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A Palm Print Images-based Age and Gender Classification Using Image Processing Techniques

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ABSTRACT:

The development of secured system and automatic verification using biometrics has increases attention and become one of the most critical and challenging task. The physical and behavior identification such as face, finger print finger vein etc have been applied to identify criminals (or) also for recognizing the person identification with their behavior. A huge variety of biometric system have been used for the verification task. The purpose of using this project is to implement a biological recognisation for identifying gender and age using palm print image, which would be useful for today's situation of increased importance of security and organization, identification and authentication method had been developed into a key technology. This work developed to determine human age – range and gender using palm print analysis trained with Principle Component Analysis (for age class) and Discrete Wavelength Tranform (for gender class).

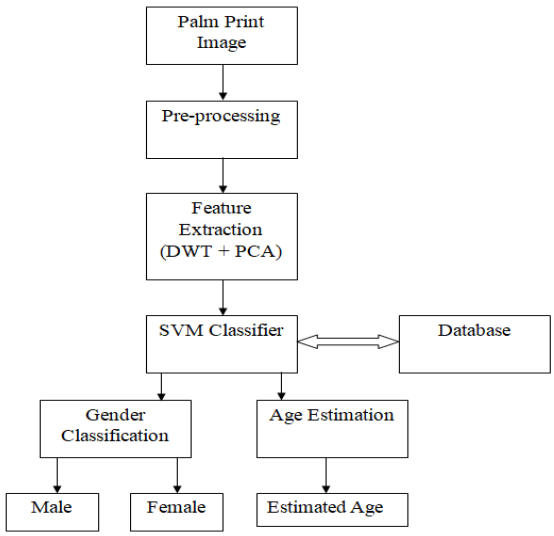
***Keyword*— Biometric, Palm print image, User identification.**

INTRODUCTION

The most important part which is used for the forensic investigation is palm print. The reason behind the project is it is more secure when compared to finger print. Pam print unique to individual, they serve as a highly accurate way for law enforcement agencies to identify a suspect, as well as potentially prove their guilt (or) innocence.

To identify of a user and authentication, there is high demand for personal identification and verification system. Biometrics provides the reliable, stable and unique personal physical characteristics like iris pattern, retina, fingerprints, palm print. Facial features (or) some human behavior like speech and handwriting. Palm print is preferred for identify matching if we compare it to some other identify matching methods such as iris or fingerprint because it is easy to capture palm print with any available device having low resolution with distinctive feature of users beside of that it contains some other features like principal line. Currently available input devices for iris are very costly and it also fears the users for adverse effects (or) their eyes.

FLOW DIAGRAM



RELATED WORK

A.) Age Identification

Generally palm print age identification is considered as a major problem. The palm print age estimation requires the following **:**

1) Palm print feature representation
2) Palm print context structure construction

3) Age prediction modeling

1)Palm Print Feature Representaion

This method seeks to represent the test sample as a linear combination of all the training samples in the feature space and then exploits the obtained linear combination to perform palm print recognition. We can implement the mapping from the original space to the feature space by using the kernel functions such as Radial Basis Function (RBF). In this method, the selection of the parameter of the kernel function is important. We propose an automatic algorithm for selecting the parameter. The basic idea of the algorithm is to optimize the feature space such that the samples from the same class are well clustered while the samples from the same class are well clustered while the samples from different classes are pushed far away. The proposed criterion measures the goodness of a feature space, and the optimal kernel parameter is obtained by minimizing this criterion. Experimental results on multispectral palm print database show that the method is more effective than 2DPCA, 2DLDA, AANNC, CRC_RLS, nearest neighbor method(NN) and competitive coding method in terms of the correct recognition rate.

2) Palm Print Context Structure Construction

These studies consider that the human age difference is influenced by the palm print context structure. In order to discover this structure, Guo et al. use OLPP to embed the palm print samples into a low dimensional manifold structure, which preserves the original neighborhood among the palm print samples. Xiao et al. learn a distance metric to preserve the contextual correlation among the neighboring palm print samples. Chao et al. propose IsRCA and IsLPP to extract the palm print features and the extracted palm print features both preserve the feature similarity and the label similarity between the neighboring palm print samples. Ni et al. learn a mapping function and consider all the samples being related and propagating their labels in this mapping space. The other studies consider that the palm print-related attributes (e.g., gender and race) also play an important role in describing the palm print context relationships. They predict the human age through reclassifying the palm print samples with the palm print-related attributes and their experiments show the difference of aging pattern between male and female. Futhermore. Guo et al. propose a "cross-population" learning strategy, which embeds different aging patterns into a common space and enforces the palm print samples with the semantically close palm print-related attributes to be correlated.

3.) Age Prediction Modeling

The existing efforts focus on designing the various age label predictors through classification or regression learning. Motivated by these studies, Guo et al. propose a mixture approach combining the advantages from both classification and regression approaches. Recently, Geng et al. observe that the human age can be represented by a set of adjacent age labels. Therfore, they propose "label-distribution" to replace the original age label, which improves the typical objective function of the age estimation problem. Specifically, they explicitly enforce a fixed-form prior assumption on the label distribution (i.e., "Gaussian" or "Triangle"), resulting in the inflexibility of adapting to complicated palm print data in practice. Furthermore, Geng et al. propose an adaptive label distribution learning approach, which considers that the label distribution varies with the temporal changes.

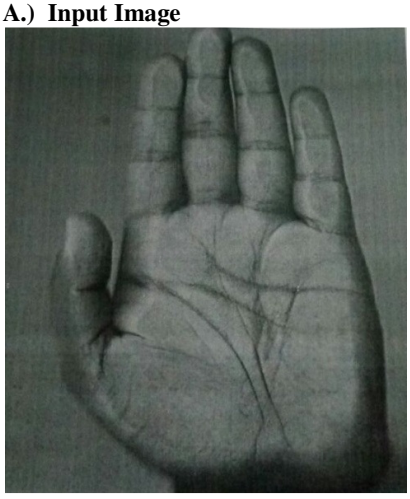
B) Gender Classification

Gender classification is an important task which in turn can enhance the performance of a wide range of application including identity authentication, human-computer interaction, access control, and surveillance, involving frontal palm print images. A large majority of gender classification approaches are based on extracting features from palm print images and then giving these features to a binary classifier. The feature extraction phase has been carried out by using either (a) appearance based methods (or) (b) geometric methods. In appearance based methods, the whole image is considered rather than the local features corresponding to different parts of the palm print. While, in geometric based methods, the geometric features like distance between eyes, palm print length and width, etc., are considered. For classification purposes, mostly neural networks, nearest neighbor method, linear discreminant analysis, and other binary classifiers are used. Automatic acquisition of attributes characterizing the person interacting with a computer makes it possible to conduct the dialog in the way that is best suited to predicted needs of the user. One of key features of (initially anonymous) interacting user is her/his gender. Automatic gender recognition can be considered as a method from the domain of biometry. In medical applications it is the source of important information of the interacting patient, especially in voice-controlled network applications, where e.g. emotional state of the patient may be important feature necessary to more precisely diagnose the patient (or) provide necessary aid. As pointed out in detection of emotional state can be in turn aided by the knowledge about patient gender.

PROPOSED SYSTEM

The main purpose of this system is to identify age and gender by using palm print image which is most effective.

A.) Input Image



B.) Preprocessing

Palm print recognition attracts more attention for personal authentication in recent years. A key issue to be solved foremost is preprocessing the image to gain a proper sub-area for feature extraction and matching. Due to the images obtained by a digital scanner without any constraint of pegs, distortions including rotation, shift and translation are contained in the palm images which make it hard to locate at correct position in the same direction. A modified preprocessing method with two rotations and two segmentations is proposed. The first rotation makes the acclivitous outer boundary of palm vertical, and then truncates the edge graph with eight intersections of four fingers. The gaps between index finger and middle finger, and that between the ring finger and little finger can be tracked. Align the two points and rotate the image to ensure the line horizontal as the basis of a precise coordinate system for extracting a fixed size region. 2D Gabor filters are used for feature extraction and the verification experimental results demonstrate the effectiveness of the proposed modified preprocessing method.

C.) Feature Extraction

1.) Discrete Wavelet Transformation

Calculating wavelet coefficients at every possible scale is a fair amount of work, and it generates an awful lot of data. If the scales and positions are chosen based on powers of two, the so called dyadic scales and positions, then calculating wavelet coefficients are efficient and just as accurate. This is obtained from discrete wavelet transform(DWT).

2.) Principle Component Analysis

Principle component analysis (PCA) is a statistical procedure that uses an orthogonal transformation to convert a set of observations of possibly correlated variables into a set of values of linearly uncorrelated varieties called principal components. The number of principal components is less than (or) equal to the number of original variables. This transformation is defined in such a way that the first principal component has the largest possible variance (that is, accounts for as much of the variability in the data as possible), and each succeeding component in turn has the highest variance possible under the constraint that it is orthogonal to the preceding components. The resulting vectors are an uncorrelated orthogonal basis set. The principal components are orthogonal because they are the eigenvectors of the covariance matrix, which is symmetric. PCA is sensitive to the relative scaling of the original variables.

ALGORITHM

```
1.  PalmIm = imread(nameIm);
2.  Val = rgb2gray(palmIm);
3.  width = size(Val, 2);
4.  lenth = size(Val, 1);
5.  widthArray = zeros(width, 2);
6.  lengthArray = zeros(length, 2);
7.  for x = 1; width do
8.        widthArray(x, 1) = x;
9.  for y = 1; length do
10.       lengthArray(y, 1) = y;
11.   If Val(x,y) != 0
12.      then
13.        widthArray(x, 2) = widthArray(x,2) + 1;
14.       lengthArray(y,2)=lengthArray(y,2) + 1;
15.    end if
16.    end for
17.    end for
18. maxWidth = max(widthArray(:, 2));
19. maxLength = max(lengthArray(:, 2));
20. ratio = maxLength % maxWidth;
```

CONCLUSION

This paper proposed that the system has been proposed for user identification based on unique biometric feature. It also provides more security to the users. It achieves the authentication easily with less time. The system has high accuracy of 99% and precision 91% to recognize the palm print. The sensitivity of 76% and specificity 99% to recognize the palm print.

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