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## Face Recognition Attendance System Software for Employee using Python and OpenCV

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### Abstract:

The main purpose of this project is to build a face recognition-based attendance monitoring system for educational institution to enhance and upgrade the current attendance system into more efficient and effective as compared to before. The current old system has a lot of ambiguity that caused inaccurate and inefficient of attendance taking. According to situation attendance marking in institutes or any organization involving manual or using RFID or using fingerprint biometrics, at current situation of COVID-19, the working environment won't be a similar post COVID. Despite the fact that the pandemic keeps on flooding, organizations are attempting to continue their on-premise tasks and taking business conferences. Under such conditions, worker's safety, wellbeing, and security are of principal significance. Associations are looking for approaches to give a without COVID or COVID-FREE workspace to representatives, and a touch-less registration is the initial move towards it. The technology working behind will be the face recognition system. The human face is one of the natural traits that can uniquely identify an individual. Therefore, it is used to trace identity as the possibilities for a face to deviate or being duplicated is low. In this project, face databases will be created to pump data into the recognizer algorithm. Then, during the attendance taking session, faces will be compared against the database to seek for identity. When an individual is identified, the attendance will be taken down automatically saving necessary information into a excel sheet. At the end of the day, the excel sheet containing attendance information regarding all individuals and saved by the respective faculty.

**Keywords-** OpenCV (Open source computer vision), csv (Comma Separated Values).

### 1. INTRODUCTION

Facial recognition is an easy and secure way of taking down attendance. Facial recognition in the workplace is going to become more and more common in a post-pandemic world. Business owners across the globe are looking for contactless ways for employees to clock in and out and calculate payroll. As a result, solutions will become more utilized than they previously were. How it will work the device captures the images of employees, train & processes the information into a database. Then trained face images coordinate structure are mapped and stored into database and now faces of employees are ready to be recognized by the machine. Software can be downloaded in any device, and the face of employees can be scanned with accuracy. Once registered, the device recognizes the matched face for all future check-ins. The proposed system can be implemented in any field where attendance system is present and plays a vital role. In addition, as the project objectives and the design criteria all met, it's greatest to say this project is an engineering solution for all university and colleges to track and manage the attendance.

### 2. LITERATURE SURVEY

Plenty of research has been conducted so far on the various available methods for implementation of an effective attendance monitoring system. These methods vary in terms of the types of input method used, the types of data processing employed and the controllers used to implement the systems. In this section looking for the various available solution with the advantages and disadvantages of each system.

## 2.1 Attendance System Using NFC Technology with Embedded Camera on Mobile Device

According to research journal “Attendance System Using NFC (Near Field Communication) Technology with Embedded Camera on Mobile Device” (Bhise, Khichi, Korde, Lokare, 2015). The attendance system is improved by using NFC technology and mobile application. According to the research paper, each student is given a NFC tag that has a unique ID during their enrolment into the college. Attendance of each class will then be taken by touching or moving these tags on the lecturer mobile phone. The embedded camera on the phone will then capture the student’s face to send all the data to the college server to do validation and verification. The advantages of this method are where the NFC is simple to use, and the speed of connection establishment is very high. It indeed speeds up the attendance taking process a lot. However, this system couldn’t automatically spot the violation when the NFC tag is not personally tagged by the original owner. Apart from that, the convenience of the system which uses the mobile phone as the NFC reader was actually an inconvenience to the lecturer. Imagine if the lecturer had forgotten to bring their mobile phones to work, what would be the backup procedure for the attendance to be recorded? Moreover, most of the lecturer will not likely to prefer their personal smart phones to be used in this way due to privacy matter. Hence, unique information about the student like biometrics or face recognition, which is genuine for a student should be used in replacement of the NFC tag. This will ensure attendance to be taken originally by the actual student.

## 2.2 Face Recognition Based Attendance Marking

The second research journals “Face Recognition Based Attendance Marking System” (SenthamilSelvi, Chitrakala, Antony Jenitha, 2014) is based on the identification of face recognition to solve the previous attendance system’s issues. This system uses camera to capture the images of the employee to do face detection and recognition. The captured image is compared one by one with the face database to search for the worker’s face where attendance will be marked when a result is found in the face database. The main advantage of this system is where attendance is marked on the server which is highly secure where no one can mark the attendance of other. Moreover, in this proposed system, the face detection algorithm is improved by using the skin classification technique to increase the accuracy of the detection process. Although more efforts are invested in the accuracy of the face detection algorithm, the system is yet not portable. This system requires a standalone computer which will need a constant power supply that makes it not portable. This type of system is only suitable for marking staff’s attendance as they only need to report their presence once a day, unlike students which require to report their attendance at every class on a particular day, it will be inconvenient if the attendance marking system is not portable. Thus, to solve this issue, the whole attendance management system can be developed on a portable module so that it can be work just by executing the python program.

## 3. MODULES OF PROPOSED PROJECT

### 3.1 Proposed Software

Fig. 1: Face Recognition Attendance System Software for Teachers Attendance



Fig. 1: Home page

### 3.2 Registration Module

In this, first interest Employee name and get registered by selecting their desired username and password and by providing the necessary details. Each person will register only one time. Details of each person along with their username and password is saved permanently in the database. Now for recognition some steps are mandatory. (Fig. 2: Registration Form)

#### 3.2.1 Data set generate (Face Detection)

Here using harr cascade classifier to detect face image. Then it will collect the images into a folder where every image will have a unique id. Simultaneously it will crop images and convert image into grey scale.

#### 3.2.2 Training classifier (Features Extraction)

LBPHFaceRecognizer help us to extract features and train faces and id.

#### 3.2.3 Detect face and Recognize it (Face Recognition)

Firstly, the web camera will open. It will be going to detect face and going to check if you are registered employee or not.

Fig. 2: Registration Form

### 3.3 Attendance Module

The most important and if u registered yourself then it will be going to show your name on your image and your attendance will marked in excel sheet successfully and if you have not registered your face then unknown person will display. (Fig. 3 & 4: Attendance module)

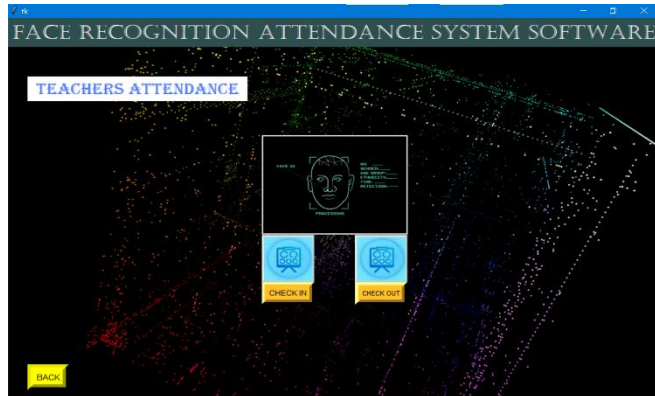
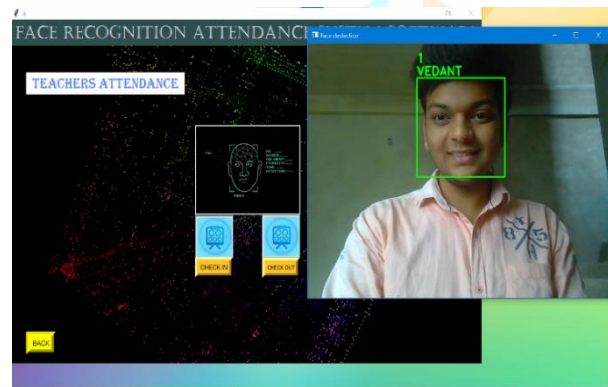


Fig. 3: Clock in & out



4: Marking Attendance.

Fig.

### 3.4 Attendance Managing Module

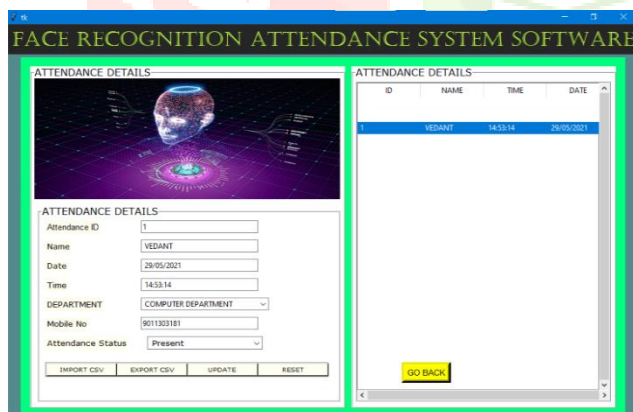


Fig. 5: Attendance sheet.

## 4. SYSTEM FLOWCHART

### 4.1 Registration Flowchart (Fig. 6: Registration flowchart)

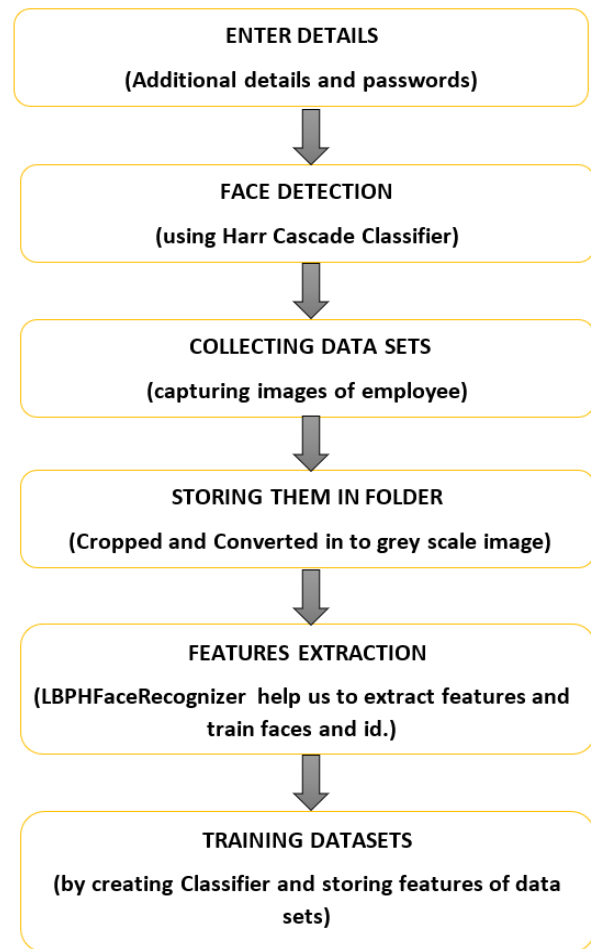


Fig. 6: Registration flowchart

### 4.2 Attendance Flowchart (Fig. 7: Attendance flowchart)

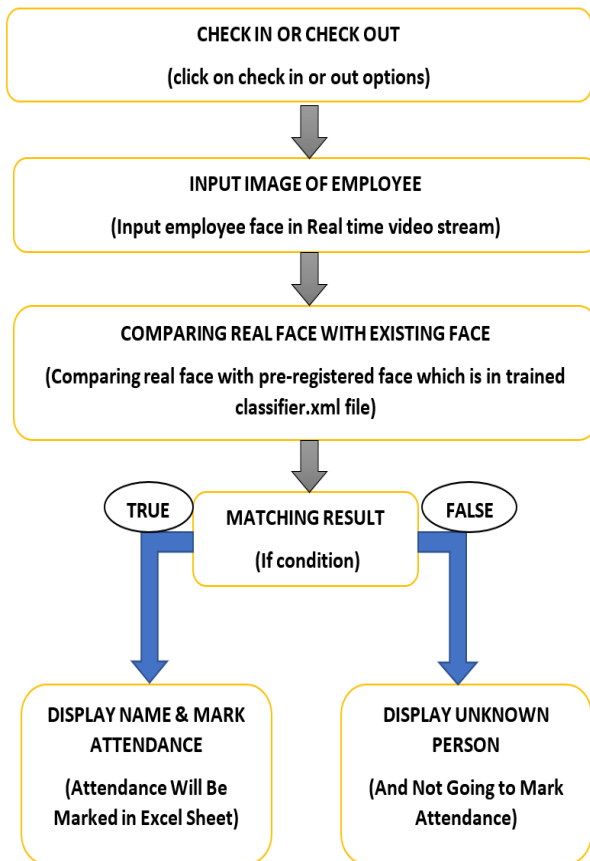


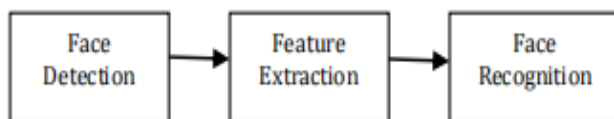
Fig. 7: Attendance flowchart

## 5. METHODOLOGY

### 5.1 Face Detection (Data set generate)

### 5.2 Features Extraction (Training classifier)

### 5.3 Face Recognition (Detect face and Recognize it)



#### Face Detection (Data set generate):

Here we used harr cascade classifier to detect face image. Then it will collect the images into a folder where every image will have a unique id. Simultaneously it will crop images and convert image into grey scale and every image gets a face id such it will collect 200 greyscale images to get better and accurate result. The images which are cropped and converted into grey scale will have a unique id which will get stored in the folder.

#### Features Extraction (Training classifier):

LBPHFaceRecognizer help us to extract features and train faces and ids of employee and save it by making classifier, it will be saved in .xml format full form extensible mark-up language.

#### Face Recognition (Detect face and Recognize it):

Firstly, the web camera will open. It will be going to detect face then real face will be compared with the faces already registered in database. This happen in matter of seconds. It

detects that you are person or not then it will draw square on your face. And most importantly, if you had registered yourself then it will be going to show your name on your image and mark your attendance in excel sheet. And if you have not registered your face then unknown person will display on screen.

#### Software / Libraries / Packages Required for Development:

Language used for programming is python. PyCharm 2020.2.3 x64 IDE used for development. Libraries used are: OpenCV (Open source computer vision) is a library of programming functions mainly real-time. "haarcascade\_frontalface\_default.xml" classifier and "LBPHFaceRecognizer" Recognizer play an important role in detecting human faces and extracting features of each and every face, and saving face coordinate structure in database. For GUI Tkinter library is used. Tkinter is the standard GUI library for Python. Python when combined with Tkinter provides a fast and easy way to create GUI applications. Tkinter provides a powerful object-oriented interface to the Tk GUI toolkit. NumPy is a package that defines a multi-dimensional array object and associated fast math functions that operate on it. It also provides simple routines for linear algebra and sophisticated random-number generation. NumPy replaces both Numeric and Numarray. To record attendance csv file is used. CSV (Comma Separated Values) is a simple file format used to store tabular data, such as a spreadsheet or database. A CSV file stores tabular data (numbers and text) in plain text.

## 6. OBJECTIVES

In the proposed system the objective of this, is to present an attendance system for human face recognition in background for an institutes or organization to mark the attendance of their employees.

- To ensure the speed of the attendance recording process is faster than the previous system which can go as fast as approximately 3 second for each student.

- Have enough memory space to store the database.

- Able to recognize the face of an individual accurately based on the face database.

- Provide a user-friendly interface for admins to access the attendance Records.

- Allow staff to store their faces in the database by using a GUI.

- Able to show an indication to the user whether the face-recognition process is successful or not.

## 7. FILES INCLUDED

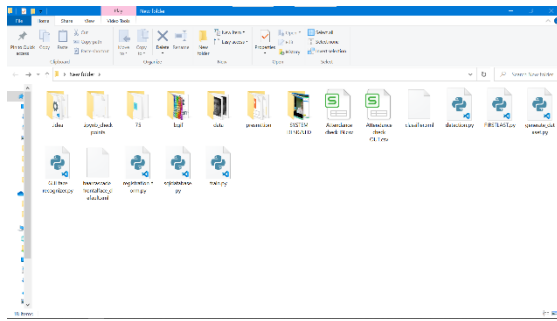
There are in total 7 python scripts, 1 harrCascade classifier, 2 csv file check in and check out, 1 xml file containing trained datasets and 1 folder for storing captured images and 1 folder which contain images for GUI.

**Python scripts:** FIRSTLAST.py, detection.py, registrationform.py, generate\_dataset.py, train.py, GUI face recognizer.py and sqldatabase.py

**Face Detection Classifier:**

haarcascade\_frontalface\_default.xml

**Containing Trained Datasets file:** Classifier.xml  
**Folder contain Employee Face:** data  
**CSV file:** Attendance check IN.csv and Attendance check OUT.csv



**Fig. 8: Content of Project**

## 8. CONCLUSION

Before the development of this project. There are many loopholes in the process of taking attendance using the old method which caused many troubles to most of the institutions. attendance marking in institutes or any organization involving manual or using RFID or using fingerprint biometrics, at current situation of COVID-19 not possible, the working environment won't be a similar post COVID. Despite the fact that the pandemic keeps on flooding, organizations are attempting to continue their on-premise tasks to guarantee business conference. Under such conditions, worker's safety, wellbeing, and security are of principal significance. Associations are looking for approaches to give a without COVID or COVID-FREE workspace to representatives, and a touch-less registration is the initial move towards it.

Here comes the conclusion *"The facial recognition attendance system software" is a contact-less attendance tracking software exceptionally relevant in the current pandemic situation."*

Apart from that, the face recognizing system is also working well. At the end, the system not only resolve troubles that exist but also provide convenience to the user to access the information collected by the attendance sheet to the respected faculty.

## 9. REFERENCES

- [1]. OpenCvDocumentation - <https://opencv.org>
- [2]. Numpy - <https://numpy.org>
- [3]. <https://www.mygreatlearning.com/blog/face-recognition/>
- [4]. <https://realpython.com/face-recognition-with-python/>
- [5]. <https://blog.devgenius.io/face-recognition-based-on-lbph-algorithm-17acd65ca5f7?gi=6ac668594605>
- [6]. <https://coderspacket.com/face-recognition-attendance-system-using-opencv-lbph-face-recognizer-in-python>
- [7]. Dr. Nita Thakare, Meghna Shrivastava, Nidhi Kumari, Neha Kumari, Darleen Kaur, Rinku Singh, "Face Detection

and Recognition for Automatic Attendance System" International Journal of Computer Science and Mobile Computing, Vol.5 Issue.4, pg.74-78, April-2016

[8]. Naema Mohamed Kutty, Shelmy Mathai, "Face Recognition - A Tool for Automated Attendance System", International Journals of Advanced Research in Computer Science and Software Engineering ISSN: 2277-128X (Volume-7, Issue-6), August 2014.

[9]. D. Santhi Priya and Mr. M. Uma Sankar, Lingayas, "Modern Attendance System Using Raspberry Pi", Institute of Management and Technology, Vijayawada, Andhra Pradesh. International Research journal of Engineering and Technology (IRJET) Volume 03, Issue :08 August 2016.

