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RECOGNITION OF IRIS & PALM-PRINT FOR SECURITY OF USER IDENTIFICATION

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ABSTRACT

Palm-print and Iris are the effective methodology for personal authentication. Biometrics is a field of analysis of biological characteristics of an individual. Its purpose is to recognize and automatically verify the identity of a person based on physiological or behavioral characteristics. Multi-modal biometrics which combining several biometric based systems, are increasingly studied. Indeed, they reduce some limitations of unimodal based biometric systems, such as the inability to acquire data of individuals or intentional fraud, while improving the recognition performance. These benefits of multi-modality with unimodal biometric based systems are obtained by fusing multiple biometric traits.

In this system, combining palm-print and Eye-Iris modalities to get the best of both worlds. They are recent and very important biometrics modalities due to their discriminatory power, robustness over time and there acceptability by users. To use, there characteristics must be extracted and enrolled for future comparison. The present proposed method is based on Histogram of Oriented Gradients (HOG) and Random Forest Transform (RFT) in order to improve the performance of the multi-modal biometric system based on palm-print and iris scan modalities. The results of the different classifiers are combined (fused) at the matching score level.

KEYWORDS: Palm-Print, Biometric, Iris, Normalization, Authentication, HOG, RFT.

INTRODUCTION

For protecting information and control the access to physical buildings and information systems, identification of persons is always an interesting question for research. previously, we were using traditional methods like passwords, key, PIN, or cards which are easy to guess now a days, might be forgotten, stolen, falsified, lost or damaged. All these problems can be solved by using biometric identification that is emerging as the most reliable because it is possible now to establish an identity based our physical biometric behavioural, rather than by what we remember, or what we possess.

Unimodal biometric systems using a single source of biometric information are often affected by some problems. These problems include noise in sensed data, non-universality, upper bound on identification accuracy, and spoof attacks. They make the error rates quite high and consequently it makes them unacceptable for deployment in securing applications. Some of the problems of unimodal biometric systems can be addressed by designing systems that used multiple sources of biometric information. In fact, the combination of several modalities improve the recognition performance by increasing the quantity of biometric information for each person. Also, using several modalities reduce the risk of record impossibility. For that, in proposed method, both the palmprint and iris are combined for solving the record impossibility limitation. These modalities are fused at the matching score level which is the most using fusion level used in multi-modal biometric system.

`The features, which represent the biometric characteristics of both the palmprint and iris scan modalities, are extracted using a most features extraction method whose the HOG descriptor. In the enrolment phase, the different features are concatenated in order to used as training vectors to a new machine learning method which is the RFT classifier. Thus, in identification phase, the same feature vector is extracted using the HOG method, then used for simulated the RFT classifier. Finally, to construct a multi-modal biometric system, the outputs of the both classifiers, palmprint and iris scan based systems, are fused in order to obtain a single score which is used for decision process.

PROPOSED SYSTEM

The proposed system is refers towards the combination of palm-print and the Iris recognition for human authentication. The system takes two image as the input, one is the image of palm print and other one is the image of Iris. Biometrics is a field of analysis of biological characteristics. Its purpose is to recognize and automatically verify the identity of a person based on physiological or behavioral characteristics. Multi-modal biometrics which combining several biometric based systems, are increasingly studied. Indeed, they reduce some limitations of unimodal based biometric systems, such as the inability to acquire data of individuals or intentional fraud, while improving the recognition performance. These benefits of multi-modality with unimodal biometric based systems are obtained by fusing multiple biometric traits. In this paper, Palm-print (PLM) and Iris modalities are combined to get the best of both worlds. They are recent and very important biometrics modalities due to their discriminatory power, robustness over time and there acceptability by users. To use, there characteristics must be extracted and enrolled for future comparison. The present proposed method is based on Histogram of Oriented Gradients (HOG) and Random Forest Transform (RFT) in order to improve the performance of the multi-modal biometric system based on PLM and Iris modalities. The results of the different classifiers are combined (fused) at the matching score level. In order to evaluate the proposed systems, a database of multiple persons is used. The obtained experimental results show the efficiency and reliability of the proposed systems.

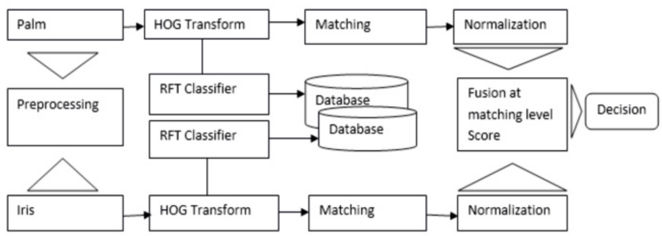

Fig. Architecture of proposed system

In our study, the features, which represent the biometric characteristics of both the PLM and Iris modalities, are extracted using a most features extraction method who's the HOG descriptor. In the enrolment phase, the different features are concatenated in order to use as training vectors to a new machine learning method which is the RFT classifier. Thus, in identification phase, the same feature vector is extracted using the HOG method, then used for simulated the RFT classifier. Finally, to construct a multi-modal biometric system, the outputs of the both classifiers, PLM and Iris based systems, are fused in order to obtain a single score which is used for decision process.

SYSTEM DESCRIPTION

The proposed system consists of pre-processing process, matching process, normalization and decision process. It is composed of two biometric based subsystems. Each subsystem exploits different biometric techniques which are PLM and Iris modalities. In fact, enrollment phase consists of taken a set of training PLM and Iris images from the users. A preprocessing process is necessary in order to align the image and segmenting the part necessary to use it in the features extraction module which extract only the pertinent information from the PLM and Iris modalities using HOG transform. All the extracted feature vectors are used to train RFT classifier in order to save them on the database. Figure shows the modules of the proposed multi-modal biometric system based on PLM and Iris modalities. For this multi-modal system, each subsystem compute its own matching score then, computed individual scores are normalized and combined into a unique score using fusion at the matching score level, which is used later by the decision module in order to make a final decision (identifying or rejecting the user).

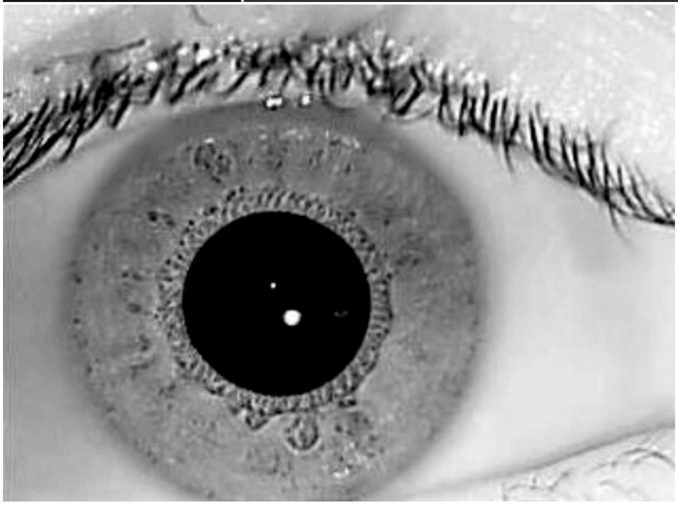

Fig. Iris

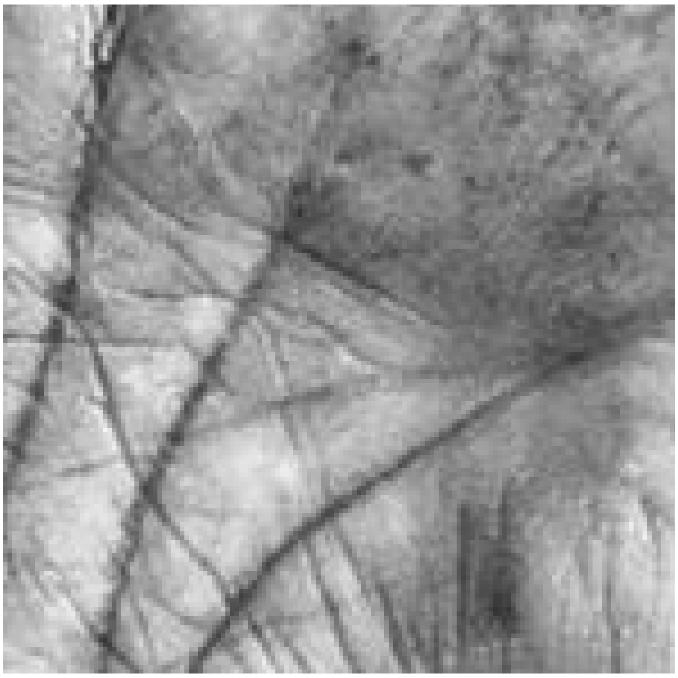

Fig. palm-print

A. Feature Extraction

The feature extraction is more influencing step on biometric based systems. It serve to build, from PLM and Iris images, a feature vector that represents better each user. This feature vector must be unique, distinctive and compact to the possible. In the proposed method, the feature vectors are formed by histograms representation which is produced by applying the HOG transform on both of PLM and Iris images. These feature vectors are enrolled in the system database as a RFT model. This model is constructed by training it using the feature vectors extracted from all enrolls users.

B. Histogram of Oriented Gradients (HOG)

This method became more used in objects recognition, and it gives excellent performance. Its purpose is to use the distribution of local intensity gradients or edge directions to give features of local object appearance and shapes of an image. In practical terms, the first step is calculating horizontal and vertical gradients of the image by filtering it with [- 1 0 1] and [- 1 0 1]T respectively. Then, the image is divided into cells. The histogram of gradient is calculated for each cell by accumulating local histograms of gradient directions or edge orientations over its pixels. Due to the illumination variations and other variability in the images, cells histograms are normalized, according to the magnitude of a gradient. Finally, these histograms are combined to form the HOG descriptor.

C. Random Forest Transform (RFT)

Among the classification methods, the random forest give a remarkable efficiency than the other used methods. Thus, this method is formed by several random decision trees. Each tree in the forest is constructed with different samples from the training set. For each tree construction, the decision at a node is made according to a subset of random variables. A new sample is classified by being put down each of the trees in the forest. Then, each tree gives a classification and the tree votes for that class. The forest chooses the classification having the most votes. The number of trees and the number of random split variables are necessary to forest growth.

FUSION STRATEGY

In a multi-modal biometric based system, information that come from each subsystem must be combined. This combination can be done at four levels sensor level, feature extraction level, decision level and matching score level. The last one is the most use kind of fusion because of its simplicity and effectiveness. In fact, scores coming from biometric based system using PLM and Iris are combined by five rules: sum score (SUM), sum-weighting-score (WHT), min-score (MIN), max-score (MAX) and Mul-score (MUL). Also, combined score are compared and the highest one is selected. However, the scores coming from different subsystems can be not be heterogeneous and they are not necessarily includes in the same interval, for that, a scores normalization process is necessary to make all the obtained scores in a same interval before combining (fusion).

CONCLUSIONS:

The system conclude that security is the prior focus for every small and big industries,IT companies are having tremendious data and it must be secured and thus new technologies and methodologies are being searched for securing these data. By using iris and palm print it may be possible to secure data to some extent. It is a perfect method for unique identification purpose. we are doing experiment on iris and palm print and after scanning, fusion is done and at last decision is taken at the matching level.

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