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A Novel Approach For Recognition Of Human Face Automatically Using Neural Network Method

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Abstract - **The Face recognition is an important and secured way to protect the frauds at everywhere like government agencies are investing a considerable amount of resources into improving security systems as result of recent terrorist events that dangerously exposed flaws and weaknesses in today's safety mechanisms. Badge or password-based authentication procedures are too easy to hack. Biometrics represents a valid alternative but they suffer of drawbacks as well. In this paper presents a new way to recognize the face using facial recognition software and using neural network methods. That makes a facial recognition system to protect frauds and terrorists.**

Keyword **- Neural network , FRS , Universal Emotion,Face recognition system.**

I. INTRODUCTION

Presently the face recognition have been used mostly to overcome the hackers , crackers and un authorized activities in the world. There have been so many biometric methods and system are available like Iris scanning, for example, is very reliable but too intrusive; fingerprints are socially accepted, but not applicable to non-consentient people. On the other hand, face recognition represents a good compromise between what's socially acceptable and what's reliable, even when operating under controlled conditions. In last decade, many algorithms based on linear/nonlinear methods, neural networks, wavelets, etc. have been proposed. Nevertheless, Face Recognition Vendor Test 2002 shown that most of these approaches encountered problems in outdoor conditions. This lowered their reliability compared to state of the art biometrics. What exactly face recognition is Face recognition technology is the least intrusive and fastest biometric technology. It works with the most obvious individual identifier the human face.

II. AUTOMATIC FACE RECOGNITION SYSTEM

Instead of requiring people to place their hand on a reader or precisely position their eye in front of

A scanner, face recognition systems unobtrusively take pictures of people's faces as

they enter a defined area. There is no intrusion or delay, and in most cases the subjects are entirely unaware of the process[1]. They do not feel "under surveillance" or that their privacy has been invaded.

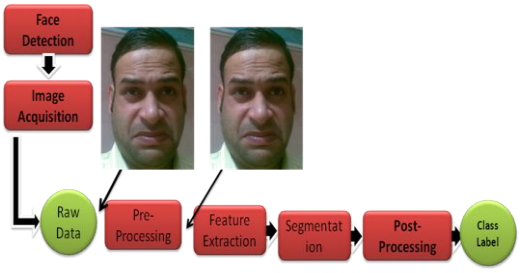


Fig (1) Face Recognition System

The process of face recognition is based on the image processing steps (face detection , image acquisition , pre processing , extraction , segmentation , post processing and classification (class label)) which is shown in the fig(1). By applying these steps the recognition system track the points of face and matched with the stored database of face , this system recognize the person's face quickly before their run away.

Fig (2). Matching of Faces in Crowed

Humans have always had the innate ability to recognize and distinguish between faces, yet computers only recently have shown the same ability. In the mid 1960s, scientists began work on using the computer to recognize human faces. Since then, facial recognition software has come
Every face has numerous, distinguishable landmarks, the different peaks and valleys that make up facial features[2]. The Face software defines these landmarks as nodal points. Each human face has approximately 80 nodal points. Some of these measured by the software are:
Every face has numerous, distinguishable landmarks, the different peaks and valleys that make up facial features. The Face software defines these landmarks as nodal points. Each human face has approximately 80 nodal points. Some of these measured by the software are:
the background. Facial recognition software is based on the ability to recognize a face and then measure the various features of the face.

- Distance between the eyes
- Width of the nose
- Depth of the eye sockets
- The shape of the cheekbones
- The length of the jaw line

These nodal points are measured creating a numerical code, called a face print, representing the face in the database.
Facial recognition software is based on the ability to recognize a face and then measure the various features of the face.

a long way. Its software, can pick someone's face out of a crowd, extract the face from the rest of the scene and compare it to a database of stored images[3]. In order for this software to work, it has to know how to differentiate between a basic face and the rest of

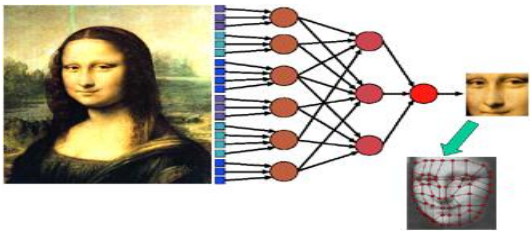
In the past, facial recognition software has relied on a 2D image to compare or identify another 2D image from the database. To be effective and accurate, the image captured needed to be of a face that was looking almost directly at the camera, with little variance of light or facial expression from the image in the database. This created quite a problem.

Fig(3) Face software compares the face print with other images in the database.

In most instances the images were not taken in a controlled environment. Even the smallest changes in light or orientation could reduce the effectiveness of the system, so they couldn't be matched to any face in the database, leading to a high rate of failure. In the next section, we will look at ways to correct the problem.

III. TECHNOLOGY

Our technology is based on neural computing and combines the advantages of elastic and neural networks .Neural computing provides technical information processing methods that are similar to the way information is processed in biological systems, such as the human brain[4]. They share some key strengths, like robustness fault-resistance and the ability to learn from examples. Elastic networks can compare facial landmarks even if images are not identical, as is practically always the case in real-world situations. Neural networks can learn to recognize similarities through pattern recognition.



Fig(4) Face Recognition Using Neural Network

A newly-emerging trend in facial recognition software uses a 3D model, which claims to provide more accuracy. Capturing a real-time 3D image of a person's facial surface, 3D facial recognition uses distinctive features of the face -- where rigid tissue and bone is most apparent, such as the curves of the eye socket, nose and chin -- to identify the subject[5-6]. These areas are all unique and don't change over time. Using depth and an axis of measurement that is not affected by lighting, 3D facial recognition can even be used in darkness and has the ability to recognize a subject at different view angles with the potential to recognize up to 90 degrees (a face in profile). Using the 3D software, the system goes through a series of steps to verify the identity of an individual[7-8].

1)Detection : Acquiring an image can be accomplished by digitally scanning an existing photograph (2D) or by using a video image to acquire a live picture of a subject .

2)Alignment : Once it detects a face, the system determines the head's position, size and pose. As stated earlier, the subject has the potential to be recognized up to 90 degrees, while with 2D, the head must be turned at least 35 degrees toward the camera.

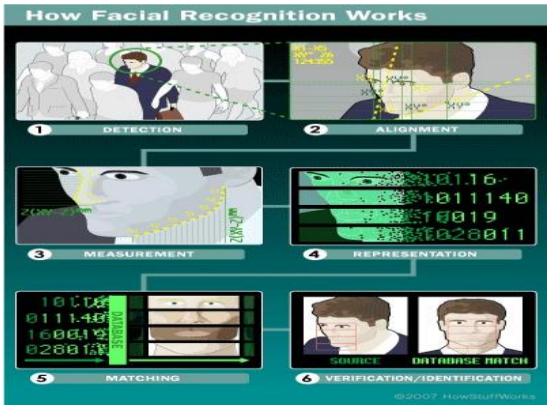
3)Measurement : The system then measures the curves of the face on a sub-millimeter (or microwave) scale and creates a template.

4)Representation : The system translates the template into a unique code. This coding gives each template a set of numbers to represent the features on a subject's face.

5)Matching : If the image is 3D and the database contains 3D images, then matching will take place without any changes being made to the image. However, there is a challenge currently facing databases that are still in 2D images. 3D provides a live, moving variable subject being compared to a flat, stable image[9]. New technology is addressing this challenge. When a 3D image is taken, different points are identified. For example, the outside of the eye, the inside of the eye and the tip of the nose will be pulled out and measured. Once those measurements are in place, an algorithm will be applied to the image to convert it to a 2D image. After conversion, the software will then compare the image with the 2D images in the database to find a potential match.

IV. VERIFICATION OR IDENTIFICATION

In verification, an image is matched to only one image in the database (1:1). For example, an image taken of a subject may be matched to an image in the Department of Motor Vehicles database to verify the subject is who he says he is. If identification is the goal, then the image is compared to all images in the database resulting in a score for each potential match (1:N). In this instance, you may take an image and compare it to a database of mug shots to identify who the subject is[10-11].



Fig(5). Matching and Verification of Face.

IV. FUTURE USES OF AFRS

All of this makes face recognition ideal for high traffic areas open to the general public, such as:

- Airports and railway stations
- Casinos
- Cash points
- Stadiums
- Public transportation
- Financial institutions
- Government offices
- Businesses of all kinds

In the past, the primary users of facial recognition software have been law enforcement agencies, who used the system to capture random faces in crowds. Some government agencies have also been using the systems for security and to eliminate voter fraud.

V. CONCLUSION

As with many developing technologies, the incredible potential of facial recognition comes with some drawbacks, but manufacturers are striving to enhance the usability and accuracy of the systems. Face recognition promises latest security invents in the upcoming trends based on bio-metrics and pattern matching techniques and algorithms.

Face recognition is also very difficult to fool. It works by comparing facial landmarks - specific proportions and angles of defined facial features - which cannot easily be concealed by beards, eyeglasses or makeup.

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AUTHOR PROFILE

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