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A Blended Biometric Approach Using Matching Score Level Architecture

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***Abstract*—** This paper aims at security authentication for an unmanned surveillance system. The system takes the Face image, impressions of a person's finger and images of eyes and prepares a database. A blended biometric approach is followed for calculating the weighted average of scores appraised from the three most trivial biometric traits, Face, Eye and Finger impressions. The features are extracted from the pre-processed images of iris, face and finger impressions.The details of a probing image are to be matched with the database we have .the individual details obtained after tallying are sent to the fusion module. This module consists of three major steps i.e., Pre-Processing, Discrete Wavelet Transformation and Image fusion. At the final phase the hidden key Analysis approach is followed to authenticate the subject under investigation.

***Keywords*—** Biometric Identity, IRIS Recognition, Finger print, Face Recognition, DWT, WAMS.

I. INTRODUCTION

The detection of objects on an image is a typical process in digital image processing technology. This process is challenging one which needs some techniques like removing noise, detecting locate lines, regions and sometimes with textures. A better option would be to consider these shapes as single objects. E.g. vehicles in the traffic, luggage bags in airports. Unlike human beings who had identify any object in any kind of situation like different angles and lightining.but AI cannot do such things and needs good programming skills to achieve this.

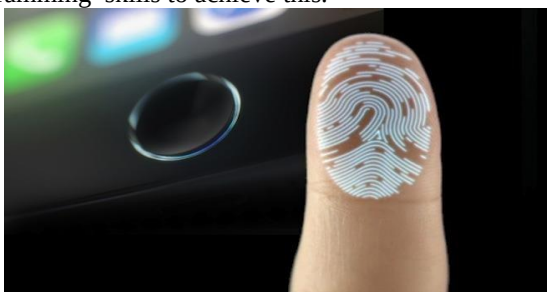


Fig: 1 Fingerprint Recognition

Fingerprint Recognition System Fig 1 has high acceptability, immutability and individuality.it works effectively owing to uniqueness of every human being. A fingerprint is a unique set of patterns seen in an individual which sets him apart from other individual. On the other hand a facial recognition system works on the principle of identifying on individual from already available source in database.

The applications are focusing on user experience improvement. Users of many online applications are matching with the systems in a large extent for accomplishing their desired tasks. While doing this, users and the online applications are considering issues that authenticate the interactions. The online learning has became a mandate for all the millennial learners. In such an event the online learning can be made successful only by considering the humanistic traits as a physical teacher to enhance the experience of learning. This is a Human Computer Interaction issue blended with the cognitive abilities of users. These cognitive abilities can be incorporated into machines by following specific Artificial Intelligence techniques. These techniques include Soft Computing algorithms such as Artificial Neural Network structures. The mood of learners while online learning, can be classified from the continuous facial expressions. In the last ten years, spontaneous facial expression has established a major role in identifying human emotions. HCI involves key operations like face detection, face recognition and the expressions of the face for the detection of facial expressions many authors' implemented techniques that are visible in huge body of research literature over the years. The most successful techniques depend on facial emotion extraction, recognition and classification for further processing.

In general the facial expressions include principal categories such as: happy, surprise, anger, dissatisfaction, sadness, fear. Some techniques used geometrical methods while others used cognitive approaches. FACS (facial action coding system) is the basis for almost all methods. The Multimodal

Biometric model devised by Hiren and Joshi [1] addressed some traits clearly and individually. Each expression is identified by the action unit (AU).The implementing system needs to incorporate these Action Units as per the applications demand.

Rest of the paper is organized as follows, Section II contains Facial Expression Recognition, Section III contain the proposed methodology, Section IV contain discussions and results, section V Conclusion and Future scope.

II. FACIAL EXPRESSION RECOGNITION

A. Template matching Techniques

For affective Computing in digital image processing to have automated desired results while interacting with the computer is best described by R.W.Picard et.al [2]. The template matching techniques for similarity measurement were discussed in R. Brunelli et.al. [3]. The integration of emotions to automate the cognitive abilities of users is a related work which has done by the L. I. Perlovsky et. Al [4] to incorporate the FER based system in the online learning which is important part of cognitive science.

B. *Face Object Detection*

The crucial part of this entire work is to distinguish the face object properly and the emotions based on training. The face recognition work done by Crawford et.al [5] made inspiring work. The real object detection can be done using several verified methods as suggested by Lie et. al [6]. As the entire online learning system that this paper takes as subject, the face object of learners can be extracted from the web cam of the system. The frame work for set up of all capturing mechanism, classification and taking apt post action can be followed by the proposals made by several earlier papers such as I. Fasel et.al [7]. This paper used a suitable method that best fits for this online learning system. The human activity motion using kinematic features as explained in A. Sanchez et.al [8], were understood before implementing this mood based online learning system. While analyzing the expressions of the face automatically a fusion of methods as suggested in [9, 10] were observed for improvement.

III. PROPOSED METHODOLOGY

The word "biometrics" is derived from the Greek words bio (life) and metric (to measure). The iris has unique features and is complex enough to be used as a biometric signature. It means that the probability of finding two people with identical iris patters is almost zero. According to Flom and Safir the probability of existence of two similar irises on distinct persons is 1 in 1072.

Multimodal recognition requires 8 main steps:-

- ✓ Input as image selection
- ✓ Grayscale Conversion Process.
- ✓ DWT Segmentation.
- ✓ Fusion Technique.
- ✓ Feature Extraction Process.
- ✓ Database up Loading.
- ✓ Matching of both Input Fusion Image and Database Images.
- ✓ Recognition Process.

The non-linear classification problems are best addressed by the above kind of networks by several authors in [11-14]. The Weighted Average of Matching Scores frame work is in Fig 2 below.

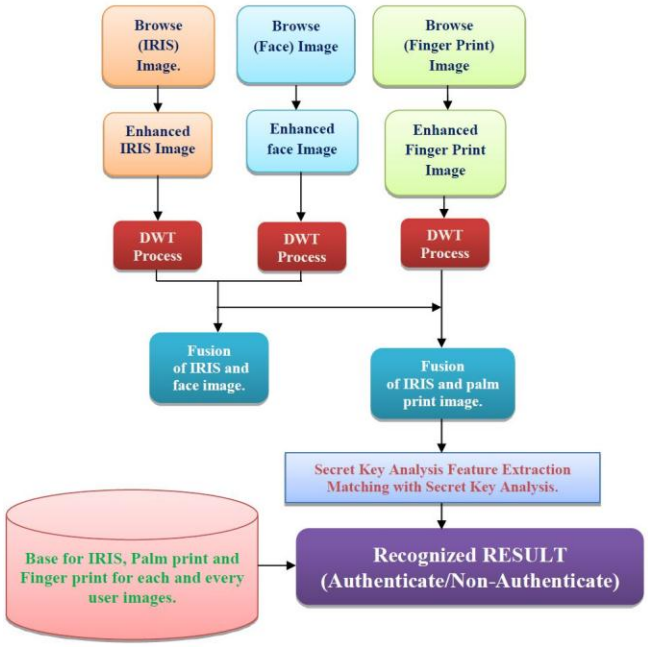


Fig. 2. The WAMS Frame Work

The addition of emotional parameters was done in the EMBPNN, while BPNN used so such concept which is

The Algorithm

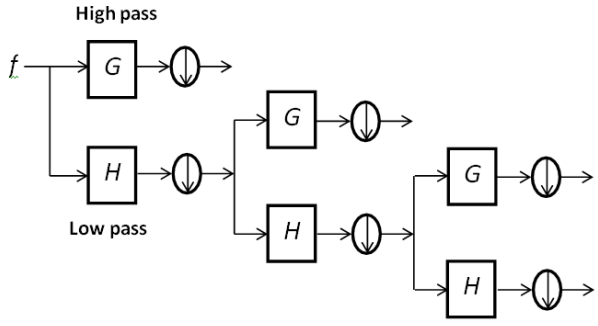
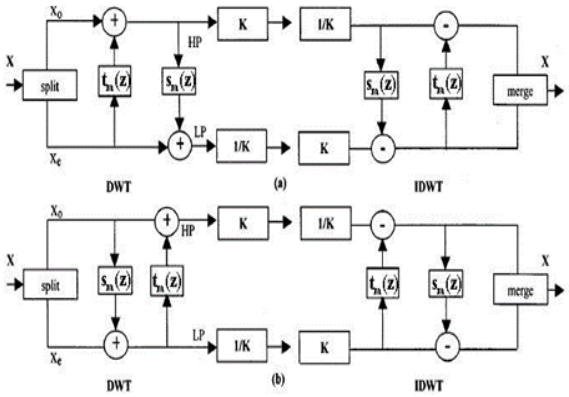


Fig. 3: DWT

Lifting schema of DWT

Lifting schema of DWT has identified as a faster approach. The basic principle is to factorize the poly phase matrix of a wavelet filter into a sequence of alternating upper and lower triangular matrices and a diagonal matrix. This leads to the wavelet implementation by means of banded-matrix multiplications.



`Fig. 4: Lifting schema of DWT

Where

$$\widetilde{\mathbf{P}}_1(z) = \begin{bmatrix} k & 0 \\ 0 & \frac{1}{k} \end{bmatrix} \prod_{i=1}^{M} \begin{bmatrix} 1 & s_i(z) \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 \\ t_i(z) & 1 \end{bmatrix}$$

$$\widetilde{\mathbf{P}}_2(z) = \begin{bmatrix} k & 0 \\ 0 & \frac{1}{k} \end{bmatrix} \prod_{i=1}^{M} \begin{bmatrix} 1 & 0 \\ t_i(z) & 1 \end{bmatrix} \begin{bmatrix} 1 & s_i(z) \\ 0 & 1 \end{bmatrix}$$

IV. RESULTS AND DISCUSSION

From database, different iris, face and finger impressions images of persons are taken (samples of iris, 4 samples of face and 4 samples of finger print) and code matrix is formed. By concatenation and shifting the feature vector s are fused. When a new iris, finger and face image is as an input, the code matrix of the images is found out. Using the feature values, the pattern matching is performed. Based on this value, the class to which the new image belongs to is are calculated. The recognition performance of iris feature alone using wavelet packet transform. The calculated key value and recognized in result using wavelets.

V. CONCLUSION AND FUTURE SCOPE

The From database, different Iris, Face and Finger print images of persons are taken (4 samples of iris, 4 samples of face and 4 samples of finger print) and code matrix is formed. By concatenation and shifting the feature vectors are fused. When a new iris, finger and face image is given as an input, the code matrix of the images is found out. Using the feature values, the pattern matching is performed. Based on the value, the new image belongs to is categorized and calculated. The recognition performance of iris feature alone used wavelet packet transform. The calculated key value is compared with the pre calculated values are given in the database.

The paper done has certain limitations and these limitations are to be surmounted in the future versions.

- ✓ To reckon a few within the purview of this project,
- ✓ Avoiding occlusions
- ✓ Processing capabilities
- ✓ Increased complexity in image processing

And inclusion of even advanced and best algorithms in individual sub-modules of detecting faces, iris and finger prints are in the coming versions extent of this paper.

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