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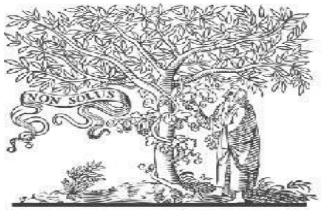

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IJIEMR Transactions, online available on 26th Dec 2020. Link :http://www.ijiemr.org/downloads.php?vol=Volume-09&issue=Issue 12

10.48047/IJIEMR/V09/ISSUE 12/168

Title **STUDYING ABOUT THE APPLICATIONS AND SCENARIOS OF PERSON RECOGNITION**

Volume 09, ISSUE 12, Pages: 985-989

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STUDYING ABOUT THE APPLICATIONS AND SCENARIOS OF PERSON RECOGNITION

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ABSTRACT
Face recognition is a hot topic in the fields of image processing, pattern recognition, and computer vision. Face recognition based on computer vision tries to mimic human vision by electronically observing, analysing, and recognising a picture. Face recognition has a number of advantages, including non-intrusiveness and a user-friendly interface. Face recognition is becoming a primary biometric technique as a result of rapid technological advancements such as digital cameras, the internet, and mobile devices, which makes it easier to acquire. Face recognition must be simulated in order to construct intelligent autonomous robotics. Face recognition by machine can be used in a variety of real-world applications, including electronic and physical access control, biometric authentication, surveillance, human-computer interaction, multimedia management, and so on. It has several advantages over other biometric traits, including the fact that it requires minimal cooperation, is non-intrusive, and is simple to acquire and use.

Keywords: - Person, Biometric, Physiological, Behavioural, Recognition.

I. INTRODUCTION

Biometric recognition refers to the use of distinctive physiological and behavioural characteristics, called biometric identifiers or simply biometrics for automatically recognizing individuals. Perhaps all biometric identifiers are a combination of physiological and behavioural characteristics and they should not be exclusively classified into either physiological or behavioural characteristics. For example, fingerprints may be physiological in nature but the usage of the input device depends on the person's behaviour. Thus, the input to the recognition sequence is a combination of physiological and behavioural characteristics. Similarly, speech is partly determined by the biological structure that produces speech in an individual and partly by the way a person speaks. Often, a similarity can be noticed among parent, children, and siblings in their voice, gait and even signature. The same argument applies to the face: faces of identical twins may be extremely similar at birth but during development, the faces change based on the person's behaviour.

Facial image processing is a process whereby the face of an individual is built onto the skull for the purpose of identification. The theory behind facial image processing is that in the same way

that we all have unique faces, we all have unique skulls, and it is the small variations in the shape, form and proportions of the skull that lead to significant variations in our faces. When I first became involved in facial anthropology-study, I too had a great deal of difficulty believing that the amount of variation seen in the world's population of faces could also be exhibited in skulls and soft tissues of face. Even though we are all having knowledge at facial recognition and identification, due to our innate ability to distinguish one face from another, we find it difficult to believe that the skull can provide a detailed map for the face. This must be, in part, due to our inability to distinguish one skull from another in the same way that we can distinguish one face from another. Uninitiated observers will not be able to demonstrate proportional and feature variation between skulls, face, face-marks, etc, with ease. Since all factors appear similar in shape and proportions to the inexperienced eye, it is assumed that the information provided by one face (image) must be virtually the same as that provided by another skull. However, the practiced and experienced observer can demonstrate unlimited variation in shape, size, proportion and detail between faces (skulls). I am now convinced: each face / skull is as individual as each face.

Facial anthropology is an unusual field made up of professionals from a wide variety of backgrounds including medical art, forensic art, dentistry, computer science, anthropology, archaeology, forensic science and anatomy. Since the field is so varied there has, in the past, been a paucity of research facts, and students have had to carry out research in all these areas in order to collate all the required information. Over the last thirty years a number of researches have propagated that have become sources in this field. So that it can be easily adopted and applied to the particular ethnic group of the individual being analyzed. In a world growing rapidly more cosmopolitan, this should enable image processing practitioners to apply the most appropriate set of data to the forensic investigation, and may also succeed in encouraging more researchers to widen the database for facial soft tissue, related studies. In addition to that it, allows future practitioners to follow this technique precisely. Finally, the field of juvenile facial analysis is discussed for this research purpose. it introduces challenging and interesting facts.

II. PERSON RECOGNITION APPROACH

Humans are known to efficiently recognize fellow humans they have known or encountered before. In fact, the task of effectively recognizing or authenticating individuals (termed person recognition) forms an integral part of routine activities in our daily lives, e.g., to initiate conversations and transactions with the intended individuals. However, in the present era, with millions of transactions being affected automatically via the use of technology, automatic recognition of individuals is important to ensure the authenticity and integrity of transactions. In such a scenario, manual recognition by human operators before every transaction is neither efficient, nor practical.

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Historically, several methods have been used for assertion of individual identity or affiliation to a certain group. Many of these methods continue to be used to this day, e.g., possession of certain tokens such as an identity document; knowledge of a secret passphrase; tattoos, body marks or other anatomical characteristics such as fingerprints. Person recognition or authentication is a necessary pre-requisite before granting authorization for use of resources that have controlled or limited access, e.g., a bank account. Person recognition is required for a variety of applications from surveillance, law enforcement, physical and logical access control to time and attendance systems, mobile user authentication and social welfare programs. Some of these applications are discussed

III. APPLICATIONS

The applications of person recognition may be categorized into several domains, some examples of which are presented below.'

- **Civil and Social Welfare**

It is estimated that about 10 million out of the 26 million annual childbirths in India are unregistered. The absence of such legal identity not only makes the child more susceptible to child trafficking and child labor, but also leads to denial of certain other privileges later as an adult, such as a formal job, bank account, driving license, marriage certificate or a passport. For such civil and social welfare applications, it is required that a person be recognized accurately before providing them access to certain benefits and resources. Examples of such applications include disbursal of monetary benefits and subsidies to certain individuals, and recognition of candidates appearing for a large scale recruitment examination. Reliable person recognition is also essential for non-cash financial transactions that are primarily accomplished through electronic means.

- **Crime and Law Enforcement**

Identifying the person of interest is of critical importance for law enforcement agencies and the judiciary, e.g., to shortlist and apprehend suspects and to ensure appropriate penalties in the case of repeat offenders. A majority of crimes do not result in a conviction because of failure to indisputably recognize the perpetrator of the crime. National Crime Records Bureau's statistics indicate that the conviction rate for crimes committed in India in 2013 was only about 25% for most crimes. Internationally, on an average, only one offender is found for every two crimes registered.

- **Border Protection**

An estimated 6.968 million international tourists travel to India every year [7, 8]. The United States has 69.768 million tourists annually [8], and including international visitors for other purposes, the U.S. Customs and Border Patrol screens about a million travelers each day [9]. Therefore, border protection is another important application for person recognition. Individuals crossing international borders have to be reliably and uniquely identified before being granted entry. This is required for protecting the borders against entry of unwanted individuals.

- **Personal**

The number of mobile devices exceeds the population of the world. For many users, the sensitive and personal information accessible through these devices is far more valuable than just the explicit cost of the device. The Automated Search Facility-Stolen Motor Vehicles (ASF-SMV) database of the INTERPOL had more than 6.8 million records of stolen vehicles at the end of 2014. A suitable and accurate authentication of the driver is likely to prevent several of these thefts.

Several personal applications requiring person recognition span over a multiplicity of personal assets that may require access, e.g. the place of residence, automobile or data stored on a laptop computer or mobile phone.

IV. RECOGNITION SCENARIOS

The aforementioned applications primarily operate in two different scenarios, verification and identification.

- **Verification**

When an identity claimed by an individual needs to be verified, the scenario is termed as verification. To verify the identity, typically, the credentials presented by the individual are matched against the known credentials of the identity being claimed. An example of the verification scenario is border protection, when a person presents immigration documents at the port of entry, claiming a certain identity, and the immigration officer verifies the claim. The outcome in the verification scenario is generally a binary response, indicating whether the claim of identity has been confirmed or declined.

- **Identification**

Certain applications, on the other hand, require that the person be recognized using their credentials, without them explicitly claiming an identity. This is termed identification. In the identification scenario, the credentials presented by, or obtained from the person being recognized are compared against all known credentials available in the system to ascertain their identity. An example of the identification scenario is recognition of a perpetrator of crime from a CCTV footage from the scene of crime by comparing the obtained face image to known mugshot face images.

- **Positive Identification**

The identification scenario is said to be positive identification if the purpose of identification is to determine the privileges or authorization granted to the person, e.g. being allowed access to a lecture theatre. In the positive identification scenario, it is expected that the users are willing to be identified, similar to verification, except that no identity needs to be explicitly claimed.

- **Negative Identification**

The negative identification scenario is when the purpose of identification is to determine the privileges or authorizations denied to them, e.g., screening passengers who are considered to be potential threat from boarding an aircraft [12] or preventing users from assuming multiple identities.

V. CONCLUSION

The human face is one of the most common and easiest characteristics, which can be used in biometric security system. Face recognition technology, is very popular and

is used more widely because it does not require any kind of physical contact between the users and device. Cameras scan the user face and match it to a database for verification. Furthermore, it is easy to install and does not require any expensive hardware. So due to this advantage and ease to use this thesis face recognition using soft computing models. Here 14 features have been extracted from the face images. The extracted features are: right eye height, right eye width, right eye area, left eye height, left eye width, left eye area, mouth height, mouth width, nose width, face height, face width, face area and center of mass. In the recognition process we are using soft computing models like neural network, PSO-NN and ANFIS. In the neural network structure, we developed the different models by changing the different parameters like number of neuron in hidden layer and trained by well-known back propagation algorithm. Based on the performance of network we select the best one that has the higher accuracy among all others. The configuration of the best model has one input, output layer and hidden layer with 10 numbers of neurons in hidden layers, trainlm learning algorithm and mu value is 0.0001. The performance accuracy of the best model comes out to be 92.9 % for the testing phase and 97.2 for the training phase respectively.

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