A Review on Biometric Technology

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Abstract—Biometric Technology has turned out to be a popular area of research in computer vision and one of the most successful applications for identifying humans by capturing and analysing the sole feature or characteristic of individual which is possessed by them and involves their Physical and Behavioral characteristics. For the individual validation and authentication the biometric system has this responsibility. Biometric Technology started from the fingerprints recognition and later on improvements were done in it to make it more secure which involves the face recognition and iris Recognition. Almost both of them are available and regarded as the accurate and reliable technology for biometric validation system. This review paper is all about Face recognition techniques in biometric locking system and Iris recognition technique of identification and the ways of making locking systems ways more efficient, full of ease, more secure, and far better than before so as to make locking or security stronger. It discusses about face recognition technique, its working and its application in different sector along with iris recognition, its working, its application.

Keywords—Physiological Biometric, Behavioral Biometric, Machine Perception, Biostatistics security system

I. INTRODUCTION

Biometrics is a specialised indication for body sizes and calculations. It denotes the metrics linked to human appearances. Computer science uses the Biometrics authentication as a form of verification and access control. Physical and behavioral appearances both can be a type of Biometrics. Physical biometrics are classified on the basis quantification and fact which derived directly from quantification which uses human attributes which involve: Finger-scan, Facial Recognition, Iris-scan, Retina-scan and Hand -scan. Quantification and data derived from an action are stated as Behavioral Biometric which include: Voice-scan and Signature-scan. A biometric system refers to the cohesive H/w and S/W used to conduct biometric validation and authentication.

Fig 1. Diagramatic representation of Biometric

All biometric identifier scan be divided into two big groups:
1) Physiological or Physical.
2) Behavioral.
Physical or behavioural appearances: Biometrics is based on the quantification of distinctive physical and behavioural appearances. Physical biometrics is based on the facts derived directly from quantification of parts of the human body such as Fingerprints, Face recognition, Retina scan and Iris scan. The establishment of behavioral biometrics depends on quantification of the data derived from accomplishment. Such as Voice scan and Signature scan.

**Fig2. Types of Biometrics**

II. PHYSIOLOGICAL BIOMETRIC AUTHENTICATION SYSTEM

Face recognition:

A system of face recognition has a skill which is used for categorizing or validating an individual from a digital spitting image or Filmed from filmed source. There are various manners in which facial recognition system trial, but in general they work by equating selected facial features from given spitting image with faces within a database. Initially a form of computer science application, it has seen broader uses in recent times on mobile platforms and in other forms of expertise, such as robotics. It is naturally pre-owned in security methods and can be equated to the following biometrics which involve the physical factor of an individual which differ from each other. Recently, it has also became the most widespread commercial documentation and a way for marketing in the market for industry among people.

**Fig3. Nodal points for face-recognition**

Phases elaborate the face recognition are:

1. Capture: Sample which consists of physical or behavioral type is taken by the system during acceptance and also in validation or authentication method.
2. Extraction: Template is formed by extracting the sole data from the sample.
3. Comparison: The template is then equated with a new sample.
4. Match/non match: Feature that are extracted from the new sample are decided by the system that they are match or a non-match.

WORKING:

It just goes on searching all those nodal points over the face those which act as parameter to be compared with the template and values are evaluated and then compared and these nodal points are distance between eyes of the individual, width of their nose, depth of socket they are having, cheekbones, jaw lines, chin, etc. Numeric code and string of number is created by using nodal points that represents a face in the database. It is named as face print.

At most 80 nodal points on human face are used for validation among which software like “face it” it takes only 14 to 22 face prints to recognize a face.

Pros:
1. There are many pros of face recognition because it is convenient and socially acceptable.
2. Easy to use and faster recognition.
3. In the market its value is too low and can be considered as inexpensive biometrics.

Disadvantages:
1. It fails when it has to recognize the twins.
2. Image quality.

Iris recognition:

Iris remembrance is a process of biometric identification for categorizing and authentication which uses the Pattern recognition techniques classified with uniqueness of the iris pattern of individual. It involves the high resolution image of the iris which have uniqueness and differs from person to person and which is further used to get accepted by the system for allowance of an individual to be authenticated. It is considered to be the most accurate and secure biometric technology available now a days. Iris recognition is the most influential biometric technology. Iris is a sheltered and internally protected by organ whose unusual texture is stable throughout life.

Working:

Iris contain more than 200 points to be used for contrast including rings, furrows and freckles.
Scan is being done using standard camera with the help of both the visible light and the infrared light.
One of the algorithm serving the industry for iris recognition is being given by John Daugman image of iris is captured and is converted into an iris code which is bar code like bit stream. The Iris code is based on information from a set of Gabor wavelets.

Applications:
1. Banking: To avoid ATM’s and INTERNET BANKING frauds making it as authentication criteria of theirs.
2. Social Welfare: Could be used to identify an individual trying more than once to receive social welfare once using different identities.
3. Border Control/Immigration: The UAE uses iris recognition as at their 35 different ports including air, sea, and land to check every foreigner entering their country isn’t a criminal.

Comparison table:

In the following table several scan method are equated with each other on various criteria such as coded pattern, misidentification rate, security and various application. The concluded result is explain in the table which shows that Iris scan is far better than other scanning methods.

<table>
<thead>
<tr>
<th>Method</th>
<th>Coded Pattern</th>
<th>Misidentification rate</th>
<th>Security</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iris</td>
<td>Iris pattern</td>
<td>1/1,200,000</td>
<td>High</td>
<td>high-security</td>
</tr>
<tr>
<td>Fingerprint</td>
<td>fingerprints</td>
<td>1/1,000</td>
<td>Medium</td>
<td>Universal</td>
</tr>
<tr>
<td>Voice</td>
<td>Voice characteristics</td>
<td>1/30</td>
<td>Low</td>
<td>Telephone service</td>
</tr>
<tr>
<td>Signature</td>
<td>Shape of letters, writing Order, pen pressure</td>
<td>1/100</td>
<td>Low</td>
<td>Low-security</td>
</tr>
<tr>
<td>Face</td>
<td>Outline, shape &amp; distribution of eyes, nose</td>
<td>1/100</td>
<td>Low</td>
<td>Low-security</td>
</tr>
<tr>
<td>Palm</td>
<td>size, length, &amp; thickness hands</td>
<td>1/700</td>
<td>Low</td>
<td>Low-security</td>
</tr>
</tbody>
</table>

III. CONCLUSIONS

We have so far able to understand the meaning of biometrics, its different types in brief. Also we have studied the various types of biometrics technology. In the end of this paper, we will be able to acquire a good knowledge about the better one technology. Here iris recognition technique is more accurate but costly and lacks at locating the iris all of sudden. So in order to improve we need to work for making this technique cheaper and to improve iris locating skill we can use it with face recognition technique, with this it also doubles the security as well.

This altogether will enhance the security of the data, country like that of UAE, and ease to authenticate an individual.

REFERENCES