WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Face Recognition in Employee Management

Umair Momin [a], Purva Jage [b], Sejal Vartak [c], Swati Patil [d]

[a] *Dept of Computer Technology, BVIT, Maharashtra, India*
[b] *Dept of Computer Technology, BVIT, Maharashtra, India*
[c] *Dept of Computer Technology, BVIT, Maharashtra, India*
[d] *Dept of computer Technology, BVIT, Maharashtra, India*

A B S T R A C T

The face is one altogether the only ways to distinguish each and every identity of face. Face recognition may be a private identification system that uses personal characteristics of somebody to identify the person's identity. A system and application which recognizes face symmetries and recognizes the face is the topic of our project. In this employee management application, as part of admin login, we have added one major facility which is login by face recognize by Open CV and Python library. In the application we can add the employee's face, in employee data to recognize the employee by his face symmetric. A facial recognition system is one which tracks and analyzes facial structures. It then compares the distinct characteristics created by making a model of the face to a data-set of models and compares particular tracking points to find a match. After recognizing the face, the respective data of the employee's face is displayed. The investments had been increased in facial recognition technology. In addition, in the learning process, we propose a new online hard sample mining strategy that can improve the performance automatically without manual sample selection. The system can be configured to raise a flag or alert the user when a match is not found between the face and any facial model from the date-set. The applications of computer vision and face recognition have increased day by day with new dimensions and new positive impacts on our society. However, some of the systems can't identify and recognize any person through the blurred conditions. illumination and lighting are the major problems. Venture funding will be increased from 2021.With advanced technology, new use cases and models in this field of health-care, airports, proctoring, etc.

Keywords: symmetric, open-CV (computer vision), venture funding, proctoring

1. Introduction

Facial recognition is the advanced application of AI. It is a method of bio metric authentication to identify and verify face using facial features in an image database . In virtually, face is recognized and acknowledgement is done by newly launched technology such as artificial intelligence and machine learning.[5]The application was created with a vision to make the process of contact-less, bio-metric security as simplified and user-friendly as possible, while also not compromising on the accuracy of intruder detection [1]. In IOT it requires small resources. Ecosystem in facial recognition refers to technology which is capable of identifying and verifying through an image, video of his face. It is used to access applications and systems. Basically, this application works as a face scanner. When the current version of the project is capable of detecting and identifying faces from a video stream, additional features such as an alert system could be implemented, which gets triggered when an unrecognized person is detected. This project has a vast range of applications due to this create and contact-less system.[1]

This form of bio-metric identification uses our body measures, in this case face ,to verify the identity of a person's facial expression or pattern. The technology collects unique bio metric data of each person with their facial expression and face to identify/verify and authenticate a person. A facial recognition system is a technology capable of matching a human face from a digital image or a video frame against a database of faces.[4] Such a system is typically employed to authenticate users through ID verification services, and works by pinpointing and measuring facial features from a given image. The face recognition and detection system used for authentication and identification of human faces. In the face recognition system, it identifies faces within the images automatically and

Mechanically . It's classified into 2 modules.

• Face verification (or authentication)

• Face identification (or recognition.[2]

The technology is mostly used for security and law enforcement, though there is increasing interest in other areas of use.

1.1 Face recognition

Face recognition and, in other words, face detection, is one of the upgraded technologies in artificial intelligence .It is used for security purposes .[1] Face Recognition detects and processes faces which match to a database of known faces, to identify the person. Since 2002, face detection can be performed fairly, easily and reliably with Intel's open-source framework called Open-CV. This framework has an in-built It decides whether the person is authorized to enter the sensitive area or not. After face localization, preprocessing is done to extract the region of interest. Here we crop face part from the image to start the recognition process.

The test images of all the authorized persons are stored in a training database, while the cropped image after face detection is used to place in the test database.[2] Face Detector that works on roughly 90-95%of clear photos of a person looking forward at the camera .However, detecting a person's face when that person is viewed from an angle is usually harder ,sometimes requiring 3D Head Pose Estimation. The brightness of an image can increase the difficulty level in detecting face shadows or maybe the picture is blurred.[3] Face recognition, however, is much less reliable than face detection, with an accuracy of 30-70%in general. Face recognition has been in research since the 1990 s ,but it is still a far away from methods of person authentication. The Eigen-faces technique is considered the simplest method of accurate face recognition , but many other(much more complicated)methods or combinations of multiple methods are slightly more accurate. Face recognition is an easy task for humans.[8]

1.2 Open-CV(Computer-vision)

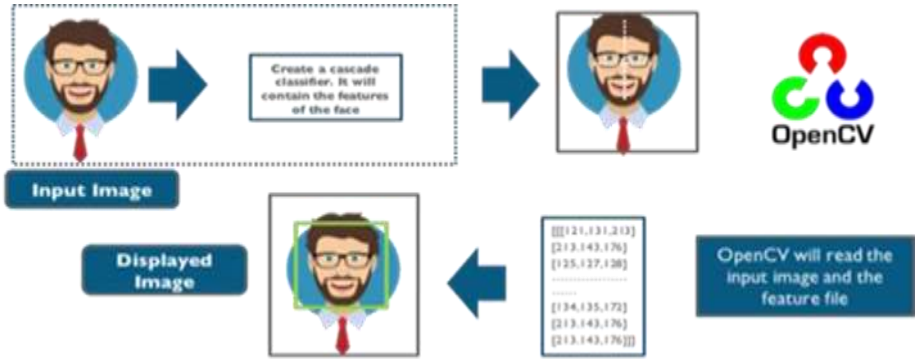
Artificial Intelligence is the field where Computer Vision is one of the most important, interesting and challenging tasks. Open CV acts as an interface between computer software and visualizations.CV allows software to understand, learn and apply the visualizations in an environment [2].For example, a fruit is identified by its features like color, shape and size. This task is very simple for the human brain, but in Computer Vision, first we need to collect information, then next we have to perform processing operations, and then we learned how to differentiate between fruits by their size, shape and color. Open-CV is the most popularly used library for computer vision. It was originally written in C/C++ ,now it provides bindings for Python. Open-CV uses machine learning algorithms. Because faces are so complicated, there isn't one simple test that will tell you if it found a face or not [2].

Advantages of Open CV:

1. Open CV is free of cost and an open-source library.
2. Open CV is faster as it is written in C/C++language as compared to others.
3. With less system RAM, Open CV works better.
4. It supports most of the operating systems like Windows, Linux, and mac OS.

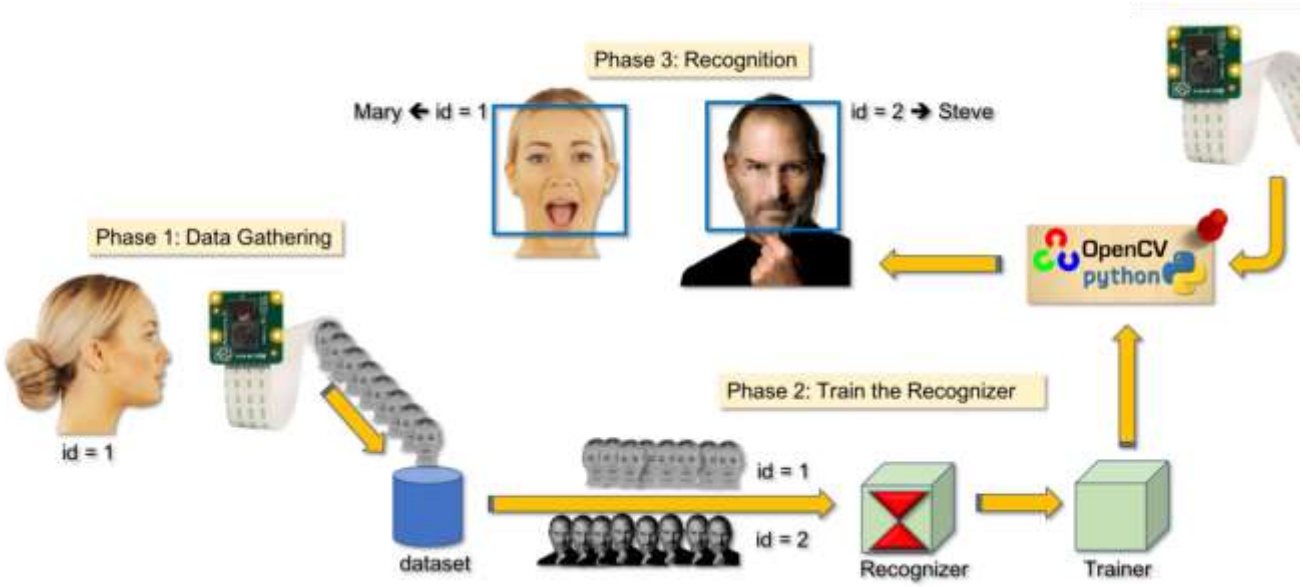
1.3 Cascade classifiers and Haar features

Haar Cascading is a machine learning method where it is classifier from positive and negative photos. This algorithm is followed by Paul Viola and Michael Jones. The Haar cascade classifier is an effective way to detect various objects in the surroundings. Positive samples contain images of objects of varying size, shapes, etc. taken at different angles which are cropped so that only the desired object is visible. Negative samples are background images without object presence. Within the positive samples, the precise location of the object can be indicated using the BMP file location, number of rectangles, the x/y coordinate of the upper left corner and the width/height from this point x/y of each rectangle. This method is also used in detection of the face and eyes.[10] The main objective of the Haar cascade classifier is collection a of a lot of positive images and negative images which are used later on to train the classifier. Haar feature-based cascade classifiers are the implement for detecting faces. This classifier chases machine learning procedure in cascade operation is inculcated from the photos to develop new items in additional photos. Face detection and expressions of an image were detected successfully. The exercise is completed by offering positive and negative pictures to the classifier.[3] Characteristics are drawn from the picture. Each characteristic has an individual value, which is acquired by subtracting the sum of pixels in a white rectangle from the summation of pixels in a black rectangle. In which it detects the faces of different individuals in different environments. The Haar-like feature of any size can be calculated in constant time because of integral images.



2. Proposed work

Systems design is a process that defines architecture, components, modules, interfaces and data requirements. We can view as a system theory application for development of product. This technology helps locate a human face in digital image. Detection technology deals with instances of objects to are detected in digital images and videos.



2.1 Image capture

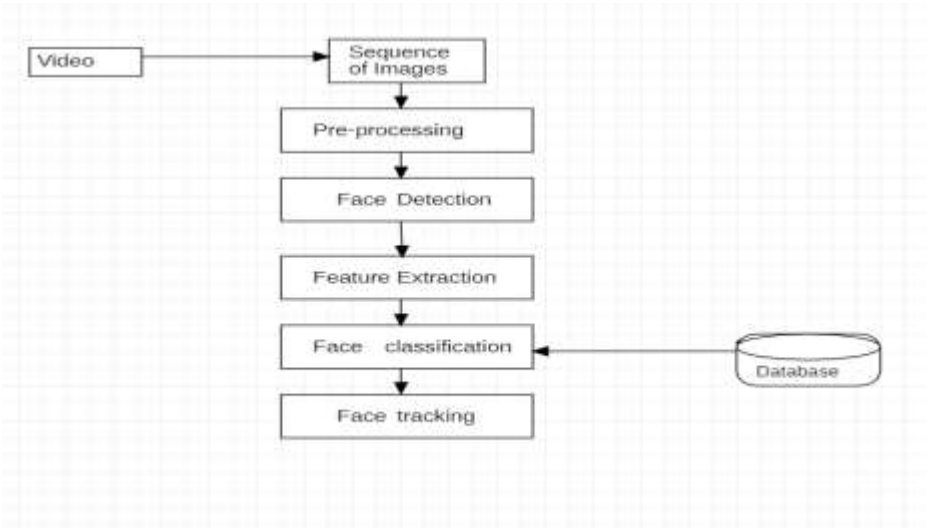
A camera is placed away at a distance from the user/admin employee and then a further process is started.

2.2 Face detection and facial features

The effective algorithm of face detection improves facial recognition. This algorithms, such as face-to-face geometry, face geometry-based methods, construction methods, Out of all these methods, Viola and Jones proposed a framework which gives a high rate of detection.The Viola-Jones detection algorithm is fast and robust. So, we choose Viola-Jones face detection algorithm, which is used for Integral Image and Ada Boost learning algorithm as classier. We have observed that this algorithm yields better results in a variety of lighting conditions.

2.3 Pre-processing

The appropriate facial detection algorithm improves facial recognition. Several facial algorithms such as face-to-face geometry, Face geometry-based methods, construction methods.



2.4 Database development

We select a bio-metric system in that all individuals should be required. This database development level consists of an image capture of an individual and extracting the bio-metric feature, and enhancing it by using pre-processing techniques and storing it in a database.

2.5 Post–processing

After identifying the faces of the person, names of person should be displayed as an output. This output is generated by an exporting mechanism present in database system. It generates records that can be seen in real time video. This ensures that people whose faces are not recognized correctly by the system have to check data in the database. And by this process, we are giving them the ability to correct the system and make it more stable and accurate.

2. Literature review

- Mayur Surve et al.in 2020, have developed a structure which captures live images from the camera. Then it applied different algorithms of face detection. They also created a GUI in which by a single click it catches the images, forming the dataset. They used the Haar cascade algorithm to recognize the face in the image [1].
- Palanivel N et al.in 2019,has approach a module that signs the existence of people by detecting their facial nature and creating the attendance data itself. Face Recognition's reliability charge with similar to changing the glow, posture , expression .They used K-means clustering algorithmic rule for analyzing the face characteristics. The K-mean clustering approach is used for collecting characteristics of faces. The SVM method used for detecting the photos. It fulfills with high identification which shows lesser characteristics .
- Jenif D Souza W Set al.in 2019, has proposed a system where image processing techniques are used for facial recognition. Photos are utilized to compare with catalogue. The procedure was of 4 modules such as Image Capturing, Face Detection, and Cleavage of group photo, Face comparison and Recognition.
- AZM Ehtesham Chowdhury in the year 2019,we developed a rare camera prototype to analyze attendance appropriately. A different algorithm was also put forward to exercise the technique perfectly. This technique will make use of a module to analyze students' attendance. This is based on face recognition and detection. Precision, on average, was the primary interest for selecting the most valid modules.

3.Tkinter

Tkinter is standard GUI library which is used to add components like buttons , label ,text-field, text-area, radio-button etc. Tkinter is used to make simple GUI applications.it fastest and easiest way to create a GUI application in python. Tkinter is lightweight. Tkinter (tk) is nothing but a simple library but it is consisting of various GUI modules. Tkinter is simply binding python to GUI. Tkinter provides three modules that that display on screen that is tk.messagebox(), tk.filedialog(), tk.colorchooser(). Tkinter allows the following geometry manager classes :pack(),grid(),place().

By using Tkinter, creating a GUI application is an easy .Step to perform importing the module of Tkinter–

- Import the Tkinter module.
- Create the GUI application main window.
- Add one or more of the above-mentioned widgets to the GUI application.

 Enter the main event loop to take action against each event triggered by the user**.**

4. Benefits of face detection technology

1] Efficient security: Facial recognition is fast and efficient system. It is faster to compare other bio-metric technology like fingerprints or retina scans. There are also touch points in facial recognition while entering passwords or PINs while login. It supports multi factor authentication for additional security verification and improved accuracy. Facial recognition is accurate method to identify and verify a person using a mobile number , email address, or IP address.

2] Easier integration: Face recognition technology is compatible and integrates easily with most security software. For example, phones with front cameras have built-in support to recognize algorithms or software codes.

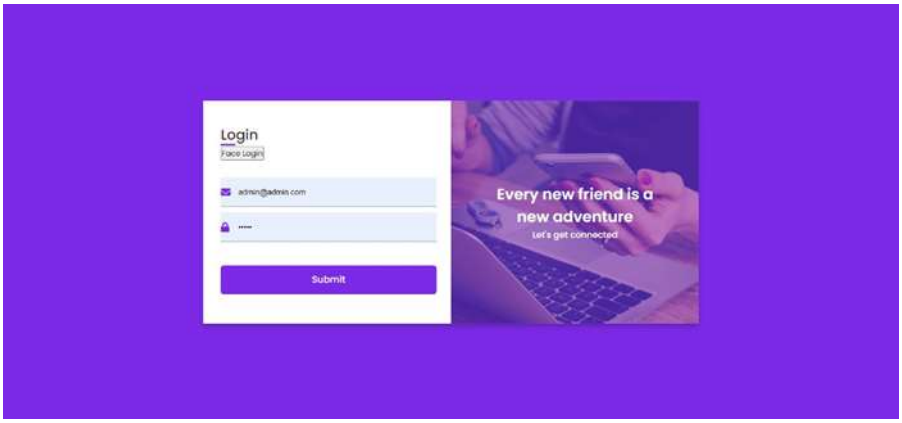
3] Fast and Non-Invasive Identity Verification: Another of the benefits of face recognition technology is it is fast processing and that it doesn't need any contact with users. With identity verification methods , users must be able to remember passwords ,present I.D .card.

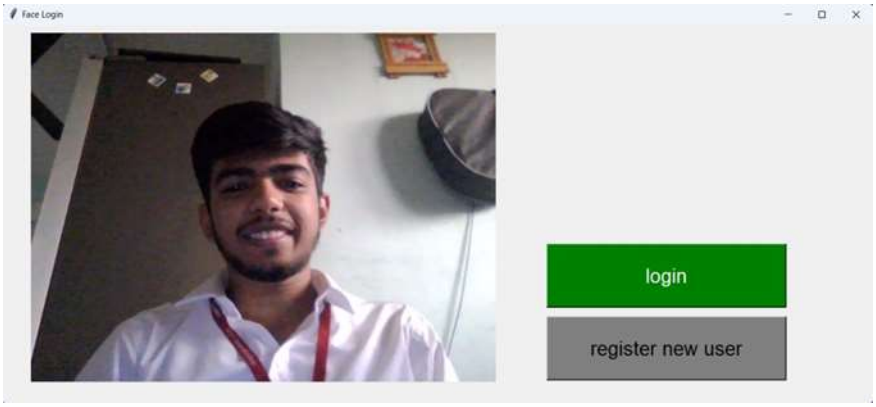
5. Limitation of face detection technology

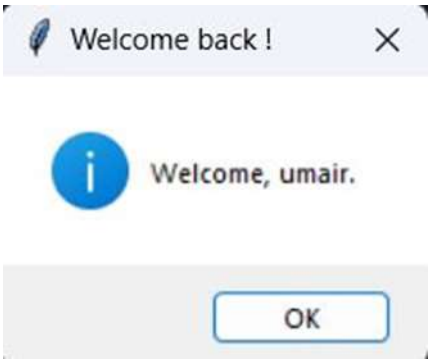
1] Can infringe on personal freedoms: Being recorded and scanned by facial recognition technology can make people feel like they're always being watched and judged for their behavior . Plus, police can use facial recognition to run everyone in their database through a virtual criminal lineup, akin to treating you as a criminal suspect without probable cause.

2] Technology is imperfect: Facial recognition is perfect, and cannot produce the accurate results in place of human judgement . This technology depends on algorithms to make equal facial matches. This algorithm is effective for some groups, such as white men than other groups such as women.

6. Result







7. Conclusion

Face recognition systems are associated with top technology companies and industries for making face recognition easier. The use of python programming and open CV makes it an easier and handy tool or system which can be made by anyone according to their requirements. The proposed system which is discussed above will be helpful for many applications, a user-friendly and cost-efficient system, Hence, by use of python and open CV, system will be designed for various tasks. Face detection technologies have been associated with very secure applications. Face recognition technology has for last twenty years .Today , machines are able to verify, identity information for secure transactions and security tasks.

8. References

[1] Aryan Narayan,Maaz Modak,Kunal Lele,Yoshik Karnawat ," face detection and recognition system ",February 2020

[2] Anubhav Kumar Singh, Manish Gupta, Akashay Kumar Singh, Mayank Kumar Singh, Mehul Gupta ,"Analysis & Study of Face Recognition and Detection " , April 2020

[3] Jyotsna More, Divyani Sutar, Remica Sequeira , Vedant Chavan , "Eye Detection using Haar Cascade Classifier" , may 2021

[4] Arnav Madan Face recognition using haar cascade classifier Int.J.Modern Trends Sci.Technol.,07(01)(January 2021),pp.85-87

[5] Digital Image Processing-by Keenneth R.Castleman,Pearson Education Society.

[6] Riddhi Patel,Shruti B.Yagnik(Nov 2013):A Literature Survey on Face Recognition Techniques(IJCTT)–volume 5 number

[7] Raunil Singh Kiran Gupta(April 2015):Face Detection and Recognition–A Review,SSRG-IJCSE

[8] K.C.Paul,S Aslan An improved real-time face recognition system at low resolution based on local binary pattern histogram algorithm and CLAHE Optics Photonics J.,11(April 2021),pp.63-78

[9] Visakha K , Sidharth S Prakash , " Haar Classifier based Identification and Tracking of Moving Objects from a Video Sequence " jan 2018

[10] Rashad J.Rasras,Bilal Zahran,Mutaz Rasmi Abu Sara,Ziad Al Qadi Developing digital signal clustering method using local binary pattern histogram Int.J.Electric.Comput.Eng.(IJECE),Vol.11(1)(February 2021),pp.872-878