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A Survey on Improved Authentication Technology-Contactless Palm Vein Recognition

Vaishnavi N. Chaudhari¹, Vijay B. Baru²

¹PG Student, Dept. of Electronics, Sinhgad College of Engineering, Savitribai Phule Pune University, Pune, India

²Associate Professor, Dept. of Electronics, Sinhgad College of Engineering, Savitribai Phule Pune University, Pune, India

ABSTRACT: Local binary patterns (LBP) are a type of visual descriptor used for classification in computer vision. LBP is the particular case of the Texture Spectrum model Local binary pattern (LBP) is well known for the surface representation attributable to its segregation capacity and computational effectiveness, yet when used to portray the scanty surface in palm vein pictures, the separation capacity is weakened, prompting lower execution, particularly for contactless palm vein coordinating. In this project, an enhanced shared frontal area LBP strategy is exhibited for accomplishing a superior coordinating execution for contactless palm vein acknowledgment. In the first place, the standardized angle based maximal foremost bend calculation also, k-implies strategy is used for surface extraction, which can adequately stifle commotion and enhance exactness and strength. At that point, a LBP coordinating procedure was embraced for comparability estimations on the premise of removed palm veins also, their neighbourhoods, which incorporate by far most of helpful particular data for ID while dispensing with obstruction by barring the foundation. To further improve the LBP performance, the matched pixel ratio was adopted to determine the best matching region (BMR). Finally, the matching score obtained in the process of finding the BMR was fused with results of LBP matching at the score level to further improve the identification performance. A series of rigorous contrast experiments using the palm vein data set in the CASIA multispectral palm print image database were conducted.

KEYWORDS: Local Binary Pattern, K means Method.

I. INTRODUCTION

Authentication technologies are used in many places in security awareness, with increasing financial activities which are followed by the development of science, technology and the progress of society. There are traditional authentication such as passwords, personal identification numbers, smart cards has been largely incapable of meeting the requirements of convenience, reliability and security in a wide range of civilian applications[1].

There are large numbers of biometric technologies available to individuals which can be used by them during their day to day life. The most common among these techniques such as face recognition, finger print recognition, voice recognition and Iris recognition are readily available even for those using smart phones, Sclera vein recognition is also the human identification method[2]. Contactless design is more preferred as it offers more hygiene. However, the face can be obstructed by hair, glasses, hats, scarves, and also facial characteristics can vary according to lighting conditions or viewpoints, which cause performance degradation in real-world applications. Fingerprint and palm print recognition is also a widely used identification technique, but the contact acquisition mode, requiring contact with a sensor, may be regarded as unsanitary and result in user resistance. In addition, under some conditions, such as in factory or construction sites, foreign matter, such as oil on the fingers, moisture, and dirt, will also have a negative effect on recognition performance.

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Local binary pattern(LBP) is popular for texture representation owing to its discrimination ability and computational efficiency. We introduce an improved mutual foreground LBP method with gabor filter is presented for achieving a better matching performance with high accuracy for contactless palm vein recognition. Local binary patterns (LBP) are a type of visual descriptor used for classification in computer vision. LBP is the particular case of the Texture Spectrum model proposed in 1990. LBP was first described in 1994. The question arise is that, "What is Palm Vein Recognition?" The biometric technology that authenticates users on the basis of vein pattern recognition rather than iris scans or fingerprint readers. Palm secure is the biometric authentication device that provides the highest level of security using palm vein authentication technology.

These authentication techniques are mainly used for security purpose and for enhancing human-machine interaction. But these biometrics information can be easily forged which leads to weak security. Since vein information is internal to the human body, it is very hard to duplicate. A vascular pattern of an individual's palm is used as personal identification data for palm vein authentication. Palm vein pattern is unique biometric identity feature of the human beings which more efficiently secure our data from unlawful intervention compared to other existing biometric techniques. The main application includes banking, government offices, hospitals and passport issuing.

II. MOTIVATION

Biometric recognition, or simply biometrics, refers to the use of distinctive anatomical and behavioural characteristics or identifiers (e.g., fingerprints, faces, iris, voices, and hand geometries) for automatically recognizing an individual. Since it is difficult to misplace, forge or share biometric identifiers, biometric recognition is more reliable than traditional token-based methods and knowledge-based methods (e.g., passwords or PINs). Besides, biometric recognition also promises better security, higher efficiency, and better user experience in many cases[1]. Due to these advantages, biometric recognition systems have been extensively deployed and employed in a large number of government agencies and daily applications.

III. OBJECTIVES

The objectives of paper are listed below:

1. To introduce hygienic technique for authentication.
2. To understand the different methods of identification and verification.
3. Develop (MPC) algorithm and k-means method used for texture extraction.
4. To find the best matching region (BMR)
5. Find matching score of the BMR.
6. To improve the LBP performance, improve the accuracy and robustness.
7. To demonstrate that local binary pattern(LBP) method is feasible and effective for contactless palm vein recognition.

IV. LITERATURE SURVEY

(1) In paper "Human identification using palm-vein images," Y. Zhou and A. Kumar, In this paper, the author has given a Statistical-based methods employ statistical information, such as the local binary histogram and moments, and can be categorized into global and local statistics methods. For example, local statistical based methods include local binary patterns (LBPs), local derivative patterns (LDPs), and their variants which are also sensitive to scaling, rotation, and displacement. Global statistical-based methods consist of invariant moments, which are invariant to scaling, rotation, and displacement, wavelet moments, gradient fields, and so on.

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(2) In paper “A finger-vein verification system using mean curvature,” W. Song, T. Kim, H. C. Kim, J. H. Choi, H.-J. Kong, and S. R. Lee. In this paper, the author has given a Geometry-based methods which are derived from fingerprint and palmprint recognition that utilize approximate line-like, curve, and point information, which are highly dependent on the chosen coordinate system. Hence, the region of interest (ROI) extraction and position calibration must be considered in advance. Generally, geometry features pose difficulties in extraction, representation, and matching, as well as suffer from information loss owing to small and/or blurred textures. Therefore, these methods have poor distinguishing ability and are also sensitive to scaling, rotation, and displacement.

(3) In paper “Contact-free palm-vein recognition based on local invariant features,” W. Kang, Y. Liu, Q. Wu, and X. Yue. In this paper, the author has given a Local invariant-based methods, inspired by the approaches emerging from computer vision, such as SIFT, SURF, ORB, extract local invariant features directly rather than first employing preprocessing. However, owing to the lack of grayscale shift and corners, the number of extracted local invariant feature points is small and also exhibit large intraclass changes; therefore, some image enhancement should be performed before local invariant-based methods are adopted for palm vein identification.

(4) In paper “Personal authentication through dorsal hand vein patterns,” C.-B. Hsu, S.-S. Hao, and J.-C. Lee, In this paper, the author has given a Appearance-based (subspace-based) methods, including PCA, LDA, ICA, NMF, and their kernel version, manifold method (OPNN), take subspace coefficients as features without prior knowledge. These can be separated from the above mentioned methods and viewed as an issue in the pattern recognition domain. Appearance-based methods are utilized for feature extraction, adopting both artificial intelligence and machine learning methods for classification.

IV. PROPOSED SYSTEM

The block diagram of the existing system is given below. The approach based on mutual foreground LBP (MF LBP) for contactless palm vein identification. Here, first the normalized gradient-based maximal principal curvature (MPC) algorithm and k-means method are utilized for texture extraction. This approach can effectively suppress noise and improve accuracy and robustness for texture extraction, which lays a good foundation for the following processing steps. Second, based on the results of texture extraction, an LBP matching strategy was adopted for similarity measurements between the mutual foreground (MF) of grayscale images. The MF is composed only of the extracted texture and its neighborhood of a grayscale image, which include the vast majority of useful distinctive information for identification while eliminating interference by excluding the background. In addition, it is observed that adopted the maximal matched pixel ratio (MPR) to find the best matching region (BMR), which can further improve the performance of LBP matching. Third, the matching score obtained in the process of finding the BMR was fused with the results of LBP matching at the score level to further improve the identification performance. First; the MPC image is obtained by gradient normalization. To acquire the palm vein texture image, k-means method is adopted for the MPC image segmentation. Subsequently, we perform MPR matching on the obtained palm arranged into different bins to vein texture image and both the MF and Matching score 1 are obtained. In addition, the LBP code is calculated directly from the MPC image, and LBP histogram matching is performed on the MF to obtain Matching score 2. The final recognition results are achieved by the score-level fusion strategy on the formerly obtained matching scores. Rigorous experiments demonstrate that proposed method attains superior recognition performance and reduces the influence from irrelevant palm regions. The below algorithm explains Texture Extraction of Palm Vein Images.

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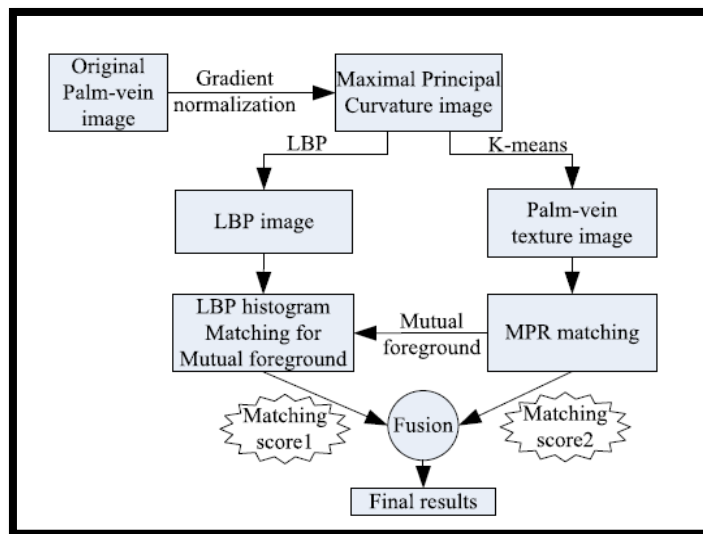


Fig.1 Schematic overview of the proposed approach

There are multiple methods used in this vein pattern verification, there are taking the inputs as palm vein (front side of hand), palm dorsal (back side of hand) and finger veins for identification.

V. CONCLUSION

Local binary patterns (LBP) are a type of visual descriptor used for classification in computer vision. Various studies have used LBP for vein image recognition because of its higher surface representation capacity. Be that as it may, most studies worked on the whole picture, while the reality remains that every locale has a one of a kind commitment to biometric ID through the LBP calculation. We inspired by past studies, Proposed a coordinating methodology as far as parcelling of the LBP histogram inside the vein and its neighborhood and near trials exhibited that proposed strategy can highlight the surface in palm vein pictures and accomplish better acknowledgment execution. To enhance the coordinating exactness of the to-be-coordinated districts from contactless palm vein pictures, the MPC of the standardized angle and k-implies division, and additionally 8-neighborhood inclination module estimation strategies, were used for surface extraction of palm vein ROI. The MPR approach was received for figuring the coordinating score 1 and the ideal coordinating district. In view of the ideal coordinating area, sub-piece histogram coordinating was performed for the LBP code of the vein and its neighborhood, what's more, the coordinating score 2 was likewise acquired. At last, SVM was used for score-level combination of the two previously mentioned coordinating techniques to enhance the acknowledgment execution for contactless palm vein pictures. Despite the fact that MPR coordinating is a middle of the road venture of MF LBP coordinating, it contributes a huge measure of correlative data with MF LBP coordinating, which makes the last execution of our technique enhance generously when SVM is received to intertwine the scores of the two coordinating systems. This technique takes full favourable position of all data produced in the count of MF LBP. To exhibit the viability of this technique, the CASIA Multi-Spectral Palm print Image Database, including 600 pictures from 100 people, was received for testing and an EER of 0.267% was accomplished but also can use the database of 5-10 people in which 5 palm images per person.

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BIOGRAPHY

Vaishnavi N. Chaudhari is a student in the Electronics and Telecommunication Department, Sinhgad College of Engineering, Savitribai Phule Pune University. She received Bachelor of Engineering degree in Electronics and Telecommunication Engineering in 2015 from SGBAU, Amravati, MS, India. Her research interests are Image processing, Signal processing and Communication networks.

Vijay B. Baruis Associate Professor in the Electronics and Telecommunication Department, Sinhgad College of Engineering, Savitribai Phule Pune University. He has received Master of Engineering (M.E.) degree in Electronics & Telecommunication Engineering from Government College of Engineering in 1996. He is a member of ISTE and IETE. His main areas of interest are Analog circuits and its applications, Electronic circuit and product design, Image and video processing and Multimedia techniques.