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An Penta -Modal Physiological Characteristics For Realistic Authentication Of An Individual

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Abstract: *Biometrics is also used to identify individuals in groups that are under surveillance. Biometric identifiers are distinctive, measurable characteristics used to label and specifically describe individuals. A tri-modal biometric system combines two or more biometric data recognition results to increase the performance of authentication systems that prevents unauthorized users from authentication and reduces False acceptance rate. The main aim of this paper is to provide multilevelauthentication in biometric systems. Tri-modal biometric is the usage of multiple biometric indicators by personal identification systems for identifying the individuals. Tri-modal authentication provides more level of authentication than uni-modal biometrics which uses only one biometric data such as fingerprint or face or palm print or iris. In this paper, we are using face, finger vein and iris of a person for the automatic identification of an individual by combining face ,finger vein and iris of a person at the matching-score level. A technique called Minutiae matching and Edge detection is used for this purpose.*

Keywords: *authentication, different methods, multiple biometrics, secured, un authentication.*

I. Introduction

Multimodal biometric systems can obtain sets of information from the same marker .Fusion of the biometrics information can occur at different stages of a recognition system. In case of feature level fusion, the data itself or the features extracted from multiple biometrics are fused. Multimodal biometric technology uses more than one biometric identifier to compare the identity of the person. Identification is the process of trying to find out a person's identity by comparing the person who is present against a biometric pattern/template database. The system would have been pre-programmed with biometric pattern or template of multiple individuals. During the enrolment stage, a biometric would have been processed, stored and encrypted, for each individual. Similar to identification, it is checked whether the similarity between pattern and template is sufficient enough to provide access to the secured system or area. The higher the score, the higher the similarity is between them.Impostor patterns can generate scores that are higher than the scores of an authorized user's patterns (FAR or false acceptance rate). FWith this methodology, the probability of accepting an impostor is greatly reduced.

II. Literature Survey

*A.*Improving Fingerprint Verification Using Minutiae Triplets

Improving fingerprint matching algorithms is an active and important research area in fingerprint recognition. Algorithms based on minutia triplets, an important matcher family, present some drawbacks that impact their accuracy, such as dependency to the order of minutiae in the feature, insensitivity to the reflection of minutiae triplets, and insensitivity to the directions of the minutiae relative to the sides of the triangle. To alleviate these drawbacks, we introduce in this paper a novel fingerprint matching algorithm, named M3gl. This algorithm contains three components: a new feature representation containing clockwise-arranged minutiae without a central minutia, a new similarity measure that shifts the triplets to find the best minutiae correspondence, and a global matching procedure that selects the alignment by maximizing the amount of global matching minutiae. To make M3gl faster, it includes some optimizations to discard non-matching minutia triplets without comparing the whole representation. In comparison with six verification algorithms, M3gl achieves the highest accuracy in the lowest matching time, using FVC2002 and FVC2004 databases

B.Finger vein recognition using weighted local binary pattern code based on a support vector machine

Finger vein recognition is a biometric technique which identifies individuals using their unique finger vein patterns. It is reported to have a high accuracy and rapid processing speed. In addition, it is impossible to steal a vein pattern located inside the finger. We propose a new identification method of finger vascular patterns using a weighted local binary pattern (LBP) and support vector machine (SVM). This research is novel in the following three ways. First, holistic codes are extracted through the LBP method without using a vein detection

procedure. This reduces the processing time and the complexities in detecting finger vein patterns. Second, we classify the local areas from which the LBP codes are extracted into three categories based on the SVM classifier: local areas that include a large amount (LA), a medium amount (MA), and a small amount (SA) of vein patterns. Third, different weights are assigned to the extracted LBP code according to the local area type (LA, MA, and SA) from which the LBP codes were extracted. The optimal weights are determined empirically in terms of the accuracy of the finger vein recognition. Experimental results show that our equal error rate (EER) is significantly lower compared to that without the proposed method or using a conventional method.

C.Enhanced Iris Recognition System – an Integrated Approach to Person Identification

This paper discusses about Enhanced iris recognition which is used to overcome some of the problem like to automate the recognition of the iris by reducing complexity and increasing algorithm speed. Various challenges are faced while working with the iris recognition system. Iris recognition systems make use of the uniqueness of the iris patterns to derive a unique mapping. Iris recognition, as a biometric method, outperforms others because of its high accuracy. Iris recognition also has the ability to handle very large populations at high speed. Mostly three stages are followed while working with iris system i.e. preprocessing, feature extraction and recognition stage. This paper presents an automated and novel iris recognition system where overall computational match speed is reduced (from iris preprocessing to the final stage of recognition) and hence makes system more reliable with accuracy of 99.38% and low FAR.

D.Problem description

By using unimodal system , we can provide security authentication but it is less robust , the unauthorized person will hack it easily . There will also be mismatched results. Hence , it is safe to go for multimodal system.The aim is to achieve higher performance that may not be possible using a single biometric indicator alone. The proposed model is a fusion of iris , finger vein, face, palm print and ear . Feature vectors are created independently for each sensor and are then compared to the enrollment templates which are stored separately for each biometric trait. Based on the proximity of feature vector and template each subsystem computes its own matching score. These individual scores are finally combined into a total score which is passed to the decision module. The proposed integrated system also provide anti spoofing measures by making it difficult for an intruder to spoof multiple biometric traits simultaneously. Scores generated from individual traits are combined at matching score level using weighted sum of score technique.

III. Techniques

A.Viola Jones Algorithm

The **Viola–Jones object detection framework** can be trained to detect a variety of object classes, it was motivated primarily by the problem of face detection.The problem to be solved is detection of faces in an image. A human can do this easily, but a computer needs precise instructions and constraints. To make the task more manageable, Viola–Jones requires full view frontal upright faces. Thus in order to be detected, the entire face must point towards the camera and should not be tilted to either side. While it seems these constraints could diminish the algorithm's utility somewhat, because the detection step is most often followed by a recognition step, in practice these limits on pose are quite acceptable.

B.Texture Based Feature Extraction

The palm vein as a piece of texture and apply texture-based feature extraction techniques to palm vein authentication. A Gabor filter provides the optimized resolution in both the spatial and frequency domains, thus it is a basis for extracting local features in the palm vein recognition. In order to obtain effective pattern of palm vascular, we proposed an innovative and robust adaptive Gabor filter method to encode the palm vein features in bit string representation. The bit string representation, called VeinCode, offers speedy template matching and enables more effective template storage and retrieval.

C.Preprocessing And Canny Edge Detection

The human ear is a perfect source of data for passive person identification. Ear seems to be a good candidate solution since ear is visible, their images are easy to take and structure of ear does not change radically over time. Ear satisfies biometric characteristic (universality, distinctiveness, permanence and collectability). In this paper we presented a new algorithm for ear recognition based on geometrical features extraction like (shape, mean, centroid and Euclidean distance between pixels). Firstly, we made a pre-processing phase by making all images have the same size. After that we used canny edge and made some enhancement on the image, largest boundary is calculated and distance matrix is created then we extracted the image features.

D.Maximum Curvature Method

In finger vein recognition, the finger vein image is captured and localized the finger region in the captured image.The shape of each finger was found to be different so normalizations is performed to the localized finger region which was defined and stretched towards the X and Y axes, respectively. Then, the localized image was sub-sampled. After that, the finger vein feature are extracted and enrolled in the back store

so that it can be matched in a later during matching process .For robust extraction of the finger vein patterns from the non-uniform images, the used method includes the repeated tracking of dark lines in the images. Extraction process of the patterns depends on the number of times the tracking lines pass through the points. The used method is based on the use of maximum curvature operation which starts at any pixel in the captured image."Locus space" is a matrix used to hold the number of times that each pixel has become the current tracking point. The size of the locus space is the same as the number of pixels in the captured images.

E.Circular Hough Transform

The iris formation happens in the third month of early life and unique patterns are formed during the first year of life. These patterns are random and don't depend on genetic factor and the only characteristic that is dependent on genetics is the pigmentation. Iris recognition systems focuson analysis many irises features; e.g. rings, furrows, and freckles. Such features are being existed in the coloredtissue surrounding the pupil.Image processing can be used for formulation aniris pattern to unique code which can be stored in a database.In turn, the iris systems have a verylow False Accept Rate (FAR) compared to other biometrictraits that can be rather highCircle detection algorithm is used to increase the overallspeed of the system. Circle detection is used because ofmany benefits. Circle detection algorithm has enough recognition performance and speed level.In turn, after eye region segmentation, segmentation for iris extraction is required to allow comparisons between different irises. Each iris that is extracted is transformed so that it has a fixed dimension, and hence removing the dimensional inconsistencies between eye images due to the stretching of the iris caused by the pupil dilation from varying levels of illumination.

IV. Experiments And Results

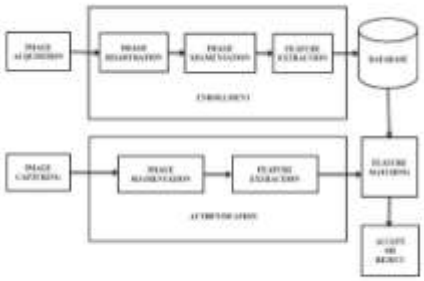

Fig.1. System Block

Fig.2. GUI code generation

Fig.3. Evaluation of GUI

Fig.4. Iris recognition output

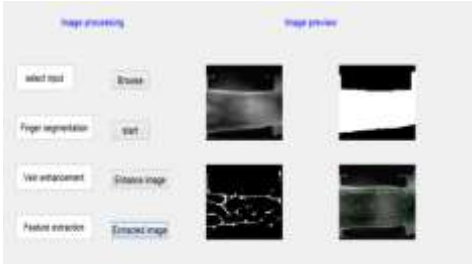

Fig.5. Finger print output

Fig.6. Face recognition output

Fig.7.a. Palm vein detection

Fig.7.a. Palm vein output

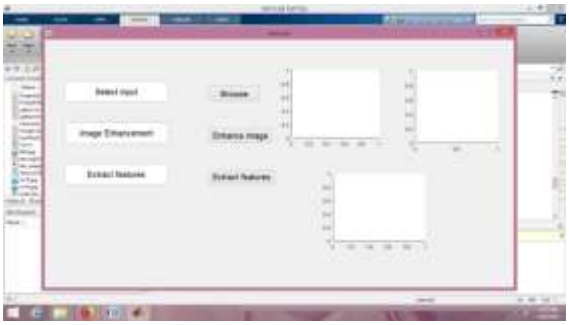

Fig.8.a. Ear detection

Fig.8.b. Ear detection

V. Conclusion

Biometrics is a very promising technology, challenges are slowing its development and deployment. Finger vein images , face images, ear and palm print, Iris images are chosen due to their unique physiological traits. The proposed multimodal biometric identification and authentication system is considered a robust combination of penta modal fusion. The proposed system is a new combination to the biometric research that can be extend and enhanced during times.

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