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DETECTION AND RECGONITION OF IRIS IMAGES

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ABSTRACT

In iris recognition, we proposed fusion between Hamming distance and FBD works better than the baseline of Hamming distance alone it performed a statistical test to determine whether this difference was statistically significant. The null hypothesis for this test is that there is no difference between the base line. Hamming distance method and the proposed fusion of Hamming distance and FBD. The alternative is that there is a significant difference. To test for statistical significance, it randomly divided the subjects into 10 different test sets. For each test set, the measured the performance of using Hamming distance alone and of using fusion of Hamming distance and FBD. Then, we used a paired t-test to see whether the proposed method obtained a statistically significant improvement. Thus provides the effective results.

Keywords: Hamming Distance, Fragile Bits, Score Fusion

I. INTRODUCTION

The most common iris biometric algorithm represents the texture of an iris using a binary iris code. Not all bits in an iris code are equally consistent. A bit is deemed fragile if its value changes across iris codes created from different images of the same iris. Previous research has shown that iris recognition performance can be improved by masking these fragile bits. Rather than ignoring fragile bits completely, it considers what beneficial information can be obtained from the fragile bits. We find that the locations of fragile bits tend to be consistent across different iris codes of the same eye. It present a metric, called the fragile bit distance, which quantitatively measures the coincidence of the fragile bit patterns in two iris codes. It find that score fusion of fragile bit distance and Hamming distance works better for recognition than Hamming distance alone. To our knowledge, this is the first and only work to use the coincidence of fragile bit locations to improve the accuracy of matches.

II. REVIEW OF LITERATURE

In this paper, we propose a novel possibilistic fuzzy matching strategy with invariant properties, which can provide a robust and effective matching scheme for two sets of iris feature points. In addition, the nonlinear normalization model is adopted to provide more accurate position before matching. Moreover, an effective iris segmentation method is proposed to refine the detected inner and outer boundaries to smooth curves. For feature extraction, the Gabor filters are adopted to detect the local feature points from the segmented iris image in the Cartesian coordinate system and to generate a rotation-invariant descriptor for each detected point. After that, the proposed matching algorithm is used to compute a similarity score for two sets of feature points from a pair of iris images. The experimental results show that the performance of our system is better than those of the systems based on the local features and is comparable to those of the typical systems. **[2].**

Wireless Local Area Networks (WLANs) are gaining gratitude as they are fast, cost effective, supple and easy to use. The networks face severe issues and challenges in establishing security to the user's of the network. With users accessing networks remotely, exchanging data by means of the Internet and carrying around laptops containing sensitive data, ensuring security is an increasingly multifarious challenge. Therefore it is essential to make sure the security of the network users. In order to offer network security many techniques and systems have been proposed earlier in literature. Most of these traditional methods uses password, smart cards and so on to provide security to the network users. Though these traditional methods are effectual in ensuring security they posses some limitations too. The different phases included in this proposed approach are user registration, Extraction of minutiae points and secret key, Iris localization and Normalization. Furthermore, biometric authentication systems can be more opportune for the users since it involves no password that might be feared to be forgotten by the network users or key to be lost and therefore a single biometric trait (e.g. Iris) can be used to access several accounts without the burden of remembering passwords. In this paper the Iris biometric is used to provide security. This proposed paper also explains some of the Iris localization and Normalization techniques to make the biometric template noise free. The new method uses entropy as the basis for measuring the uniformity of pixel characteristics (luminance is used in this paper) within a segmentation region. The evaluation method provides a relative quality score that can be used to compare different segmentations of the same image. This method can be used to compare both various parameterizations of one particular segmentation method as well as fundamentally different segmentation techniques. The results from this preliminary study indicate that the proposed evaluation method is superior to the prior quantitative segmentation evaluation techniques, and identify areas for future research in objective segmentation evaluation. **[1].**

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III. IRIS RECOGNITION SYSTEM

A typical iris recognition system consists of three major building blocks. Biometric technologies are the foundation of personal identification systems. It provides an identification based on a unique feature possessed by the individual. This paper provides a walkthrough for image acquisition, segmentation, normalization, feature extraction and matching based on the Human Iris imaging. A Canny Edge Detection scheme and a Circular Hough Transform, is used to detect the iris boundaries in the eye's digital image. The extracted IRIS region was normalized by using Image Registration technique. A phase correlation base method is used for this iris image registration purpose. The features of the iris region are encoded by convolving the normalized iris region with

2D Gabor filter. Hamming distance measurement is used to compare the quantized vectors and authenticate the users.

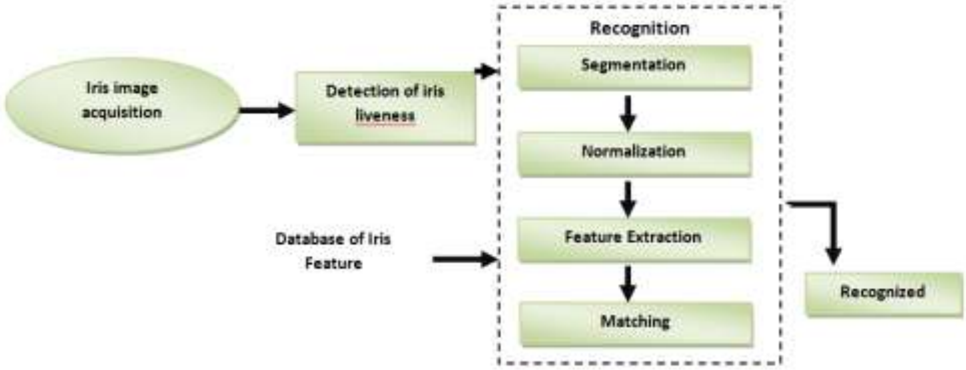

Fig.1 Flow Diagram of Iris Recognition System

3.1 Segmentation

Precise iris image segmentation plays an important role in an iris recognition system since success of the system in upcoming stages is directly dependent on the precision of this stage . The main purpose of segmentation stage is to localize the two iris boundaries namely, inner boundary of iris-pupil and outer one of iris-sclera and to localize eyelids. shows block diagram of segmentation stage. As it could be seen in this figure, segmentation stage includes three following steps:

1. Localization of iris inner boundary (the boundary between pupil and iris).
2. Localization of iris outer boundary (the limbic border between sclera and iris).
3. Localization of boundary between eyelids and iris.

3.1.1 Segmentation Process

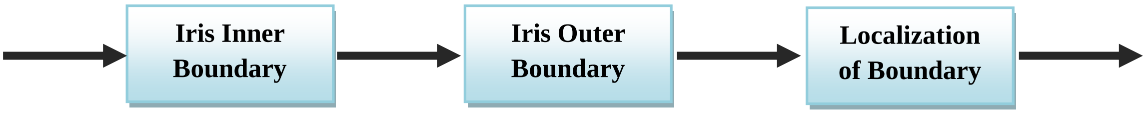

Fig.2 Segmentation Process

3.3 Normalization

The next focus of this work is on iris normalization. Most normalization techniques are based on transforming iris into polar coordinates, known as unwrapping process. Pupil boundary and limbus boundary are generally two non-concentric contours. The non-concentric condition leads to different choices of reference points for transforming an iris into polar coordinates.

Proper choice of reference point is very important where the radial and angular information would be defined with respect to this point.

• This is to deal with variation, between iris image pairs, of the number of bits actually compared to form the Hamming Distance.

• Stage 1: the raw Hamming Distance (HDraw) is given by the number of bits differing between the 2 IrisCodes divided by the number of bits compared (n, as determined from the probe and gallery mask bits).

• Stage 2: this modifies HDraw non-linearly, leading to HDnorm.

• By mistake, but fortuitously, our initial implementation of IrisCode pattern matching used only the Stage 1 Normalisation

3.2.1 Normalization of Extracted Iris

Once the iris region is successfully segmented from an eye image, the next stage is to normalize the iris region in rectangular block so that it has fixed dimensions in order to allow comparisons. The normalization process produces iris regions, which have the same constant dimensions, so that two photographs of the same iris under different conditions will have characteristic features at same spatial location.

3.3 Feature Extraction

Hamming distance is measure two bit patterns or template. It will be provide the decision whether the two patterns are generated from the different irises or from the same one. The LBP score can join with Hamming distance using cascaded classifiers. Since their LBP method is slower than computing the Hamming distance, they suggest calculating the Hamming distance first. If the Hamming distance is below some low threshold, the comparison is classified as a match. If the Hamming distance is above some high threshold, the comparison is classified as a non-match. If the Hamming distance is between those two thresholds, use the LBP score to make the decision.

3.4 Matching

The feature encoding process will also need a corresponding matching metric, which gives a measure of similarity between two iris templates. This metric should give one range of values when comparing templates generated from the same eye, known as intra-class comparisons, and another range of values when comparing templates created from different irises, known as inter-class comparisons

3.5 Iris Image Acquistion

Image acquisition is considered as the most critical step for building the iris recognition system since all subsequent stages depend highly on the image quality. Another challenge of capturing the iris images is due to the smaller size of the iris and exhibition of more abundant texture features of iris under infrared lighting. A specifically designed sensor is used to capture the sequence of iris images. An iris image capturing device considers the following three key factors: The lighting of the system, The position of the system, and The physical capture system.

3.6 Detection of Iris Liveness

In order to avoid the forgery and the illegal usage of iris biometric features, the detection of iris liveness ensures that the captured input image sequence comes from a live subject instead of an iris picture, a video sequence, a glass eye, and other artifacts. No such major researches have been conducted for iris liveness detection. The utilization of the optical and physiological characteristics of the live eye is considered as the most important aspects for the assurance of the liveness of the input iris image sequence.

3.7 Recognition

The accuracy of the iris recognition system depends on this module. This module can be further subdivided into four main stages: Segmentation, Normalization or Unwrapping, Feature extraction, and Matching. In the first stage, the iris region is localized from the eye image, the segmented iris region is normalized in order to avoid the size inconsistencies in the second stage, then the most discriminating features are extracted from the normalized image and finally, the extracted features are used for matching with the known pattern in the feature database.

3.8 Approaches of Iris Recognition

From the extensive literature review, we divide the iris recognition approaches roughly into four major categories based on feature extraction strategy: Phase-based approaches, Zero-crossing representation approaches, Texture-Analysis based approaches and intensity variation analysis approaches.

3.8.1 Phase-Based Approach

In this method, the iris structure is encoded by demodulating with Gabor wavelets. Each phase is quantized in the complex plane to the quadrant in which it lies for each local element of the iris structure and this operation is repeated all across the iris, at different scales of analysis.

3.8.2 Zero-Crossing Representation Approach

The zero-crossing representation of the 1D wavelet transform at different resolution levels of a concentric circle on an iris image is used to characterize the texture of the iris.

3.8.3 Texture-Analysis Based Approach

The iris pattern provides abundant texture information and it is desirable to explore the representation scheme to acquire the local information in an iris. According to the iris recognition approach based on texture analysis, the discriminating frequency information of the local spatial pattern in an iris is captured which reflect the significant local structure of the iris.

3.8.4 Intensity Variation Analysis Approach

In this scheme, the local sharp variation is used to represent the distinctive structure of the iris. The most discriminative variations of an iris image are characterized by constructing a set of 1-Dsignal by adopting wavelet transform to represent these signals.

IV. CONCLUSION

In this paper, “Detection and Recognition of Iris Image Acquisition” the input image is given then the iris liveness is detected by using some process and then finally the iris is recognized by segmenting, extracting the features. The feature is extracted from the database.

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