



# EMPLOYEES ENTRY MONITORING SYSTEM TO AVOID SPREAD OF COVID -19

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**Abstract:** In this digital era, face recognition systems plays a vital role in almost every sector. Face recognition is one among the mostly used biometrics. It can be used for security, authentication and identification. As compared to iris recognition and fingerprint recognition, it is being widely used because of its noncontact and non-invasive process. Face recognition system also can be used for attendance marking in schools, colleges, offices, etc. This method aims to make a class attendance system which uses the concept of face detection and face recognition as existing manual attendance system is time consuming and also there is a chance of proxy attendance. Thus, the need for this system increases. So, in the present situation created by Covid-19 pandemic, temperature and oxygen level measurement is also important to allow the students to attend the class. We propose a concept where together with face recognition, temperature and oxygen level is measured to mark the attendance record and also, sanitization system is added for safety purposes. This system will be designed using ultrasonic sensors, temperature sensor, oximeter, camera module that is interfaced with Raspberry Pi. In this manner attendance is often marked automatically and at an identical time system can scan individual student to spot potential patients of Covid-19.

**Keywords - Face Recognition, Covid-19, Raspberry- Pi.**

## I. INTRODUCTION

Maintaining attendance is very important in the whole institute for checking the performance of employees as well as students. There are various methods in this regard. Some use file-based format method and at some institutes they use biometric technique to store the attendance records but in some biometric methods employees have to wait for a long time which is time consuming for them. Many biometric systems are available but key authentications are the same for all the techniques. Every biometric system consists of an enrollment process in which unique features of a person are stored in the database and then there is a process of identification and verification. These two processes compare the biometric feature of an individual with previously stored template captured at the time of enrollment. Biometric templates are often of various types like fingerprint, Face, Hand Geometry, Signature, Gait and voice. Our system uses the face recognition approach for the automatic attendance of employees and students in the office room and classroom environment.

In this Covid-19 situation, it is necessary to take care of ourselves. So, when the colleges and offices will reopen, it is necessary to monitor the health status of students and employees. Through this attendance monitoring system, it will detect the temperature and oxygen level of the person. So, by considering this, we have decided to make this project which will display the health details of the employees by using LCD and help to alert that person by using a buzzer if the health status of that person is not similar with the normal range. We will be going to use a face recognition-based attendance system which saves the attendance record of that person in an excel file. So, this system will be helpful to prevent people from infection risk.

## II. LITERATURE SURVEY

Smitha [1] which detects the faces of students from live streaming video of classrooms, and then attendance will be marked if the detected face is found in the previously stored database. Images are captured using a webcam. These images undergo pre-processing. Then these images will be saved as the names of respective students in a folder. Face detection here is performed by Haar-Cascade Classifier with OpenCV. Face recognition process can be divided into three steps-prepare training data, train face recognizer, and prediction. Training data will be the images present in dataset. They will be assigned with an integer label of student it belongs to. Then these images are used for face recognition. Face recognizer used in this is Local Binary Pattern Histogram. After face recognition process, recognized faces will be marked as present and the rest will be marked as absent in the excel sheet. And the list of the absentees will be mailed to the respective faculties.

Mayur Surve [2] in proposed system face recognition was done by using Arduino and sensors. At initial step student, fill registration form along with all the details, which stored in college database. Image/picture of student also stored in database. Then camera was going to set at entrance of class along with sensor and microcontroller. Here, PIR sensor used for measure the radiation from object. It also detected motion of objects. When student enter into the class first PIR sensor had measured the radiation of object and motion. If radiation belongs to human category, then camera become activates and captures the pictures. Then by clicking the images of student, it compares that image with database if image matched then it updates the database with present. Otherwise marked as absent in database. Every updating in database about particular student sent to their parents through mail or SMS every day. This system also worked for faculty in same manner.

Shrutika V. Deshmukh [3] proposed a system, which is based on face recognition and detection. So as to realize a far better accuracy and effectiveness they use OpenCV libraries and python computer language. Training and identification is completed in Raspberry Pi. The system will divide in face detection and face recognition. In face detection initially, the algorithm needs many positive images and negative images to train the classifier. Then need to extract features from it. For this, haar features are used. Once the face is detected, it are often cropped and stored as a sample image for analysis. To acknowledge the face detected, a vector of HOG features is used. The ultimate step is completed using histogram of oriented gradient descriptors. Once trained images containing some particular object the SVM classifier can make decisions regarding the presence of an object and humans. The efficiency of the system was analysed in terms of face detection rate.

Vamsi Nandan [4] proposed system is designed using the concepts of IoT, Learning and AI. The Object's Proximity Module identifies the person when he comes closer to the device. To measure the distance from the attendance marking system ultrasonic sensors are used. When the distance between student and the device is within the limit set by the system, image will be captured. The face of the person is checked and compared with the face stored in datasets. If it matches with the stored image then it will proceed with temperature screening. After face recognition is successful temperature screening is done. Student's identity, time stamp information and thus the temperature readings are recorded if temperature is not more than normal body temperature. If the captured image doesn't match with images stored within the database, and if temperature is high, then a warning message are getting to be sent to the faculty.

Mahesh Patil [5] Proposed an attendance system, which is based on face recognition technique. OpenCV algorithm, is used with the image-processing framework. The camera module is placed at the doorway and video is taken inside the distance less than 5 meters. If an individual enters in the room, camera takes a snapshot and with further pre-processing like face cropping the face database is collected to recognize the faces of students. Initially the system is trained with faces which are mentioned as student databases. Then it compares the image with the dataset and if it matches the attendance is directly stored into any storage device with the respective person's name and ID. MLX90614 sensor, sense body temperature. Database holds the name and ID of all people. As the face is detected and matched, the attendance and body temperature is automatically updated in database.

### III. PROPOSED SYSTEM

In this proposed system, the vital parameters for the detection of Covid-19 such as temperature level and oxygen level are monitored using Raspberry-Pi. Here, person's body temperature and oxygen level is monitored using respective sensors and displayed on the the LCD display board. Also, in this system we have used automatic hand sanitizer dispenser system where ultrasonic sensor is used. The proposed system stores the attendance records of the respective person by using face recognition based system where camera module is used to detect the human face and compare it with store database.

## FLOW CHART:

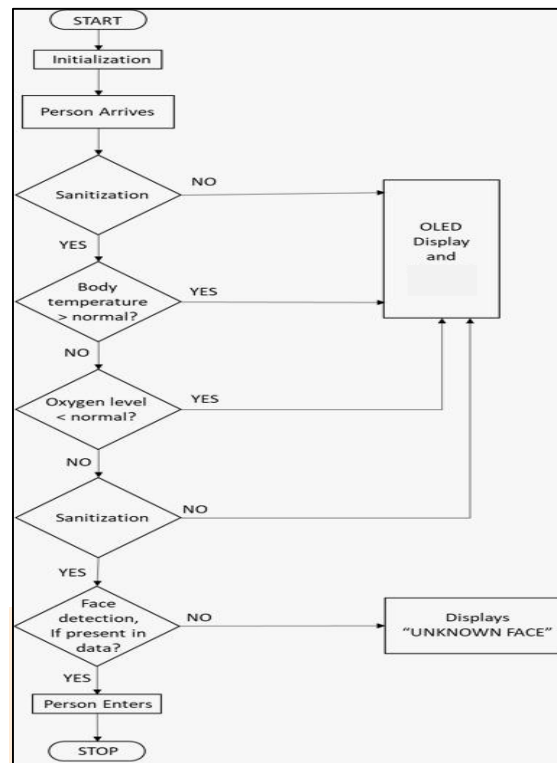


Figure1- Flowchart of overall system working

## IV. METHODOLOGY

## A]. Overview of safety system-

When the person is going to inter in an office, He/she must have to be sanitized first. By using ultrasonic sensor, it checks the presence of hands below sanitizer machine & turn on the pump. If that person is done with the hand sanitization step, then He/she will be able to go for the body temperature check.

If the temperature level of that person is more than a specific level, then the buzzer will alert that person by displaying "Unable to enter" on the display board or if the temperature level of that person is normal, then he/she will be able to go for the next step (oxygen level check).

During oxygen level checking, if the oxygen level of that person is less than specific limit, then buzzer will alert that person by displaying "Unable to enter" on display board, or if the oxygen level of that person is normal then he/she will be able to go for the next sanitization step.

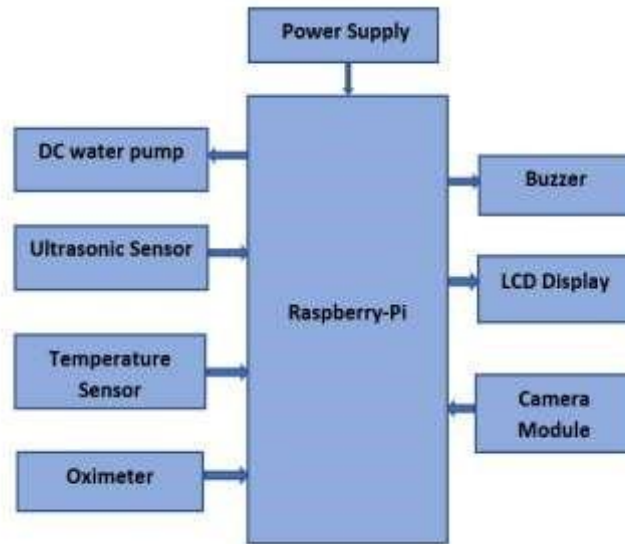


Figure 2: Hardware Architecture

#### □ Temperature Sensor(MLX90614)-

We have used contactless infrared(IR) digital temperature sensor that can be used to measure the temperature of a particular object ranging from  $-70^{\circ}\text{C}$  to  $382^{\circ}\text{C}$ . The sensor measure the temperature using IR rays and detect the person temperature without any physical contact.LCD display is used to display the temperature of the person.

#### □ Oximeter(MAX30102)-

We have used MAX30102 Sensor which measure blood oxygen and heart rate. It contains two LEDs, a photodetectors, optical elements and low-noise analog signal processing to detect pulse oximetry and heart-rate signals. We have used LCD display to display the value of Spo2 and BPM. The Spo2 is measured in percentage and Heart Beat is measured in BPM.

#### □ Ultrasonic sensor-

We have used an ultrasonic sensor to detect the presence of hands. .An ultrasonic sensor measure the distance of an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic waves that relay back information about an object if the hand is closer to the dispenser. Raspberry pi will activate the pump whenever the distance is less than 15cm to push the sanitizer out.

### B]. Face Recognition-

By comparing with other systems, face recognition is one of the more efficient and advanced system. Face recognition in our system consists of mainly 3 steps namely-

- 1]. Capture the image and Creation of Dataset
- 2]. Training the dataset
- 3]. Run Facial Recognition and Postprocessing

#### 1]. Capture the image and Creation of database-

We have used camera module for taking videos. Database of all employees along with 15 images of individual person is captured and stored. So, we have stored multiple images of every single individual by considering different features for the face detection and recognition process.

#### 2]. Training the dataset-

Here we have used the Haar Cascade Algorithm for face detection and recognition by considering the need for the Real-time recognition. Since, the image contains unnecessary elements and background noises, there is need of remove such elements. So, feature extraction is the main solution for reducing such unnecessary data and make proper face available in the image. Then, histogram equalization process is performed on that image and make it easier to process.

#### 3]. Face Recognition and postprocessing-

In this step, when the person is proceed for the attendance in front of camera, here current image of that person is compared with generated database and displays attendance status of that person on the screen. So the below attendance details are stored in datasheet.

Name	Date	Time in	Present/ Absent
Akshata Pednekar	12/01/2022	9:45	Present
Amisha Patil	12/01/2022	9:40	Present
Kranti Tendolkar	12/01/2022	9:43	Present
Bhagyashri Kambali	12/01/2022	9:41	Present

Table 1- Model Attendance Sheet

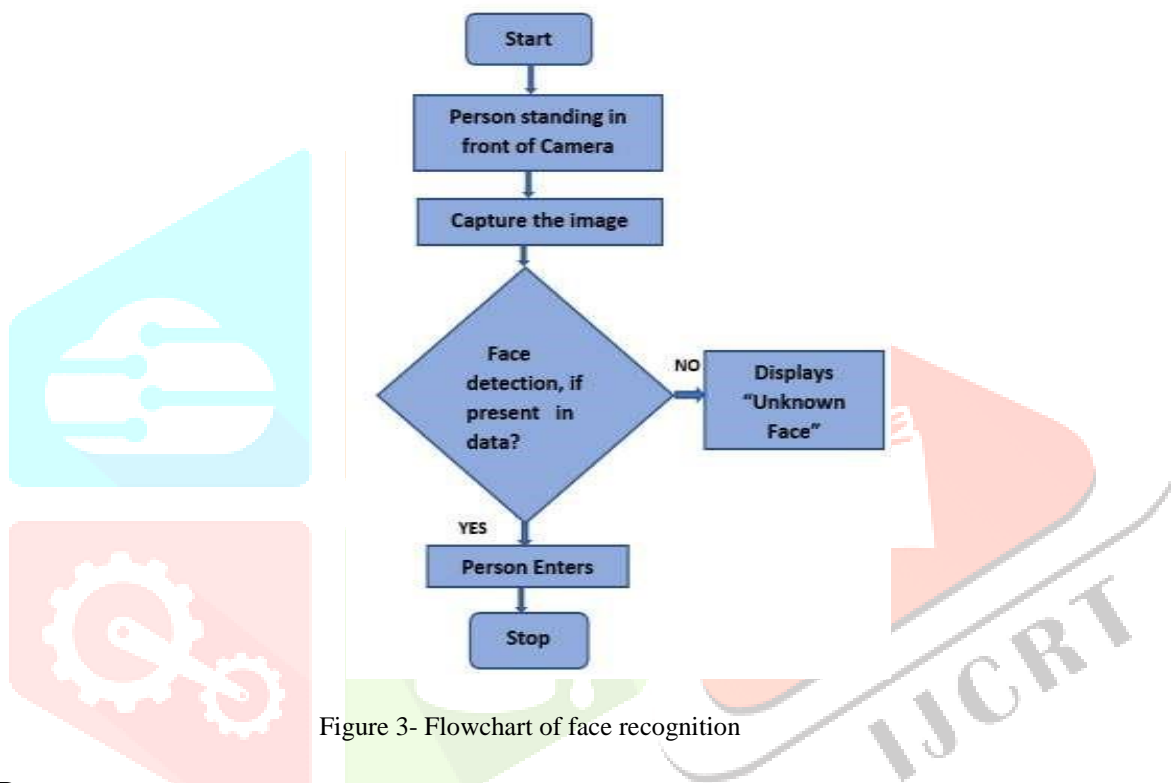


Figure 3- Flowchart of face recognition

**V. RESULTS**

**A. Temperature Level Checking:**



Fig.4- Temperature Level Checking

**B. Oxygen Level Checking:**



Figure 5 Oxygen Level Checking.



### C. Face Recognition:

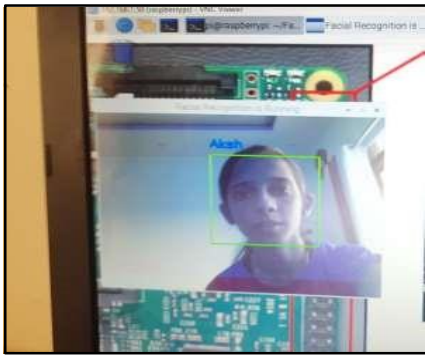


Figure 6- From the dataset

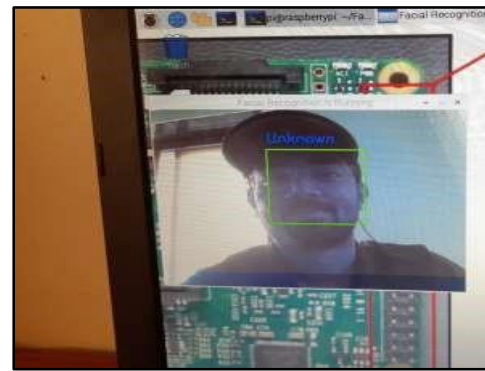


Figure 7- Detection of Unknown Face

## VI. CONCLUSION

After analyzing different methods, we have realized that this system will be helpful for students, employees, patients to check their health status easily at any workplace. This system will help to take required safety measures at any workplace to avoid spread of infection. Also, face recognition based attendance system will be useful to reduce manual work in offices, colleges and at any other workplaces and it can be more secure and efficient in nature. Real time face recognition using Haar Cascade Classifier found to be suitable and flexible for the implementation of our project. In this Covid-19 pandemic it is one of the safest way to mark attendance in offices, colleges and schools. It can also be further modified as health monitoring system where one can check its health condition in a secure manner.

## REFERENCES

- [1]. Smitha Pavithra S Hegde, Afshin "Face Recognition based Attendance Management System" International Journal of Research and Technology ISSN:2278-0181 IJERTV9IS050861 Vol. 9 Issue 05, May-2020.
- [2]. Mayur Surve, Priya Joshi, Sujata Jamadar, Minakshi Vharkate "Automatic Attendance System Using Face Recognition Technique" International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-9 Issue-1, May 2020.
- [3]. Shrutika V. Deshmukh, Prof Dr. U. A. Kshirsagar, "Face Detection and Face Recognition Using Raspberry Pi" International Journal of Advanced Research in Computer and Communication Engineering ISSN 2278-1021 Vol.6, Issue 4, April 2017.
- [4]. Vamsi Nandan Archana Bhat "Contactless Attendance Marking System with Thermal Screening using Arduino" International Journal of Engineering Research & Technology (IJERT), ISSN: 2278-0181 NCAIT-2020 Conference Proceedings.
- [5]. Mahesh Patil, Shraddha Vibhute, Akanksha Vasawade, Yashwant Tambe, Ankush Varute "Attendance Management System using Face Recognition And Body Temperature Sensing" International Journal of Research in Engineering and Science Volume 9 Issue May 2021
- [6]. K.Senthamil Selvi , P.Chitrakala, A.Antony Jenitha "Faced recognition based attendance marking system" International Journal of Computer Science and Mobile Computing IJCSMC, Vol.3, Issue. 2, February 2014.
- [7]. Raj, R., Das, A., & Gupta, S. C, "Proposal of an Efficient Approach to Attendance Monitoring System using Bluetooth" 2019 9th International Conference on cloud Computing, Data Science & Engineering (Confluence). doi:10.1109/confluence.2019.8776978.
- [8]. Saleem Ulla Shariff, Amaranath C, Ravi Anand Jadhav, Dr. K Suresh Babu, Maheboob Hussain, "Face and Biometric Based Attendance and Security System using RFID and Arduino ", International Journal of Electrical Electronics & Computer Science Engineering Special Issue - NEWS 2016, E-ISSN : 2348-2273, P-ISSN : 2454-1222.
- [9]. S. Jagannatha, M. Niranjana Murthy, and P. Dayananda, "Algorithm Approach: Modelling and Performance Analysis of Software System" Journal of Computational and Theoretical Nanoscience (American Scientific Publishers), December 2018, Volume 15, Issue 15, PP.3389-3397.
- [10]. Alam, M. J., Faisal, F., & Karim, A, "A Proposition for a Low-Cost Effective Attendance Management System", 5th International Conference on Communication and Electronics Systems (ICES). Doi:10.1109/ices-48766.2020.9137974,2015.
- [11]. R Samet, and M Tanriverdi.(2017) "Face Recognition based Mobile Automatic Management Classroom Attendance Management System." International Conference on Cyberworlds, Chester United Kingdom, 20-22 September, IEEE Computer Society , pp.253-256.
- [12]. <https://annalsofrscb.ro/index.php/journal/article/view/9248/6757>
- [13]. [https://www.researchgate.net/publication/332034361\\_Smart\\_healthcare\\_monitoring\\_system\\_using\\_raspberry\\_Pi\\_on\\_IoT\\_platform](https://www.researchgate.net/publication/332034361_Smart_healthcare_monitoring_system_using_raspberry_Pi_on_IoT_platform)