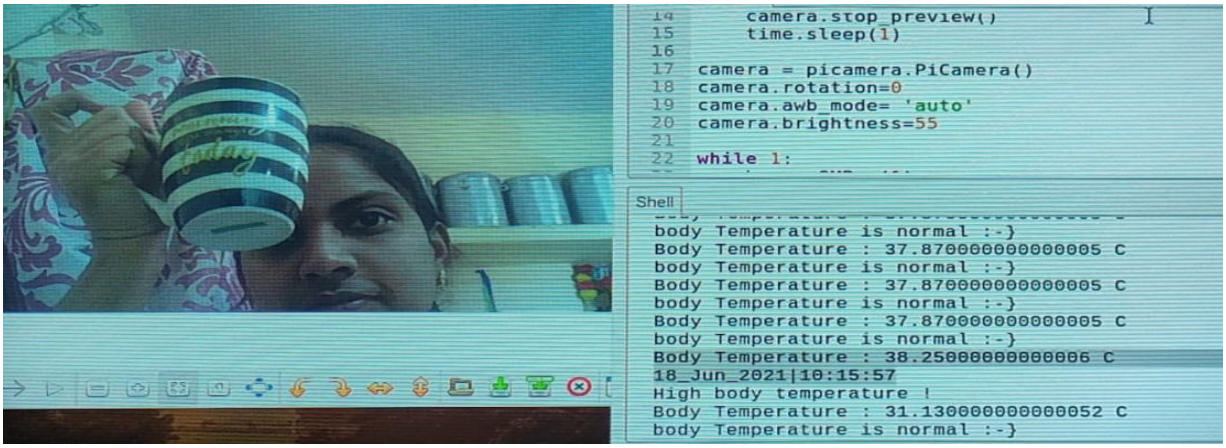

Fig 5: Body Temperature with Hot mug

IV. CONCLUSIONS

Fever screening device can be used in real time applications which are meant for safety in this covid pandemic time. This can be integrated with the embedded systems for applications in airports, railway stations, and school, public places to ensure our safety and to find people with abnormal temperature. The accuracy to which the screening works depends on the sensor methods used to screen the temperature.

Future scope is addition of automatic face mask to our proposed model. Developing face mask detection application. Developing a model that recognizes social distance, detecting temperature using thermal imaging techniques.

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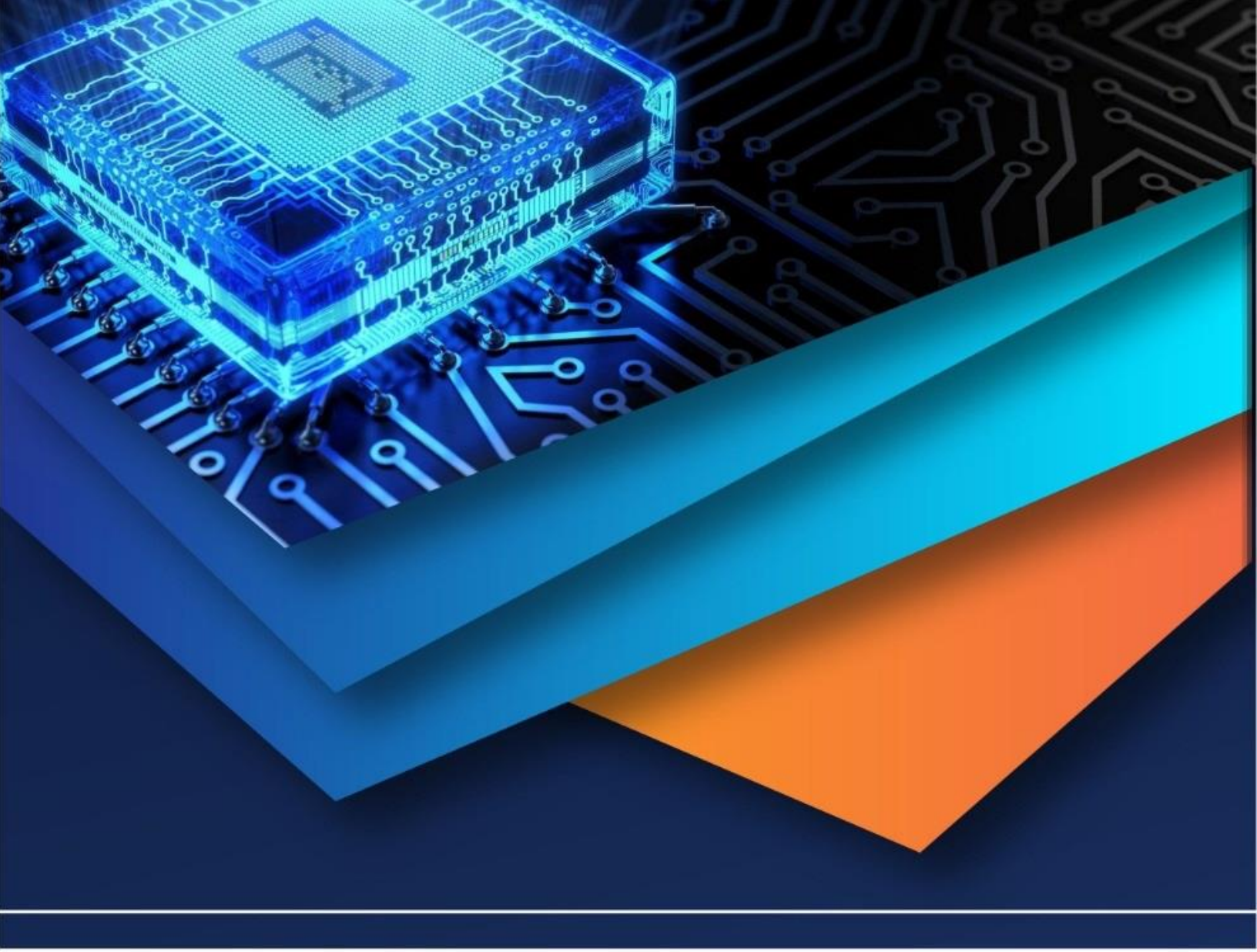

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