

A RESEARCH PAPER ON FACE RECOGNITION & ATTENDANCE USING AI THROUGH PYTHON

¹Shobhit Kumar Dahima, ²Prof. Ritesh Kumar

¹Research Scholar, ²Assistant Professor

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
PKG Group of Institutions
KURUKSHETRA UNIVERSITY, KURUKSHETRA

Abstract— *The identification of individualities has long been a fascinating issue for study and business. Facial recognition has come increasingly popular in recent times as artificial intelligence has grown fleetly. Face recognition has a variety of benefits, including non-contact, high concurrency, and stoner- benevolence, in comparison to further conventional systems of card, point, and iris identification. Governance, public spaces, security, e-commerce, retail, and education are just a many of the numerous diligence in which it might find use.*

One of the most recent and pivotal machine learning subfields is deep literacy. A class of styles appertained to as "in- depth literacy" uses numerous machine literacy styles in multilayer neural networks to attack a variety of issues, including those involving words and film land.

Although deep literacy may be categorised as a neural network in general, there are several differences in the factual perpetration.

The core of deep literacy is a point literacy, which tries to gain hierarchical knowledge through hierarchical networks to handle substantial difficulties that preliminarily needed artificial design features. Some important algorithms are part of a frame called Deep Learning. For colorful operations, you must use different network models in order to achieve better issues (images, speech, and textbook).

With the development of deep literacy and the use of deep convolutional neural networks, face recognition delicacy and speed have vastly increased. But, as we've mentioned, the results of different networks and models are relatively different. The combined features are also trained and constructed using a deep neural network. In this study, facial attributes are attained by incorporating and differing different models. The advantages of numerous models may be used in this way to ameliorate recognition perfection. After acquiring a veritably realistic model, we develop a product model. This composition compares the garcon customer paradigm to the pure- customer system and discusses the advantages and disadvantages of each armature. It's also examined what different marketable goods are necessary for the garcon customer model.

Keywords: - python programming, AI, Face Recognition

1. INTRODUCTION

The process of determining whether a preliminarily observed item is a known or unknown face is known as face

recognition. constantly, the issue of face discovery and identification gets mixed up. On the other hand, face recognition determines if a " face" belongs to a known or unknown / strange person by validating the input face against a database of faces.

A face analyzer is a piece of computer software / algorithm or set of codes that utilizes a person's face to verify or attest their identification. It works by tracking, IDing & quantifying face aspects or facial marked points in photographs. Face ID technology can track, mark & recognise actual people's faces in films or videos, check to see if the same face appears in two unalike pics, images or videos of the same person, or browse a sizable database of previously used faces. Facial recognition is a technique used by biometric security systems to more effectively identify users during login or signup processes. Face analysis tech is also frequently used in mobile applications which secure device security.

2. OBJECTIVES

The major changes which come across face recognition are to find the age and gender of the person. This study is focuses on face detection technology. During this study, it has been worked on the input camera which takes multiple shots of person. After that, the Cascade Classification algorithm has been used inside the application which creates the multiple human templates. So the facial features have been detected. After that, it saved in particular database with their unique ID. Furthermore, the verification process has been started by matching the templates inside the database. Through this process, the student attendance has been marked automatically. It has been presented that face detection technology can enhance the security measures. Employee's attendance can be marked by simply detecting face that can increase punctuality. Students can be checked and marked by face detection process. As well, it can also be setup in banks to enhance the security by allowing authorized people only or who have accounts in that bank.

- To Detect face using Python.
- To Analyse facial data.
- To Convert the image into data.
- To Find a match and mark the time of face appearance in front of the camera.

3. METHODOLOGY

The concept of Open-CV, that perhaps function on a Several - level architecture, was put out by Gary Bradski. Open-CV contains a no. of noteworthy features and conveniences that are immediately apparent. The Open-CV assists in identifying a person's frontal face and also generates XML documents for various places, such as anatomical structures.

In the domain of identification systems, deep learning has recently grown. Thus, face ID and deep learning function as a single deep metric learning system. In summary, face tracking & ID using deep learning will fundamentally focus on 2 sectors: the 1st is processing a solitary image as input or any other related image, and the 2nd is giving the image of the picture the best outputs or outcomes. We would make use of the D-lib facial ID framework to organise the face analysis. D-lib and face ID are the system's two most important libraries.

Python has exhibited to produce the finest results in face ID & Tracking systems. Python is a highly futuristic programming language that is utilised all over the world. Recognizing and identifying faces is exceedingly quick and easy thanks to Open-CV and the Python programming language.

DIFFERENT FACE RECOGNITION APPROACHES:

Face recognition may be approached in two main ways: geometrically (based on features) and photometrically (view based). Three of the numerous algorithms created as a result of the growing interests in face recognition among researchers have been extensively researched in the face recognition literature.

There are two primary categories of recognition algorithms:

1. Photometric stereo: Being used to identify an object's form from a collection of pictures taken in various lighting situations. A gradient map, which is composed of an array of surface normals, determines the form of the recovered object (Zhao and Chellappa, 2006). (Figure 3).

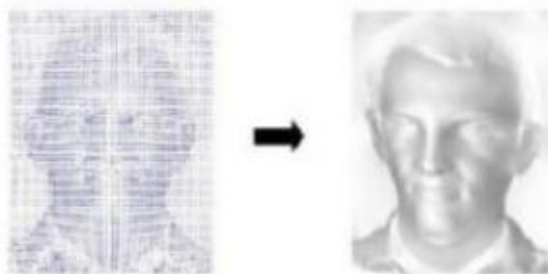
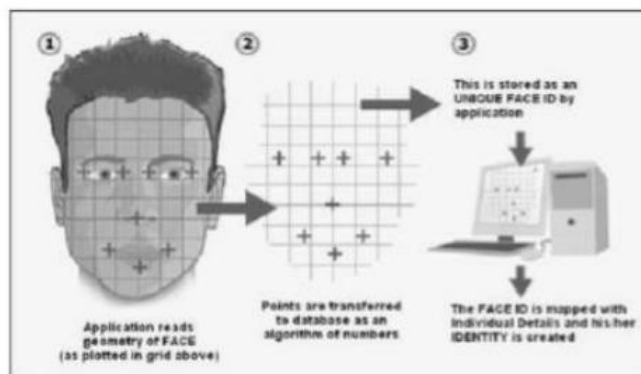


Figure – 3 : Photometric stereo

2. Geometric: Using the spatial arrangement of facial characteristics or the geometric relationships among facial landmarks. It implies that faces are first categorised according to different geometrical angles and distances between features before the key

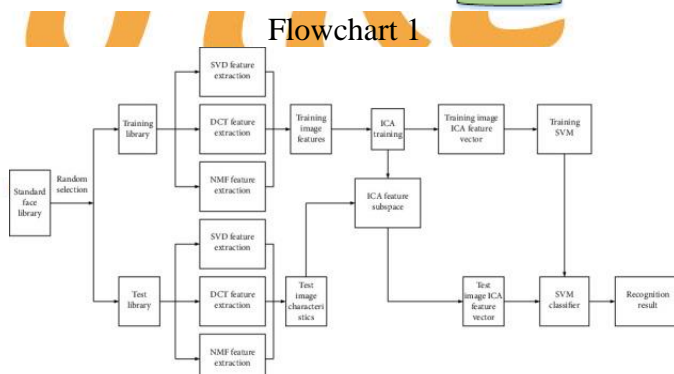
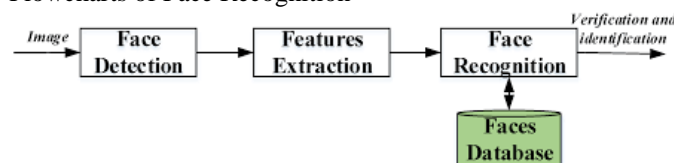
geometrical characteristics of the face, such as the eyes, nose, and mouth, are found. (See Figure 3)



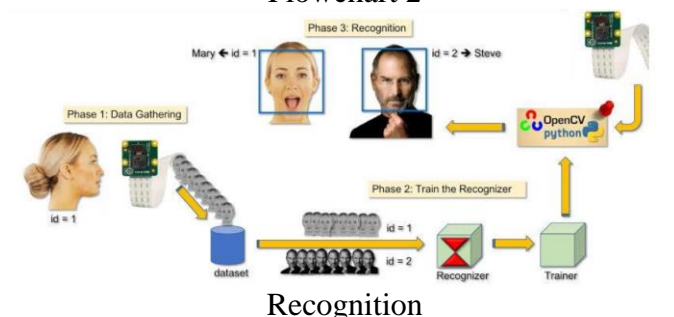
Conventional recognition algorithms are as follows:

1. Principal Component Analysis using Eigenfaces, (PCA)
2. Linear Discriminate Analysis,
3. Elastic Bunch Graph Matching using the Fisherface algorithm.

Flowcharts of Face Recognition



Flowchart 2



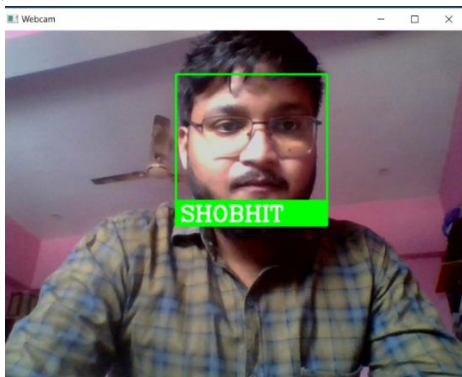
```

Face recognition with OpenCV, Python, and deep learning
1. $ python encode_faces.py --dataset dataset --encodings encodings.pickle
2. [INFO] quantifying faces...
3. [INFO] processing image 1/218
4. [INFO] processing image 2/218
5. [INFO] processing image 3/218
6. ...
7. [INFO] processing image 216/218
8. [INFO] processing image 217/218
9. [INFO] processing image 218/218
10. [INFO] serializing encodings...
11. $ ls -lh encodings*
12. -rw-r--r-- 1 adrian staff 234K May 29 13:03 encodings.pickle
    
```

Population

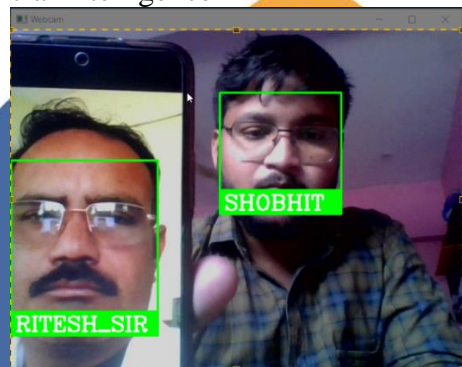
4. RESULT

The system's intended result is to find faces, recognise them by comparing them to the data previously provided in the database..



Single Face Detection

Several faces should be detected simultaneously by the artificial intelligence



Multi Face Detection

As soon as a face shows on the camera, the artificial intelligence should record the time of appearance and save it in a CSV file.

```
Attendance.csv
1 Name,Time,Date
2 SHOBHIT,09:49:21,20/10/2022
3 RITESH_SIR,09:51:06,20/10/2022
```

Attendance Marking

5. CONCLUSIONS

Facial recognition is a biometric tool used to identify people without the need for direct physical touch. Algorithms in the solution compare a person's facial nodes to the..images stored in the database.

Facial recognition technology may improve security at any important site or organisation. Facial recognition is a popular option for greater security due to its adaptability.

This thorough overview presents the most recent state-of-the-art in face recognition research. The most recent developments in this discipline are listed, and future directions for

advancement are suggested.

The findings of this study demonstrate that there has been a significant increase in this field's research over the past five years, especially with the introduction of deep learning approaches that have surpassed the most widely used computer vision techniques. Also, a variety of face databases—both public and private—are offered for study and business use, and their key traits and evaluation procedures are described.

REFERENCES

- [1] Alcantara, G. K. L., Evangelista, I. D. J., Malinao, J. V. B., Ong, O. B., Rivera, R. S. D., & Ambata, E. L. U. (2018). Head detection and tracking using Open-CV. In 2018 IEEE 10th International Conference on Humanoid, Nanotechnology, Information Technology, Communication and Control, Environment and Management (HNICEM) (pp. 1-5). IEEE
- [2] Gupta, S. (2018, January). Facial emotion recognition in real-time and static images. In 2018 2nd international conference on inventive systems and control (ICISC) (pp. 553-560). IEEE
- [3] Mostafa, S. A., Mustapha, A., Gunasekaran, S. S., Ahmad, M. S., Mohammed, M. A., Parwekar, P., & Kadry, S. (2021). An agent architecture for autonomous UAV flight control in object classification and recognition missions. *Soft Computing*, 1-14
- [4] Hoque, M. A., Islam, T., Ahmed, T., & Amin, A. (2020, March). Autonomous face detection system from real-time video streaming for ensuring the intelligence security system. In 2020 6th International Conference on Advanced Computing and Communication Systems (ICACCS) (pp. 261-265). IEEE
- [5] Mehariya, J., Gupta, C., Pai, N., Koul, S., & Gadakh, P. (2020, July). Counting Students using Open-CV and Integration with Firebase for Classroom Allocation. In 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC) (pp. 624-629). IEEE
- [6] Patel, R., Patel, M., & Patel, J. (2018, April). Real Time Somnolence Detection System in Open-CV Environment for Drivers. In 2018 Second International Conference on Inventive Communication and Computational Technologies (ICICCT) (pp. 407-410). IEEE
- [7] Boyko, N., Basystiuk, O., & Shakhovska, N. (2018, August). Performance evaluation and comparison of software for face recognition, based on dlib and Open-CV library. In 2018 IEEE Second International Conference on Data Stream Mining & Processing

- (DSMP) (pp. 478-482). IEEE
- [8] Kashinath, S. A., Mostafa, S. A., Mustapha, A., Mahdin, H., Lim, D., Mahmoud, M. A., & Yang, T. J. (2021). Review of Data Fusion Methods for Real-Time and Multi-Sensor Traffic Flow Analysis. IEEE Access
- [9] Sharma, V. K. (2019, May). Designing of Face Recognition System. In 2019 International Conference on Intelligent Computing and Control Systems (ICCS) (pp. 459-461). IEEE
- [10] Balachandran, B., Saad, K. F., Patel, K., & Mekhiel, N. (2019, December). Parallel Computer for Face Recognition Using Artificial Intelligence. In 2019 14th International Conference on Computer Engineering and Systems (ICCES) (pp. 158-162). IEEE
- [11] Apoorva, P., Impana, H. C., Siri, S. L., Varshitha, M. R., & Ramesh, B. (2019, March). Automated criminal identification by face recognition using open computer vision classifiers. In 2019 3rd International Conference on Computing Methodologies and Communication (ICCMC) (pp. 775-778). IEEE
- [12] Srivastava, M., Kumar, A., Dixit, A., & Kumar, A. (2020, February). Real time attendance system using face recognition technique. In 2020 International Conference on Power Electronics & IoT Applications in Renewable Energy and its Control (PARC) (pp. 370-373). IEEE
- [13] Sharma, S., & Jain, S. (2019, March). A static hand gesture and face recognition system for blind people. In 2019 6th International Conference on Signal Processing and Integrated Networks (SPIN) (pp. 534-539). IEEE.



IJTRE
Since 2013