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Principal Lines Region of Interest Extraction Method for Palmprint

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***Abstract*— Biometrics is now associated with the use of unique physiological characteristics to identify an individual next association is security and verification. A biometric system is a pattern recognition system that operates on biometric data which is collected from an individual. There are different biometric systems are available and universally accepted. In this paper we have discussed different principal lines extraction techniques. The proposed system is used for recognition. we have proposed a principal line extraction technique based on coarse segmentation. Susan, niblacks methodology are used in combination for feature extraction. In this paper we discussed the region of interest extraction method for principal lines.**

***Keywords*— Eigen transform, pca, haar, binarization, dwt**.

I. INTRODUCTION

Palmprint based biometric system can be of two types: identification in which an individual is recognized, and verification in which an individual is verified or authenticated. In this paper we are going to take an overview of the biometric system based on palmprint. The area between base of fingers and wrist is known as palm area. It has larger skin area and contains different line features. The inner surface of the palm normally contains three flexion creases, minor creases and ridges. The flexion creases are also called principal lines and the secondary creases are called wrinkles. The flexion and the major secondary creases are formed between the third and fifth months of pregnancy [4]. The major crease or flexion crease are formed because of folding of hand, these are the permanent feature of palm and can be used for recognition or as identification methodologies. It consists of different stages such as input stage where palmprint image is given as input to the system. Region of Interest Extraction stage in which the area containing the major lines are get extracted from the image. Feature Extraction stage in which the principal lines are obtained and used as matching characteristic. In this paper we are concentrating on feature extraction methodologies used for principal lines. The first task of the system is to extract region of interest. The region of interest contains the principal lines features. The techniques used for ROI extraction are discussed. After the ROI extraction the next step is to extract the features. Principal lines extraction is an edge detection problem the methods are used.

II. LITERATURE SURVEY

The different techniques used so far are mainly transform based techniques and different algorithms. Some of them are discussed here. The various Transforms are coding models which are used on a wide scale in video/image processing. Transforms are often applied in order to extract the correlation that resides in an image and its neighboring pixels. Thus, one can obtain information about the image by analyzing its neighbors [1]. A transform is a paradigm that on application to an image de-correlates the data. In most transformation techniques, the data is found to be compacted into one or more particular corners. Such Transforms generally polarize most of the high frequency information in discrete parts or patterns of the Transformed Image. We cut back out these detailed portions and term them as fractional coefficients. Performing pattern recognition on these cropped out images provides us with a much greater accuracy than with the entire image.

The Eigen transform is a newer transform that is usually used as a component of Principal Component Analysis (P.C.A.). The Eigen Transform is unique as in it provides essentially a measure of roughness calculated from a pixels surrounding a particular pixel. The magnitude specified which each such measure provides us with details related to the frequency of the information [2].All this helps us to obtain a clearer picture of the texture contained in an image. The Eigen transform is generally given by Equation

$$Q(t,f) = \sqrt{\frac{2}{n+1}} \times \sin\frac{tf\pi}{n+1}$$

The Haar transform is the oldest and possibly the simplest wavelet basis, as seen in Equation [3][5]. A Haar Wavelet used high-pass filtering and low-pass both filtering and works by incorporating image decomposition on first rows of image and then the columns of image. It provides us with a representation of the frequency as well as the location of an image's pixels.

$$(t) = \begin{cases} 1, & 0 \le t < \frac{1}{2} \\ -1, & \frac{1}{2} \le t \le 1 \\ 0, & \text{otherwise} \end{cases}$$

In this methodology [8] a probability distribution template of major line is generated. Texture feature were obtained by applying dual tree complex wavelet onto palmprint image. The two features accompaniment each other well and the method can improve recognition accuracy. A probability distribution template of major line is generated from the palmprint image on the first level, then dual tree complex wavelet is applied onto palmprint image to obtain texture feature on the second level. Dual tree DWT has the advantages of approximate shift invariance, good directional selectivity, computational efficiency and low redundancy, that why it can be used to analysis palm texture effectively. In this the dual tree complex transform has two parallel wavelet trees that are constructed with traditional orthogonal wavelet filters. One is odd length high-pass filter, the sample sequences is even-symmetric about its mid-point; the other is even length high-pass filter and is odd-symmetric about its mid-point. They turn out to be the real part and virtual part of complex wavelet after odd and even filtering alternatively. The decomposed image results in six wavelet sub-bands on each level. The transform redundancy degree is 4:1. Compared to traditional wavelet, the dual tree complex wavelet can be easily reconstructed besides its approximate shift invariance and good directional selectivity properties [8].

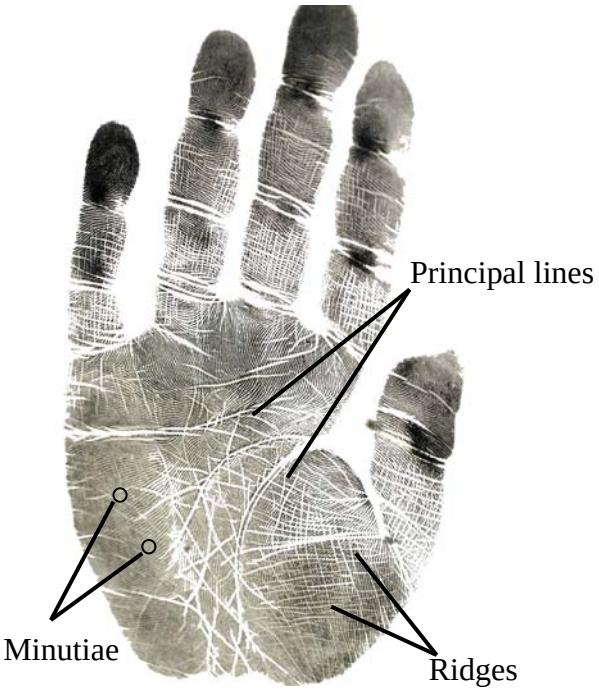

Fig 1: Human Palmprint with line features

III. PROPOSED METHODOLOGY

The fig 1 shows human palm with its features. our system is designed to extract the principal lines as an means of recognition. The proposed system has basic stages as shown in fig 2. Firstly we have to give input to the system the palmprint image then the following operations are performed on (1) image pre-processing,(2)feature extraction and (3) feature matching.

A. Binarization

Binarization technique is used to extract the foreground objects from the background. It is an important step to convert a grayscale image into a binary form. By applying the mode method [6] the histogram of a grayscale image is analyzed first to automatically determine a local minimum between two local maxima as a threshold. When a grayscale value is lower than this threshold value, we set the pixel value as '0'; otherwise, the pixel value is set '255' to segment the palm shape.

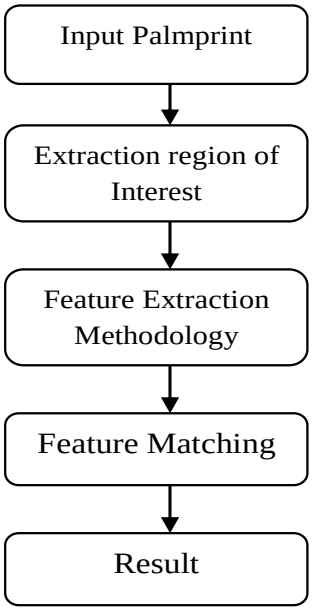

Fig 2: system structure

B. Border tracing

The border tracing algorithm is used to trace the boundary of human palm [6] starting point Wm is set at the middle point of the intersection line segment formed by the wrist and the bottom margin of the palm shape. Then, all contour pixels of the palm shape are traced in the anti-clockwise direction. The eight neighboring directions are applied to describe the relative position of those traced points more precisely. The coordinates of contour pixels would be recorded sequentially as p1, p2, p3.. . .pn

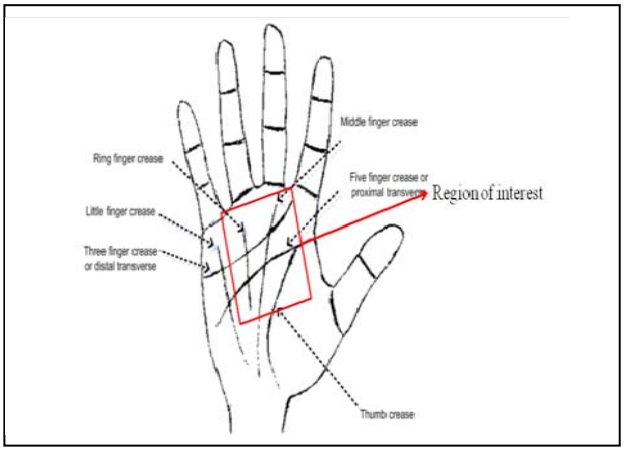

Fig 3: Region of interest

C. ROI extraction

ROI extraction is an important step and it affects the final recognition results. Most of the existing methods extract ROI according to some key points between fingers or in palm boundary, or some external factors [7]. Two-key-points-based ROI extraction method is used. It first searches for the two key points as the two valley points one is between the forefinger and the middle finger, and the other one is between the ring finger and the little finger; then, a coordinate system can be set up as per the two key points; and the ROI can be extracted as a constant square under this coordinate system. [7]

IV. CONCLUSIONS

Biometric system has gain more appraisal due to reliability and its robustness. The proposed region of extraction methodology gives a good base for further processing of image. The proposed technique successfully extracts the region of interest for the system.

REFERENCES

[1] Syed Ali Khayam., "The Discrete Cosine Transform (DCT): Theory and Application." ECE 802-602: Information Theory and Coding. Seminar 1.

[2] 16Abdu Rahiman, V. Gigi C.V."Face Hallucination using Eigen Transformation in Transform Domain" International Journal of Image Processing (IJIP) Volume(3), Issue(6).

[3] Dr. H.B. Kekre, Archana Athawale, Dipali Sadavarti "Algorithm to Generate Wavelet Transform from an Orthogonal Transform" IJIP Volume (4), Issue(4).

[4] M. Cannon, M. Byrne, D. Cotter, P. Sham, C. Larkin, E. O'Callaghan, Further evidence for anomalies in the hand-prints of patients with schizophrenia: a study of secondary creases, Schizophrenia Research 13 (1994) 179–184.

[5] Mohammed Alwakeel, Zyad Shaahban, "Face Recognition Based on Haar Wavelet Transform and Principal Component Analysis via Levenberg- Marquardt Backpropagation Neural Network." European Journal of Scientific Research. ISSN 1450- 216X Vol.42 No.1 (2010), pp.25-31.

[6] BI Wu-zhong, YAN Gao-shi. Detection Algorithm of Small Target Based on Improved SUSAN Principle. LASER & INFRARED, vol. 36, pp. 504-507, 2006.

[7] D. Zhang, A. W. K. Kong, J. You, and M. Wong, "On-line palmprint identification," IEEE Trans. Pattern Anal. Mach. Intell., vol. 25, no. 9, pp. 1041–1050, Sep. 2003.

[8] J Leqing Zhu, Rui Xing, Hierarchical Palmprint Recognition Based on Major Line Feature and Dual Tree Complex Wavelet Texture Feature, 2009 Sixth International Conference on Fuzzy Systems and Knowledge Discovery, 978-0-7695-3735-1/09 $25.00 © 2009IEEE.

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