Face Recognition

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Abstract **- Wouldn't you're keen on to exchange password-based access control to avoid to reset forgotten password and worry about the integrity of your system? Wouldn't you wish to rest secure in comfort that your healthcare system doesn't merely on your Social Security number as proof of your identity for granting the entry to your medical records? Because each of those questions is becoming more and more important, access to a reliable personal identification has been becoming increasingly essential. Conventional method of identification based on possession of ID cards or exclusive knowledge sort of a Social Security number or a password are not all together reliable. ID cards can be lost forged or misplaced; passwords can be forgotten or compromised. But a face is undeniably connected to its owner. It cannot be borrowed stolen or easily forged. Face recognition technology will solve this problem since a face is undeniably connected to its owner expect within the case of identical twins. It's non-transferable. The system can then compare scans to records stored during a central or local database or maybe on a sensible card.**

Index Terms **- Computer Vision, Deep Learning, Face Recognition.**

I.INTRODUCTION

The information age is quickly revolutionizing the way transactions are completed. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted during a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use PINs for identification and security clearances. Using the right PIN gains access, but the user of the PIN isn't verified. When credit and ATM cards are lost or stolen; an unauthorized user can often come up with the correct personal codes. Despite warning, many people continue to choose easily guessed PIN's and passwords: birthdays, phone numbers and Social Security numbers. Recent cases of fraud have heightened the necessity for methods to prove that someone is truly who he/she claims to be. A biometric may be a unique, measurable characteristic of a person's being which will be used to automatically recognize a private or verify an individual's identity. Biometrics can measure both physiological and behavioral characteristics. Physiological biometrics (based on measurements and data derived from direct measurement of a neighborhood of the human body) include:

a. Finger-scan
b. face recognition
c. Iris-scan
d. Retina-scan
e. Hand-scan Behavioral biometrics include:
a. Voice-scan
b. Signature-scan
c. Keystroke-scan

A "biometric system" refers to the integrated hardware and software wont to conduct biometric identification or verification

II.LITERATURE REVIEW

The face is a crucial a part of who you're and the way people identify you. Except in the case of identical twins, the face is arguably an individual's most original physical characteristics. While humans have the innate ability to acknowledge and distinguish different faces for many years, computers are just now catching up. For face recognition there are two sorts of comparisons .the first is verification. This is where the system compares the given individual with who that individual says they're and provides a yes or no decision. The second is identification. This is where the system compares the individual to all the Other individuals within the database and provides a ranked list of matches. All identification or authentication technologies operate using the following four stages:

a. Capture - A physical and behavioral sample is captured by the system during Enrollment and also in identification or verification process

b. Extraction: unique data is extracted from the sample and a template is made .
c. Comparison: the template is then compared with a replacement sample.
d. Match/non match: the software decides if the features extracted from the new.

Samples are a match or a non match Face recognition technology helps in analyzing the unique shape, pattern and positioning of the facial features. Face recognition is extremely complex technology and is essentially software based. This Biometric Methodology establishes the framework with tailored algorithms for every type of biometric device. Face recognition starts with an image , attempting to seek out an individual within the image. this will be accomplished using several methods including movement, skin tones, or blured human shapes.

The face recognition system locates the top and eventually the eyes of the individual. A matrix is then developed based on the characteristics of the Individual's face. The method of defining the matrix varies consistent with the algorithm (the mathematical operation employed by the pc to perform the comparison). This matrix is then compared to matrices that are during a database and a similarity score is generated for every comparison.

Artificial intelligence is used in simulating the human interpretation of faces. In order to increase the accuracy and adaptableness, some quite machine learning has got to be implemented. There are essentially two methods of capture. One is video imaging and the other is thermal imaging. Video imaging is more common as standard video cameras are often used. The precise position and therefore the refore the angle of the top and the surrounding lighting conditions may affect the system performance. The complete facial image is typically captured and variety of points on the face can then be mapped, position of the eyes, mouth and therefore the nostrils as a example.More advanced technologies make the 3-D map of the face that multiplies the possible measurements that can be made. Thermal imaging has better accuracy because it uses facial temperature variations caused by vein structure as the distinguishing traits. As heat pattern is emitted from the face itself without the source of external radiation, these systems can capture photos despite the lighting condition, even in the dark. The drawback is high cost. They are more expensive than standard video cameras.

III.METHODOLOGY

After going through various different research papers, the following frameworks or techniques have been identified:

A.Geometric Based / Template Based:

Face recognition algorithms are classified as a geometry based or a template based algorithms. The template-based methods are often constructed using statistical tools like SVM [Support Vector Machines], PCA [Principal Component Analysis], LDA [Linear Discriminant Analysis], Kernel methods or Trace Transforms. The geometric feature based methods analyse local countenance and their geometric relationship. it's also referred to as a feature-based method.

B.Piecemeal / Wholistic:

The relation between the weather or the connection of a function with the entire face not undergone into the quantity, many researchers followed this approach, trying to deduce the foremost relevant characteristics. Some methods attempted to use the eyes, a mixture of features then on. Some Hidden Markov Model methods also fall under this category, and have processing is extremely famous in face recognition.

C.Appearance-Based / Model-Based:

The appearance-based method shows a face related to several images. a picture considered as a high dimensional vector. this system is typically wont to derive a feature space from the image division. The sample image compared to the training set. On the opposite hand, the model-based approach tries to model a face. The new sample implemented to the model and therefore the parameters of the model wont to recognise the image.

The appearance-based method can be classified into linear or nonlinear. Ex- PCA, LDA, IDA utilized in direct approach whereas Kernel PCA utilized in nonlinear approach. On the opposite hand, within the model-based method are often classified as 2D or 3D Ex- Elastic Bunch Graph Matching used.

IV.HELPFUL HINTS

For face recognition there are two sorts of comparisons. the first is verification. this is often where the system compares the given individual with

who that individual says they're and provides a yes or no decision. The second is identification. this is often where the system compares the given individual to all or any the Other individuals within the database and provides a ranked list of matches. All identification or authentication technologies operate using the subsequent four stages:

a. Capture: A physical or behavioural sample is taken by the system during Enrollment and also in identification or verification process
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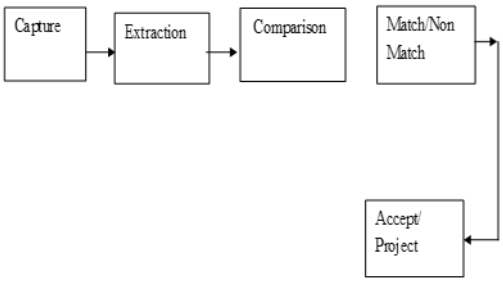
c. Comparison: the template is then compared with a replacement sample.
d. Match/non match: The system decides if the features thats has been extracted from the new Samples are a match or a non match



V.CONCLUSION

Face recognition technologies are associated generally with very costly top secure applications. Today the core technologies have evolved and therefore the refore the cost of equipment goes down dramatically thanks to the intergration and the increasing processing power. Many applications of face recognition technology are now cost effective, reliable and highly accurate. As a result there are not any technological or financial barriers for stepping from the pilot program to widespread deployment.

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