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INFORMATION TECHNOLOGY AS SECURITY TOOL

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ABSTRACT

Today is era of AI. Artificial Intelligence is a field of study in Information Technology (IT). 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 in a greater demand for fast and accurate user identification and authentication. Access codes for buildings, banks accounts and computer systems often use PIN's for identification and security clearances. Using the proper PIN gains access, but the user of the PIN is not verified. When credit and ATM cards are lost or stolen, an unauthorized user can often come up with the correct personal codes. IT encloses the computational techniques for performing tasks that require intelligence when performed by humans. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication. The information age is quickly revolutionizing the way transactions are completed. Artificial Intelligence is a field of study that encloses the computational techniques for performing tasks that require intelligence when performed by humans.

Keywords- Artificial Intelligence, Biometrics, Face Recognition, IT Security.

1. INTRODUCTION- AI

Artificial Intelligence is a field of study that encloses the computational techniques for performing tasks that require intelligence when performed by humans. Everyday actions are increasingly being handled electronically, instead of with pencil and paper or face to face. This growth in electronic transactions has resulted in a greater demand for fast and accurate user identification and authentication.

There are many applications of artificial intelligence. These include entertainment applications such as computer games, medical applications such as diagnostics, military applications such as autonomous control & target identification.

2. INTRODUCTION- BIOMETRICS

A biometric is a unique, measurable characteristic of a human being that can be used to automatically recognize an individual or verify an individual's identity. Biometrics can measure both physiological and behavioral characteristics. A "biometric system" refers to the integrated hardware and software used to conduct biometric identification or verification.

3. TYPES OF BIOMETRICS

A. Physiological biometrics:

These are based on measurements and data derived from direct measurement of a part of the human body, they include:

- Finger-scan
- Facial Recognition
- Iris-scan
- Retina-scan
- Hand-scan
-

B. Behavioral biometrics:

These are based on measurements and data derived from an action, they include:

- Voice-scan
- Signature-scan
- Keystroke-scan

4. FACE RECOGNITION TECHNOLOGY

The face is an important part of who you are and how people identify you. Except in the case of identical twins, the face is arguably a person's most unique physical characteristics. While humans have the innate ability to recognize and distinguish

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different faces for millions of years, computers are just now catching up.

Face recognition technology analyze the unique shape, pattern and positioning of the facial features. Face recognition is very complex technology and is largely software based. This Biometric Methodology establishes the analysis framework with tailored algorithms for each type of biometric device.

Face recognition starts with a picture, attempting to find a person in the image. This can be accomplished using several methods including movement, skin tones, or blurred human shapes. The face recognition system locates the head and finally 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 according to the algorithm (the mathematical process used by the computer to perform the comparison). This matrix is then compared to matrices that are in a database and a similarity score is generated for each comparison.
Artificial intelligence is used to simulate human interpretation of faces. In order to increase the accuracy and adaptability, some kind of machine learning has to be implemented.

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Face recognition technology may solve this problem since a face is undeniably connected to its owner expect in the case of identical twins. It's nontransferable. The system can then compare scans to records stored in a central or local database or even on a smart card.

5. REASONS TO CHOOSE THIS BIOMETRIC

The question arises why we choose face recognition over other biometric? There are number reasons to choose face recognition. This includes the following:

- It requires no physical interaction on behalf of the user.
- It is accurate and allows for high enrolment and verification rates.
- It does not require an expert to interpret the comparison result.
- It can use your existing hardware infrastructure; existing cameras and image capture devices will work with no problems.
- It is the only biometric that allow you to perform passive identification in a one to many environment such as identifying a terrorist in a busy Airport terminal

6. TYPES OF COMPARISONS

A. Verification:

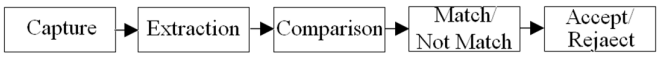
This is where the system compares the given individual with who that individual says they are and gives a yes or no decision.

B. Identification:

This is where the system compares the given individual to all the other individuals in the database and gives a ranked list of matches. All identification or authentication technologies operate using the following four stages:

- Capture: a physical or behavioral sample is captured by the system during enrollment and also in identification or verification process. There are essentially two methods of capture:
  - Video Imaging
  - Thermal imaging
- Extraction: unique data is extracted from the sample and a template is created.
- Comparison: the template is then compared with a new sample.

Match/not match: the system decides if the features



extracted from the new sample are a match or a non match.

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6. HOW FACE RECOGNITION SYSTEM WORKS

Facial recognition software is based on the ability to first recognize faces, which is a technological feat in itself and then measure the various features of each face. If we look at the mirror, we can see that our face has certain distinguishable landmarks. These are the peaks and valleys that make up the different facial features. It defines these landmarks as nodal points.

There are about 80 nodal points on a human face. Here are few nodal points that are measured by the software.

- Distance between the eyes
- Width of the nose
- Depth of the eye socket
- Cheekbones
- Jaw line
- Chin

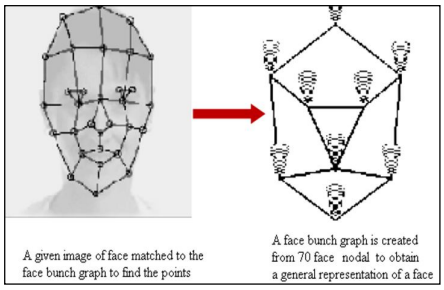

Figure.1 Nodal points on face

These nodal points are measured to create a numerical code, a string of numbers that represents a face in the database. This code is called faceprint. Only 14 to 22 nodal points are needed faceIt for software to complete the recognition process.

7. THE SOFTWARE

Facial recognition software falls into a larger group of technologies known as biometrics. Facial recognition methods may vary, but they generally involve a series of steps:

A. Detection

While the system is attached to a video system, the recognition software searches for the field of faces. If there is a face in the view, it is detected within a fraction of a second.

B. Alignment

Once a face is detected, the system determines the head's position, size and pose. A face needs to be turned at least 35 degrees toward the camera for the system to register it.

C. Normalization

The image of the head is scaled and rotated so that it can be registered and mapped into an appropriate size and pose.

D. Representation

The system translates the facial data into a unique code. This coding process allows for easier comparison of the newly acquired facial data to stored facial data.

E. Matching

The newly acquired facial data is compared to the stored data and linked to at least one stored facial representation. Once the system has stored a faceprint, it can compare it to the thousands or millions of faceprints stored in a database.

8. ADVANTAGES & DISADVANTAGES

Advantages:

- There are many benefits to face recognition systems such as its continence and social acceptability. All you need is your picture taken for it to work.
- Face recognition is easy to use and in many cases it can be performed without a person even knowing.
- Face recognition is also one of the most inexpensive biometric in the market and its prices should continue to go down.

Disadvantage:

- Face recognition systems can't tell the difference between identical twins.

9. APPLICATIONS

A. Government Use

1. Law Enforcement
2. Security/Counter terrorism
3. Immigration

B. Commercial Use

1. Day Care
2. Residential Security
3. Voter verification
4. Banking using ATM (The software is able to quickly verify a customer's face.)
5. Physical access control of buildings areas, doors, cars or net access.

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9. CONCLUSION

Face recognition technologies have been associated generally with very costly top secure applications. Today the core technologies have evolved and the cost of equipments is going down dramatically due to the integration and the increasing processing power. Certain applications of face recognition technology are now cost effective, reliable and highly accurate. As a result there are no technological or financial barriers for stepping from the pilot project to widespread deployment.

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