



Face Recognition System

¹Sonia Sharma, ²Sumanpreet Kaur, ³Pooja

Asst. Prof., Department of Computer Science & Engineering, Chandigarh Engineering College, Jhanjeri, Mohali-140307¹

Asst. Prof., Department of Computer Science & Engineering, Chandigarh Engineering College, Jhanjeri, Mohali-140307²

Asst. Prof., Department of Computer Science & Engineering, Chandigarh Engineering College, Jhanjeri, Mohali-140307³

ABSTRACT

Using a straight advance algorithm called the primary component method which accurately and quickly recognizes human faces in real time using matched faces it has been possible to quickly identify the faces. Further monitor the children's attendance. Facial identification is usually an incredibly difficult vision-related task due to enlighten position as well as facial expression. Since the persons figure is a complex and nuanced graphical portrayal it is extremely challenging to create a computational model for identifying it. It is a function that is utilized frequently in camcorders media platforms tagging and sensors. Educator's attendances are regularly maintained by our system. The students face is registered in our module. Their face will be saved in the database after this one-time enrollment process. Since enrolling a face is a one-time activity we need a mechanism. Each student will have a unique identification number called a roll number which they can use. A database will be updated to reflect each students presence. Following student identification attendance is noted.

Keywords: Image processing, PCA, ANN, Extraction, Matching

1. INTRODUCTION

Maintaining absenteeism is critical at all institutes for assessing students achievement. In this sense each institute uses a different methodology. Some individuals still manually record crowd using paper or files whereas others have adopted computerized attendance systems that use biometrics. Rather than confirming persons and granting they access to

physical and virtual areas based on passwords, PINs, keen cards, plastic cards, tokens, keys, etc., biometric-based solutions have been established as the most effective alternative in recent times. In order to decide or determine a person's identity, these procedures examine both their physiological and behavioural characteristics. Cards, tokens, keys, and other items can be misplaced, forgotten, stolen,

or copied. Attractive cards can become noticeably contaminated and mangled. Passwords and PINs are difficult to remember and can be stolen or surmised. The human body's natural biology, however, cannot be forgotten, taken for granted, robbed, or faked. Although numerous ways for detecting and recognizing human faces have been established, it is still difficult to build a computer model for a considerable data set; however, it is considered that face recognition is a high-level vision-based problem where programs can be created to provide trustworthy results. For confront acknowledgment essential highlight determination and classification in manufactured neural systems and profound learning neural nets are one of a few viable procedures within the facial acknowledgment method. The input picture and the dataset are compared. The categorization is taken after by the introduction of a coordinate report outlined to discover the subpopulation to which unused perceptions fit when it comes to machine vision. There are fundamentally a few ways. The entrance database is called the display and is additionally known as the test. The input database is referred to as the gallery and is also known as the probe.

INCLUDE BASED APPROACH - Particular neighborhood highlights like a nose and eyes may be used as information input for confront location making it less difficult to recognition of faces problem.

HOLISTIC APPROACH- considers the complete individual utilized within the confront location framework as the input perceive faces by face.

HYBRID APPROACH - combining diverse procedures of a comprehensive and feature-based approach. This method uses both the nearby and whole face as the input to the face locating framework.

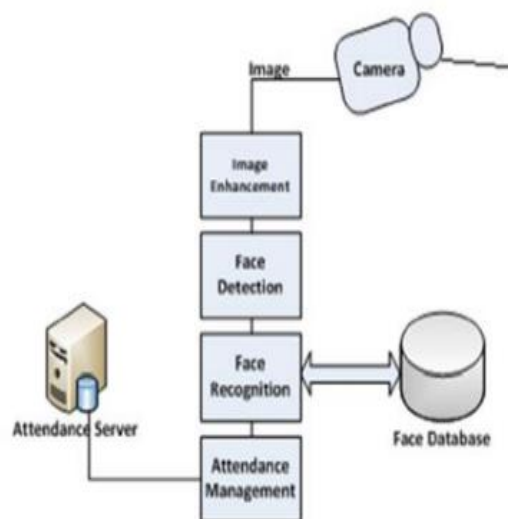


Fig. 1. Block diagram

2. PROPOSED SYSTEM

Frameworks plan could be prepared that characterize architecture components modules interfacing and information requirements figure. Framework plan can be seen as a framework theory application for item improvement. The confront detection technology that makes a difference find human confront in advanced images and video outlines the protest location innovation that deals with identifying occasions of objects in advanced image and recordings. The proposed strategy execute an proficient confront location and recognition technique which is free of varieties in highlights like color haircut, different facial expressions etc. utilizing viola jones calculation, PCA and ANN.

2.1. FACE DETECTION

Early action within the confront discovery has passed over as instantly as the begin of the 1970s where the essential heuristic and anthropometric systems were utilized. These frameworks are for the most part unbending due to diverse suspicions for illustration frontal confront plain establishment a common visa photo circumstance. For confront identifying ready to do it utilizing the question cascading class and we utilize the b-box strategy the location of the face using the protest cascading is bought from the foremost popular facial acknowledgment show. The purpose of the face location is to determine whether any appearances are present in the image and, if so, to identify each face's position and degree in relation to the others. Due to variations in scale, area, facial enunciation, light condition, presentation, stance, and other various appearance features, the face's location, while irrelevant to human vision, may be a challenge for machine vision.

Confront discovery in pictures - Most of the confront location systems endeavors to center a little amount of a complete confront, by allocating with the lion's share of the establishment and different zones of a singular's head, for case, hair that's not important for the face recognizable proof. With inactive pictures, typically frequently prepared by executing a sliding "window" over a picture. The confront detection scheme then looks in case a confront is display interior the window. Laments, with static pictures there's a expansive chase space of the conceivable areas of a confront within the picture. The Faces can be costly and be put anyplace from upper cleared out to an simpler right of the picture.

Real-time confront discovery - the continuous-face acknowledgment includes the examination of the confront from an course of action of casings from any feature-catching contraption. The real-time confront discovery is truly a bit more straight forward prepare than recognizing a face in the inactive pictures. It is on the discoveries that not at all like a colossal parcel of our nature an people can dependably keep moving.

2.2. FACE RECOGNISATION

The faces taken within the database are required to loaded into our workspace well stack the exhibition pictures into that presently. We need to part the information of each and each individual into testing and training information. Human confront acknowledgment can be partitioned into two procedures geometrical highlights and format coordinating.

Confront acknowledgment utilizing geometrical highlights - It includes computation of a set of geometrical highlights such as nose width and length mouth position and chin shape etc. From the picture of the confront we need to recognize this set of highlights is at that point coordinated with the features of known people. An appropriate metric such as Euclidean remove finding the closest vector can be utilized to discover the closest coordinate.

The advantage of utilizing geometrical highlights as a premise for face acknowledgment is that acknowledgment is conceivable indeed at exceptionally low resolutions and with loud pictures with numerous disorderly pixel forces.

Confront acknowledgment utilizing layout matching - This is comparative the layout coordinating strategy utilized in face discovery but here we are not attempting to classify an image as a face or non-face but are attempting to recognize a face. The premise of the layout coordinating procedure is to extract entire facial districts lattice of pixels and compare these with the put away pictures of known people. Once again Euclidean remove can be utilized to discover the closest match.

3. WORKING OF PROPOSED SYSTEM

A facial recognition system has four phases which are as follows:

- Capturing and scanning
- Facial data extraction
- Database comparison
- Matching and identification

1. Capturing and scanning:

During this phase an image of your face is taken from a photo or video and scanned. Faces must be facing the camera correctly for a more accurate and better match. To complete this phase, we first train a face detection algorithm to learn what faces look like with different data inputs and then we will start capturing and scanning the faces.

2. Facial data extraction:

Key factors are recognized during this phase. The space between your eyes and the distance from your forehead to chin are important considerations. The face-print is created by

combining such measurements and turning them into a singular set of integers than your facial signature is produced by the algorithm when it recognizes certain face traits and builds a profile of you.

3. Database comparison:

In this phase, the facial features that are obtained from the previous step are matched to a database of recognized faces. A collection of faces with labels is called the Face Databases. The effectiveness of face recognition systems is assessed using a database of recognized faces.

4. Matching and identification:

This is the final phase, where the face image of a single person is compared to a database of recognized faces. Your facial signature can be used to investigate and capture you if it is discovered that it matches one that has been identified in the criminal database.

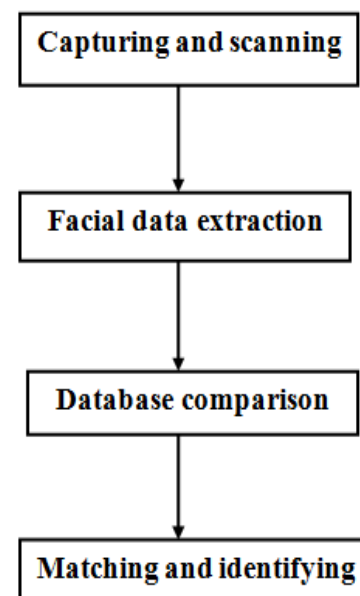


Fig2: block diagram of phases of face recognition system

4. APPLICATIONS

1. Education:

The major advantages for schools utilizing this technology are keeping track of student attendance and preserving campus security.

Numerous schools currently employ cameras with face recognition software to recognize kids, staff, unwanted visitors, and even actions that could be dangerous to children's safety.

2. Security at airports:

Security is a top priority for airline employees, customers, and airport personnel. Many airports across the globe have installed facial recognition technology-based airport security systems.

3. Healthcare sector:

i. Patient recognition:

Face recognition technology may also be used to follow individuals entering and exiting a facility to detect security risks, identify patients who are not accompanied by a medical professional, and confirm the identities of surgery patients.

ii. Preventing the spread of COVID-19:

Face recognition technology has expanded its applications since the pandemic outbreak; it is currently used to track COVID-positive patients who are required to stay at home. To ensure that the self-isolation guidelines are followed, a mobile app with facial recognition capabilities asks the person who is being quarantined to take a selfie and then verifies their identity.

iii. Supporting with mental therapy:

Facial recognition aids in tracking patients' behavioral patterns and mental health. For

instance, the program can assess the emotional condition of patients who are more likely to engage in dangerous actions, like removing a breathing tube, so this system can increase their safety.

4. Banking and Finance:

The use of cardless ATM transactions by banks is now possible. Skimming devices are often used by crooks to access ATMs nowadays. Plastic cards and PINs could eventually be replaced with facial recognition as a more secure method of combating fraud. Facial recognition software is already being tested by some banks.

5. Face Tracking:

Face tracking is typically used to follow criminals who are on the run or discover relatives of missing people. The negative face recognition has significantly improved with the introduction of 3D face recognition algorithms and systems. The system receives the images of the missing youngsters or suspects. The dynamic picture information is then collected from a massive volume of security video footage, and the most similar face information is tracked or discovered.

5. CONCLUSION:

A facial recognition system is a device that can compare a human face in a digital picture or video frame to a database of faces. This technology is divided into two categories: face detection and face recognition.

In this work, we examined the four steps of a face recognition system, which are capturing & scanning, extracting facial data, comparing databases, and

matching & identifying. This study also includes some facial recognition system applications. Python is the programming language that we utilized to create this system. The usage of Python programming with OpenCV makes it a simpler and more useful tool or system that anybody may create based on their needs. This approach is quick and easy to use for identifying people.

Governments and business organizations use facial recognition technologies all around the world today. This technology has a wide range of applications in society, including criminal detection, security, and many other areas. This may also be used to improve human-machine connection by allowing robots to comprehend the feelings or emotions of humans by scanning their expressions. It may also be utilized in advanced attendance management so that instructors do not have to take attendance since this software allows them to simply recognize the child's face and take attendance.

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