ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)

Vol 9, Issue 6, June 2022

Automated Body Temperature, Mask Detection And Face Recognition Based Attendance System

[1] Aditya Ajith, [2] Rohan Jacob Alexander, [3] Augustas Nixon, [4] Jisha Jose, [5] Denit Philip

[1] [2] [3] [5] Department of Computer Science, Mar Baselios College of Engineering and Technology, Trivandrum, India.
[4] Asst. Professor, Department of Computer Science, Mar Baselios College of Engineering and Technology, Trivandrum, India.
Corresponding Author Email: [1] adityaajith9996@gmail.com, [2] rohanjacobalexander@gmail.com, [3] augustas744@gmail.com, [4] jisha.jose@mbcet.ac.in, [5] denitp009@gmail.com

Abstract*— Cross-contamination of the virus among employees is a major risk factor as communities grapple with the COVID-19 outbreak. Swiping cards or bio-metrics are commonly used to track individual employee attendance. This can be a simple means of infection transmission, leading to the virus's spread. If the person is not wearing a mask that can lead to a serious spread of virus. In order to avoid this physical contact for measuring temperature a non-contact temperature gauge can be implemented. This can be used as part of a first examination at entry points to know or avoid people with high temperature to enter the premises, which could also help in order to classify a person who has contracted the COVID-19 infection. This system can be used to as a replacement for the current system, in which a staff is manually scans temperature were the staff is exposed completely to the outsider. The proposed system uses the Haar cascade algorithm for face recognition and temperature of the person is measured along with attendance updation. This eliminates the possibility of virus transmission via card swipes or bio-metrics. The device also identifies whether the employee is wearing a mask and guarantees that the COVID necessary masking protocol is followed.

I. INTRODUCTION

Temperature of a person can be measured as part of the evaluation to see if they have an increased fever then we can estimate that the person is infected by COVID-19. One approach for monitoring a person's body temperature is to utilize "no-touch" or non-contact temperature measurement devices. The Non-contact body temperature estimation and face mask detection system, along with facial recognition feature give temperature reading and also automatically updates attendance and ensures that masks are worn as required. This sensor, which calculates the temperature of a person body, which helps in reducing the danger of cross-contamination and transmission of diseases. Although 37°C is commonly thought of as a "natural" body temperature, several studies have indicated that "normal" body temperature can range from 36.1°C to 37.2°C, with 37.2°C being defined as the threshold. This device will calculate the temperature of a human body from a distance of 30 to 35cm. Also, the cross-contamination is avoided by keeping the device at a safe distance from the device and person body. The model is trained with employee photos to update attendance. The employee's expression must be captured in such a way that all of his or her facial characteristics may be seen. The system makes a recording, the face is registered, and the attendance database is updated as a result, allowing for the next stages to be processed. The same method can be used to detect the employee's/ student's mask.

II. LITERATURE SURVEY

Ravi Kishore Kodali , Rekha Dhanekula "Face Mask Detection Using Deep Learning" April 2021.

Face mask detection refers to detecting faces in the image and then classifying each face as with mask or without mask. First step is to found ROI to identify is there a human face or not in the given input. OpenCV is used for the implementation of face recognition as it has built in features of face recognizer and along with this Haar classifier is implemented for recognizing eyes, face etc. This model a single frame is capable of detecting multiple faces and also classifies each face. There are two folders in the dataset they are with mask and without mask. Model had 3 stages like first one was Pre-processing, second stage is training of CNN and third stage is detect whether the person has mask or did not have a mask. As a result, two colours or labels were used one for colour and another for title, with mask and without mask faces in the image were classified and face detection were performed also accuracy was displayed in percentage.

Hao Yang , Xiaofeng Han ; "Face Recognition Attendance System Based on Real-Time Video Processing" July 2020.

Many companies in the world use facial recognition system based on real time. The face is recognized by extracting features from the subject's face which is stored in the database for later reference. A partial image of a face is located from the entire image. The recognition module mainly consists of four parts firstly the login module followed by the recognition module then check-in module and lastly the background management module. Thus, proper

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)

Vol 9, Issue 6, June 2022

and enhanced technique can be used for the maintenance of student's attendances system.

E. Omer Akay , K. Oguz Canbek , Yesim Oniz "Automated Student Attendance System Using Face Recognition"Oct. 2020.

This paper introduces the use of two new techniques discrete wavelet transform and discrete cosine transform.A method previously used called radial basis function provides high success rate for a given dataset. Face embedding is formed using successive layers of convolutional network. Facial features such as mouth, eyes, nose are used to detect a person. Two face recognition algorithms Haar-Cascade algorithm and Histogram of Oriented Gradients (HOG) is used. These use dlib and OpenCV to function and their performances are compared with each other.

Jin Chen , Jun Chen , Zheng Wang , Chao Liang , Chia-Wen Lin "Identity-Aware Face Super-Resolution for Low-Resolution Face Recognition" April 2020.

Even though a lot has been achieved in the field of deep learning, identification of faces in low resolution images still remains a task at hand. Using the currently available models on these low-resolution images deteriorates the performance largely.Here a model is proposed to convert the low-resolution faces to high resolution images. The entire network contains two parts: first the identity aware embedding module and second the face super resolution module. The proposed method achieves an accuracy of 98.46% and 98.98% on two models.

III. PROPOSED SYSTEM

We are proposing a model that is trained with employee photos to update attendance. The image should be captured in such a way that all the facial features are seen. The faces are recorded then registered by which the attendance can be updated, allowing the next stages to be processed. The same method can be used to detect the employee's mask.

advantages of our proposed system

- Helps to control spread of virus
- Reduces the work of teacher in taking attendance
- Reduces infection between students/employees
- Checks if masks are worn, to increase protection from virus.

Design flow diagram of the system

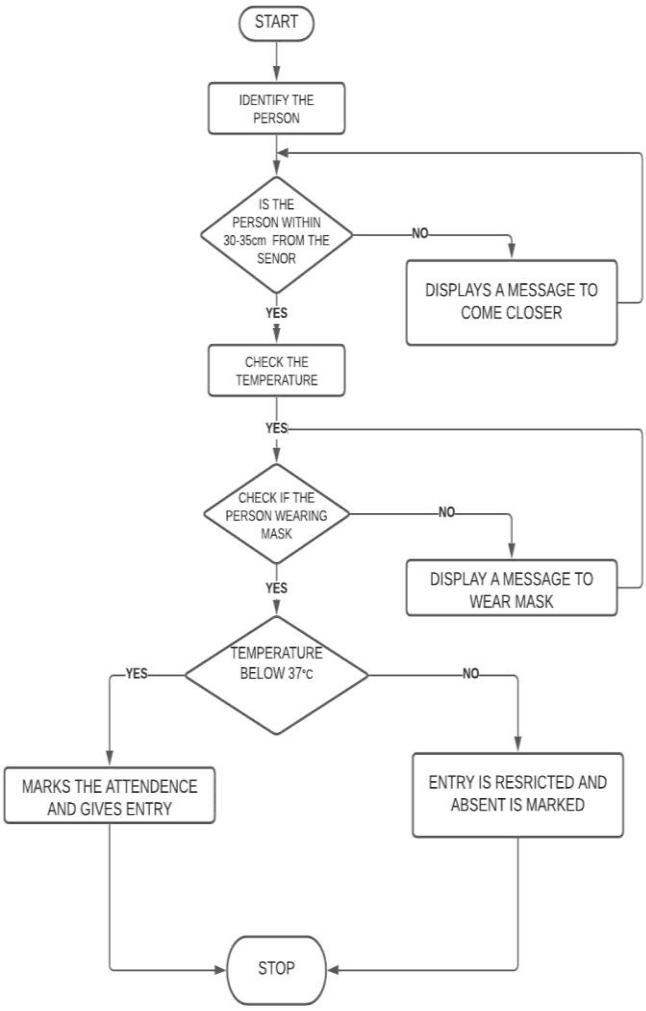

FIG 1.DESIGN FLOW DIAGRAM

Resources required

a) Dataset: - The data used for mask detection is those that are widely available online. The data that is used for face recognition is the faces of the employees/students (10-15 photos of each person).

b) Components:

Hardware:

-Raspberry PI 3
-Webcam
-Desktop
-temperature sensor
-Ultrasonic sensor

Software:

-Raspbian OS
-OpenCV
-Tensor flow
-Python

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)

Vol 9, Issue 6, June 2022

IV. METHODOLOGY

As demonstrated in Fig. 1, the Raspberry Pi serves as the controller. The ultrasonic sensor measures the distance between the candidate and the device, the MLX90614 infrared temperature sensor is utilized to assess the body temperature without making direct touch. The HOG facial recognition technique is used to update attendance and detect masks.

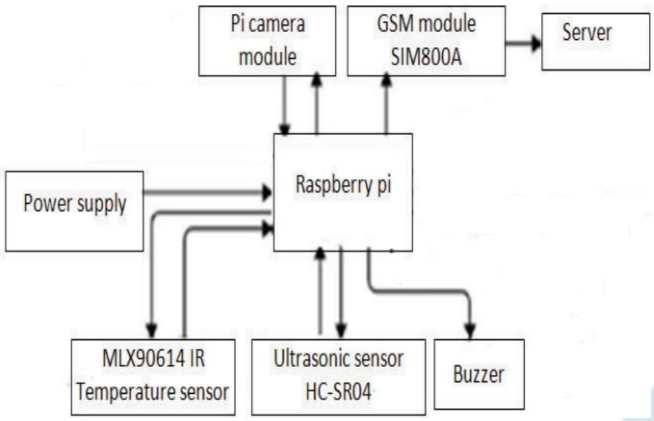

FIG 2. HARDWARE ARCHITECTURE

The picture of the candidate is taken at 30 frames per second at a modest 1080p resolution or 5 megapixels. When the device captures the image of the candidate it compares the image with the images present in the database, and when a match is found the device checks the temperature of the candidate. Candidates distance from the device is adjusted using ultrasonic sensor which can be configured using the raspberry pi. The human body temperature can be detected using an infrared temperature sensor. In the most basic configuration, infrared radiation is directed into a detector, which subsequently converts the energy into an electronic signal. After being corrected for the ambient temperature, this signal will be shown as a temperature measurement. Through this device temperature can be measured without having to touch the object.

The procedure is as follows:

- Identification of the person is done at the entry point through the webcam or camera module.
- A distance of 30-35 cm is maintained between the device and candidate with the help of an ultrasonic sensor.
- When the candidate's distance is set correctly, his body temperature is measured.
- If the candidate's temperature does not exceed 38 °C then he is granted access to the premises.
- Using the same principles of face recognition, the candidates is checked to having worn a mask, and if so, is granted entry.
- If the temperature exceeds 38 °C then he is not allowed into the premises and is marked absent.

For facial identification, the Histogram of Oriented Gradients technique is utilized, it is used to extract necessary features from images. It's often used for object detection in computer vision. The structure of the object is the focus of HOG. It derives information about the size and orientation of the edges.

V. RESULT

The first step in recognizing a candidate is to make a database containing all the photos of the people to be recognized. These images are then put into a single folder and the path is added to the source code. The candidate's name is renamed as the corresponding folder name. When the recognition process takes place, the model compares the captured image to the images available in the database. If a match is found the name will appear on the screen, after this process, the face mask will be checked, and the employee data will be saved. After this phase the candidate's temperature is checked and displayed. If the temperature is above a certain degree, then entry is denied and attendance is marked as absent.

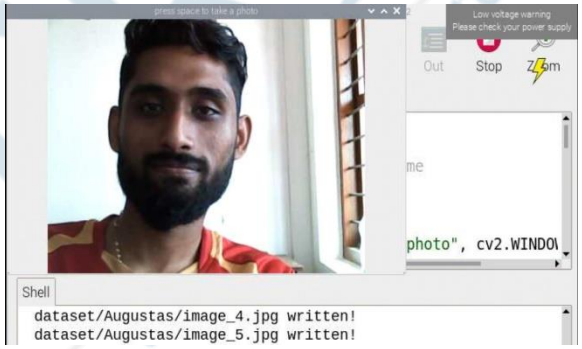

FIG 3. TRAINING THE DATASET

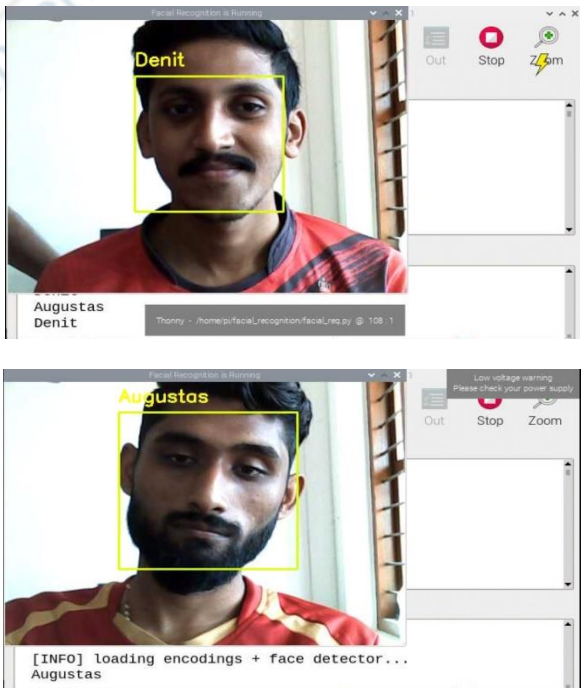

FIG 4 & 5. TESTING THE MODEL

ISSN (Online) 2394-2320

International Journal of Engineering Research in Computer Science and Engineering (IJERCSE)

Vol 9, Issue 6, June 2022

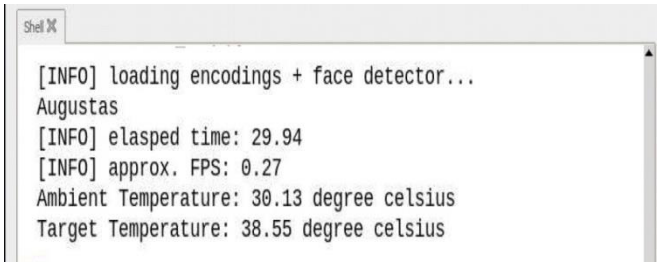

FIG 6. *CANDIDATE RECOGNITION AND TEMPERATURE ESTIMATION*

This device recognizes students, checks temperature, detects mask and updates attendance, Haar Cascade algorithm method provides a 92% efficiency at different light conditions.

Number of tests conducted	Number of true positives	Face Detection efficiency
50	46	92%

FIG 7. *FACE DETECTION EFFICIENCY*

In the comparison between a non-contact IR temperature sensor used in the device and a hand-held thermometer.

the IR temperature sensor showed an inaccuracy of 0.2 °C, which implies the viability of this device in the current situation.

Test Number	Non Contact Temperature (C)	Hand Held thermometer (C)	Error
1	37.51	37.52	0.01
2	36.47	36.45	0.02
3	37.62	37.60	0.02
4	37.02	37.01	0.01

FIG 8.*COMPARISION BETWEEN IR TEMPERATURE SENSOR AND HANDHELD THERMOMETER*

VI. CONCLUSION

The new technology is becoming increasingly popular as the world fights the COVID-19 outbreak. While vaccination and social isolation are critical, the World Health Organization emphasises the need of effective screening and sanitization, which has benefited in the fight against the epidemic. By swiping cards or noting biometric attendance, the created model prevents front-line health workers from coming into contact with sick people. It also helps to reduce the risk to employees. In compared to its competitors, the product is considerably less expensive, making it a significant value addition for developing countries and small businesses.

REFERENCES

[1]. Ravi Kishore Kodali , Rekha Dhanekula ; Face Mask Detection Using Deep Learning ; 2021 International Conference on Computer Communication and Informatics (ICCCI) ; 21 April 2021.

[2]. E. Omer Akay , K. Oguz Canbek , Yesim Oniz ; Automated Student Attendance System Using Face Recognition; 2020 4th International Symposium on Multidisciplinary Studies and Innovative Technologies (ISMSIT) ; 22-24 Oct. 2020.

[3]. J Udaykumar, M Sakthivel, K Sivakrishna Rao. " Extracting Results from Servers by using Density between Micro Clusters." *Int. J. Pure Appl. Math.* Vol.117 no.21, PP: 277-285, 2017.

[4]. Hao Yang , Xiaofeng Han ; Face Recognition Attendance System Based on Real-Time Video Processing ; IEEE Access (Volume: 8) ; 10 July 2020.

[5]. Jin Chen , Jun Chen , Zheng Wang , Chao Liang , Chia-Wen Lin ; Identity-Aware Face Super-Resolution for Low-Resolution Face Recognition ; IEEE Signal Processing Letters (Volume: 27) ; 20 April 2020.