



## Face recognition and body temperature surveillance for indoor system

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**Abstract—** In this digitalized world, ventures, different organizations as well as instructive associations are utilizing individual distinguishing proof methodology like RFID, unique mark, and so on. Out of this multitude of systems face acknowledgment is generally proficient one. It saves time. A camera is fundamental prerequisite for this task. Assuming an individual goes into in a room, camera takes a preview and with the further pre-handling like face editing the face data set is gathered to perceive the essences of an individual. At first the framework is prepared with faces which are known as data set. Then, at that point, it contrasts the picture and dataset and assuming it matches, it will straightforwardly store into any capacity gadget with separate individual's name and ID. OpenCV calculation is utilized with picture handling system. We measure the internal heat level of every individual utilizing MLX90614

**Keywords:** Personal Identification, OpenCV, Face Detection, Recognition of Face, Body temperature sensing.

### I. INTRODUCTION

The advanced participation machine is manual. It burns through a lot of time each for teachers and understudies. The showing hour for the understudies is expanded assuming that participation is taken by this face acknowledgment framework. There are in any case opportunities for intermediaries with inside the grandness while participation is taken physically. Manual participation consistently a have a worth of human mistake. Face is the indispensable conspicuous proof for any human. So robotizing the

participation framework will development the efficiency of the greatness. To make it to be had for every stage we have chosen the Raspberry pi three for face location and acknowledgment. A Webcam is joined to the Raspberry Pi module. Face character isolates faces from non-faces and individuals faces that might be seen. In this framework we can take the participation utilizing face acknowledgment which perceives the essence of every understudy during the class.

The framework gives elements like location of faces, extraction of highlights, and identification of extricated highlights and investigation of understudy's participation. The precision in identifying and perceiving appearances will be more because of purpose of bigger number of highlights (shape, variety, LBP, wavelet, Auto connection, and so forth) Of the face.

This paper makes sense of about equipment plan, programming plan, execution and finish of the framework.

### Raspberry pi 4

The Raspberry Pi is a minimal expense, Mastercard estimated PC that plugs into a PC screen or TV, and utilizations a standard console and mouse. It is a fit little gadget that empowers individuals, everything being equal, to investigate figuring, and to figure out how to program in dialects like Scratch and Python.



### Camera module

The flex link embeds into the connector marked CAMERA on the Raspberry Pi, which is situated between the Ethernet and HDMI ports. The link should be embedded with the silver contacts confronting the HDMI port. To open the connector, pull the tabs on the highest point of the connector upwards, then, at that point, towards the Ethernet port. The flex link ought to be embedded immovably into the connector, with care taken not to twist the flex at too intense a point. To close the connector, push the top piece of the connector towards the HDMI port and down, while holding the flex link set up



### Thermal imaging camera

This infrared thermometer module has a solitary point clinical-grade infrared temperature sensor (MLX90641), which can distinguish the temperature of items with a precision of  $\pm 0.2^{\circ}\text{C}$  in the internal heat level reach. At room temperature, the surface temperature of the deliberate item

can arrive at a precision of  $\pm 0.5^{\circ}\text{C}$  in a wide reach. The module can utilize the I2C convention to acquire information from the camera. The field of view (FOV) of this sensor is  $35^{\circ}$ , the temperature estimation range is  $-70^{\circ}\text{C} \sim 380^{\circ}\text{C}$ , and the functioning temperature is that the sensor's  $T_a$  esteem is between  $-40^{\circ} \sim 85^{\circ}$ .



### PROPOSED APPROACH

The total system is separated into 3 modules-Database creation, Training the dataset, Testing, and sending ready messages as an augmentation.

#### 1. Data set creation

- a) Initialize the camera and set an alarm message to get the notice of the understudies.
- b) Get client id as information
- c) convert the picture into grayscale, identify the face, and
- d) Store it in the information base by involving the given contribution as a name up to 20 edges.

#### 2. Preparing

- a) Initialize LBPH face recognizer.
- b) Get appearances and IDs from the data set organizer to prepare the LBPH face recognizer.
- c) Save the prepared information as a XML or YAML document.

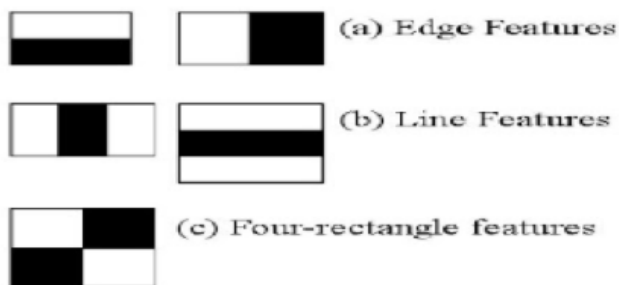
Load Haar classifier, LBPH face recognizer, and prepared information from XML or YAML document.

- a) Capture the picture from the camera,
- b) Convert it into grayscale,
- c) Detect the face in it and
- d) Predict the face utilizing the above recognizer.

Raspberry Pi's control center either by utilizing SSH on a PC or by utilizing Keyboard and mouse with the showcase gadget like a TV associated with Pi. The calculation, first and foremost, needs a ton of positive pictures and negative pictures to prepare the Haar overflows classifier. Positive pictures are pictures with clear faces though bad pictures are those with no appearances.

### Haar Cascades

Each component is addressed as a solitary worth acquired from the distinction between the amounts of pixels in the white square shape from the amount of all pixels in the dark square shape. All various potential sizes and areas of the classifier are utilized for ascertaining a lot of elements. As the quantity of classifiers builds the number-crunching calculations appear to consume most of the day. To stay away from this, we utilize the idea of Integral Image. In Image Processing, an Integral picture is an information structure that is an added region table and calculation for rapidly and effectively creating an amount of values in a rectangular lattice subset. A basic picture is inferred by utilizing the equation.



## II. IMPLEMENTATION OF THE SYSTEM

### A. Capturing the image

The camera module is set where individuals go into the everyday schedule and video is taken inside a distance under 5 meters. A camera is utilized for taking video which contains different formats from which any of the housings can be utilized for confronting insistence and venturing the cooperation.

### B. Creating database

As a biometric procedure has been decided for us, it is huge for enrolment of every person whose interest should be taken. Here the face of every individual is caught and taken

care of in a sensible data set that incorporates the name of an individual and different capabilities like an exceptional ID number. Here various tests are taken for a solitary individual with various lighting conditions

MYSQL is chosen as a database as relational DB will be much suited for the data being stored and for faster retrieval and storage.

Java Database Connector connects java with a MySQL database. Separate schemas are created in a single database for logging and registering purposes. from the database can be fetched using a Data Access Object class and is returned as a JSON response to display in the frontend. MYSQL queries are written in the form of Prepared Statements rather than directly allowing access to the database to avoid any form of injection attacks. Details such as Name, Temperature, in-time, and out-time are stored in DB MYSQL is chosen as database as relational DB will be much suited for the data being stored and for faster retrieval and storage. Java Database Connector connects java with a MySQL database. Separate schemas are created in a single database for logging and registering purpose. Data from database can be fetched using a Data Access Object class and is returned as a JSON response to display in frontend. MYSQL queries are written in the form of Prepared Statements rather than directly allowing access to database to avoid any form of injection attacks. Details such as Name, Temperature, in-time, out-time are stored in DB.

### C. Detecting Faces

Picking a successful calculation for face affirmation or acknowledgment is fundamental in this proposed work. There are various face location calculations available in OpenCV, for example, Eigenfaces, Fisher appearances, and Neighborhood Binary Pattern Histograms. Considering the expectations for the ongoing affirmation a calculation which has been chosen is the Haar Cascade Algorithm for face recognition and affirmation. It is available in the OpenCV source library.

### D. Face Recognition with Temperature Sensing

Inside the examination module, the face acknowledgment handle is done. At the point when a face is recognized by the camera, it checks the contrasting upsides of the ongoing clear face with values set aside inside the record. On the occasion that the qualities are a direction, then the face is perceived and the title related to that face is shown

what's more, with the assistance of the MLX90614 sensor internal heat level is detected.

## E. DATABASE

The data set holds the name and ID surprisingly whose participation should be checked. As and when a the face is recognized and coordinated with the current records, the participation, and internal heat level are naturally refreshed in the information base

One of the various significant perspectives for the smooth working of a site or a web application is the strength of its data set. How well the DB handles basic high-volume traffic, is there an information recuperation component in the event of framework disappointments, high level functionalities, and so on are a portion of the boundaries that characterize the working of a DB.

We will take a gander at a prologue to the MySQL information base (a RDBMS) and go through design and different elements settle on it the best decision concerning creating web applications or sites.

### JDBC (Java Database Connectivity):

Java API that oversees interfacing with a data set, giving inquiries and orders, and taking care of result sets got from the information base. Delivered as a component of JDK 1.1 in 1997, JDBC was perhaps the earliest library produced for the Java language.

JDBC was at first considered as a client-side API, empowering a Java client to collaborate with an information source. That changed with JDBC 2.0, which incorporated a discretionary bundle supporting server-side JDBC associations. Each new JDBC discharge from that point forward has highlighted updates to both the client-side bundle (java.sql) and the server-side bundle (javax.sql).

JDBC 4.3, the most current version as of this writing, was released as part of Java SE 9 in September 2017 as JSR 221.

## F. WEBPAGE DESIGN

This is a webpage which serves the purpose of logging in the temperature and attendance of people detected by the face detection system. Temperature and individuals data is fetched from Raspberry Pi using suitable API and is stored in a database.

### Frontend:

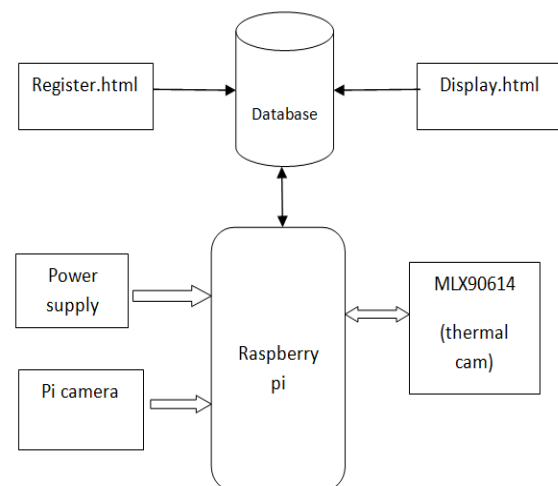
UI of webpage is implemented using HTML and CSS. For first time, users need to register their details

for logging their details in future automatically. Login page is provided for previously registered users and their details will be sent to backend for further processing.

### Backend:

Apache Tomcat server hosts the whole webpage and java is the main language used for backend. Parameters entered in the input fields of html page is received and processed to transmit it to database. Database: This is a webpage that serves the purpose of logging in the temperature and attendance of people detected by the face detection system. Temperature and individuals data are fetched from Raspberry Pi using a suitable API and are stored in a database.

### BLOCK DIAGRAM



Setup:

B. Database

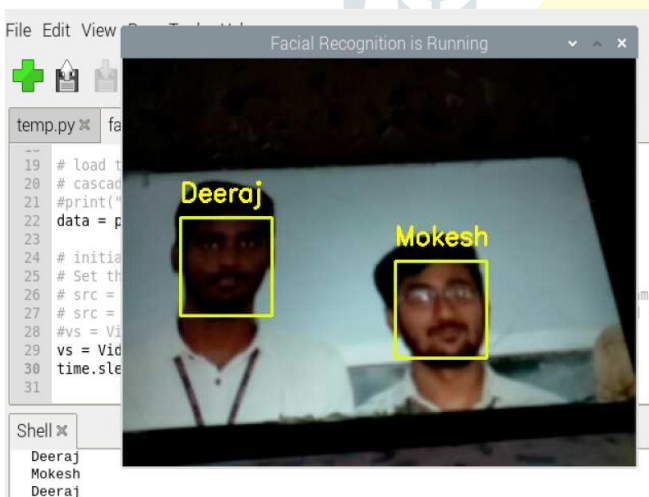


```

+-----+-----+-----+
| name   | temp   | InTime |
+-----+-----+-----+
| Mokesh | 35.05000000000001 | 13:58:41 |
| Arunraja | 34.79000000000002 | 13:59:30 |
| Deeraj  | 34.79001000000005 | 15:31:45 |
| Harish  | 35.56001000000009 | 15:48:33 |
| Naveen  | 34.78001000000009 | 16:24:56 |
+-----+-----+-----+
5 rows in set (0.00 sec)
    
```

Output

A. Face recognition



CONCLUSION

In this system we have executed a participation framework for a talk by which instructors can record understudy's participation. It saves time and effort. The complete system is executed with OpenCV and raspberry pi. This participation framework shows the utilization of facial acknowledgment and identification technique for the understudy participation the board. This strategy can moreover distinguish numerous faces. At that point the identified faces are at that point confirmed with confront database. The exactness of face affirmation is almost over 90%. In Covid19 situation body temperature sensing is important in terms of student's safety, so temperature sensing is done.

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