

Latent Overlapped Fingerprint Matching Using Level-2 and Level-3 Features Refinement

Rajasekar .T¹, Uma Maheswari.N²

¹M.E Scholar, Computer Science & Engg, PSNA College of Engineering and Technology, Dindigul.

²Professor, Computer Science & Engg, PSNA College of Engineering and Technology, Dindigul

Abstract

Fingerprint is the most important for the identification of crime scene investigation. Fingerprint technology is not a destroyable one at any time from the early of 20th century. A latent fingerprint is an important main source of the forensic evidences in the court of law. Overlapped finger prints are encountered in latent fingerprints. An automatic match of both latent fingerprints and rolled or plain fingerprints with higher accuracy is important for these applications. A latent impression is of typically of bad quality with detectable background noise which makes the feature extracting and matching of the latent is a notable problem. The problem has been solved by performance gain via feedback from exemplar prints. To solve the problem level-2 and level-3 were proposed. In Level -2 features like minutiae ridge ending, bifurcation is to be introduced. Similarly the level-3 pores like open pores, closed pores fingerprint images also to be introduced.

Keywords: Fingerprint, forensic, overlapped, automatic, feature extracting, bifurcations.

complex chemical or are unphysical method. Latent prints, in particular, are of critical value in forensic applications because they are usually encountered at crime scenes and serve as crucial evidence in a court of law.

INTRODUCTION

Fingerprints have been most widely used to determine the identification of an individual's ones or to verify the claim identity in both the civilian and law enforcement applications. In court of Law agencies; in particular, has been used for finger prints for identifying suspects since the late 19th century. The identification division of the Federal Bureau of Investigation (FBI), for instance, was established in 1924, and it currently has finger prints of more than 70 million numbers such, including over than 34 million civilian subjects, on record. Based on the acquisition process, fingerprints can be broadly categorized into one of the following three types,

- (i) rolled finger prints which will contain almost all of the ridge full details that are captured by rolling a finger from the nail-to-nail,
- (ii) plain or slap finger prints which are required by pressing the finger on a plain surface,
- (iii) Latent fingerprints¹ which are partial impressions of the finger inadvertently left behind on the surface of objects when they are touched or handled. They are either captured photographically or lifted from objects using

The Rolled and plain impressions (collectively called exemplars²), in general, are good quality fingerprints acquired under expert supervision either at the time of enrolment or booking (of suspects). They usually contain sufficient amount of discriminatory ridge valley

2 PROPOSED SYSTEM

2.1 System Overview

The proposed system consists of an level-2 and level-3 have been successfully used in forensics and law enforcement applications. Fingerprint matching at last it is commonly divided in to one of the. These two categories are

- (i) Matching.
- (ii) Score fusion.

Feature analysis uses first order, second order, and global features. ANFIS (Adaptive Neuro Fuzzy Inference System). Is a classifier classifies the fingerprint depending on the input and it will display the result according to the threshold values. Here the levele-2 Minutiae likes' ridge ending and bifurcations are determined. Normally like level-3 pore like open pores and closed pores are determined. These two levels are in matching normally the overlapped and the latent overlapped fingerprints are

determined. Which is compared or matched with the databases. The human delineates of the pathology bearing regions (PBR) score fusion determines the result of the two fingerprint results and a set of anatomical landmarks of the image when it is subject's fingers are searched against.

2.2 FEATURE ANALYSIS

In the feature analysis are like first order feature analysis, second order feature analysis, global features. The feature analysis use so many formulas normally 1.first order features are calculated for the given input image below. (i) Median is the numerical value separating the higher half of a the data sample, a population, or a probability distribution from the lower half is determined .(ii) variance is the measures of numbers to be spread zero variances denotes that all the values are identical variance is always non negative or a small variance. Skewness is a measure of the asymmetry of the probability distribution of the real-values random variable about it mean. The skewness value can be an either positive or negative or even undefined. (iv)Kurtosis measure of the "peakedness" of the probability distribution of real-valued random variables. In a same way to the concepts of skewness, kurtosis are the way of the descriptor and shape of the probability distribution and it is just for the skewness at so many ways of quantifying it for a theoretical distribution and corresponding ways of estimating it from a sample from a population. There is various interpretation of kurtosis, and of how particular measures should be interpreted; these are primarily peakedness (width of peak), tail weight, and lack of shoulders (distribution primarily peak and tails, not in between). (v) Coefficient of variance the coefficient of variation should be computed only for data measured on a ratio scale, as these are measurement that can only take non-negative value. The coefficient of variation will not have any meaning for data in the period of scale.

Second order is an extension of the first order logic in which it is the extension of the conditions. Second-order logic is the extended way by the higher-order logics (i) energy is a property of a objects, which will be a transferring among the same a fundamental interactions that can be converted in form but they are not created or destroyed (ii) homogeneity is defined as the quality or state of being homogeneous It also means having a uniform structure throughout (iii) correlation is the measures of the images with its neighbour pixels of entire image management.(iv)contrast - a measure of the intensity contrast between the pixels to its neighbour one image . 3. **Global features** to extract the Ride distance and the ridge frequency. One of these such domain is a medical radiology for which it is a clinically useful and provided information in an image of typically consists of an gray level variations in the highly localized regions of the image. Nowadays it is not a possible to extract all those regions by automatic image segmentation techniques. That are notified all this problems the persons have implemented a human-in-the-loop a physician-in which the more specifically approaches in which

entered in to the database. From the regions that are marked, these approaches is to applies the low-level computer vision and the image processing algorithms is to extract the features related to the variations in the gray scale image, texture, shape. To extract the features is to create a indexing that will be characterizes the image level. It will form the image-based on the query of of the PER. (i) Ridge distance: The system that extracts the relevance image in to features, that it will compute the distance of an image query of in the database for the matching or combined once and it retrieves an image that is needed to extracted the images. These approach are based on the consumption of the medical image characteristics. This main focus of the paper is to assess the utility of localized versus global features. The average ridge distance of fingerprint images is a very important parameters for the fingerprint images enhancements, which will mostly affect the performance of the fingerprint recognition or retrieval. A method that is efficient on the ridge distance and the estimation is based on the typical image of the blocks is to proposed. The obtained some of the typical candidates images in to the blocks by the initial selection according to the orientations and the curvature of each of the block; Then the better quality of these blocks from the candidates blocks are to selected by taking the quality of the strategy into one, The remaining blocks is to use to compute ridge distance using statistical window method in which it is finally an average ridge distance is estimated through its averaging several ridge distances in the lifted blocks. The experimental results show that these methods is fast enough to for all real applications and it is robust and reliable on estimating the average fingerprint ridge distance and the ridge frequency.

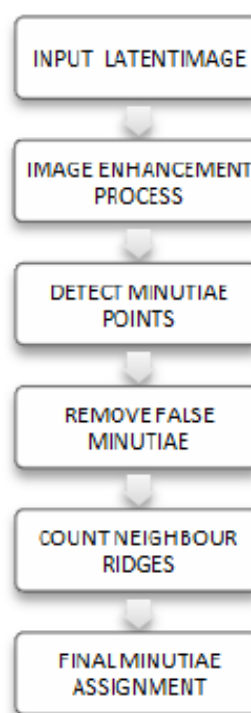
3.GLCM (Gray Level Co Occurrence Matrix) gray level co-occurrence matrix calculates several values in the GLCM of the image I. Element (1,1) in the GLCM contains the values in 1 because that there is a only one instance of an image where it has the two horizontally adjacent pixels and it has the values 1 and 1. Element (1, 2) in the GLCM contains value 2 because that there is a two instances in the image where.. Gray co matrix continues this processing to fill in all the values in the GLCM indicates that data points tends This work is a study about the fingerprint ridge distance and presents an efficient algorithm to estimate the values of local ridge frequency and the most of the fingerprint images are enhancement in the algorithms are to use in anisotropic filters with the highly frequency response. Therefore, ridges frequency, as global features of fingerprint is to verify the important of an image pre processing methods used in the automatic fingerprint identification system (AFIS). In proposed algorithm, through the use of fingerprint direction of these images of the frequency values are to be calculated directly without the use of an computationally of an expensive spectral analysis.

4. FEATURE EXTRACTION

Feature extraction process Level-2 and Level-3 is determined. Level-2 likes Minutiae and Level-3 like pores in which these detection can be done on pores which are to be open and closed pores. Minutiae are the most major features of a fingerprint like ridge ending abrupt of a ridges. Ridge bifurcations a single that can be divided in to two ridges. Transforming the input data or input images in to the set of features is known as a feature extraction.

4.1 MINUTIAE

Minutiae in the fingerprint are context and the various ridges are to discontinuities of an fingerprint. There are more than the 100 different types of minutiae's have been identical among in which the ridge bifurcations and ridge endings are the most widely used one. Minutiae-based methods have been used in many commercial fingerprint matching systems. Based primarily on a point pattern matching model, these methods rely heavily on the accuracy of minutiae extraction and the detection of land marks such as core and delta for the pre alignment and spurious are missing minutiae in both introduce. Taken together, the problem is leaded the sub-optimal and matching accuracy is estimated. The contextual information will provide by the ridge flow and their orientation in the neighbourhood to detect the minutiae that can be help to eliminate the spurious minutiae while combining the absence of the smoothly missing minutiae both and before during these matching. With an addition of the coupled with a high core detection algorithm that can be robustly handled by missing or partially available in landmarks for the pre-alignment same wise to improvement the matching accuracy can also be expected. Firstly the review of a fingerprint feature is to the extraction of an minutiae representation and its registration which are the important factors of the fingerprint matching algorithms.



4.1a.

Minutiae Process

With an addition of the coupled with a high core detection algorithm that can be robustly handled by missing or partially available in landmarks for the pre-alignment same wise to improvement the matching accuracy can also be expected. Firstly the review of a fingerprint feature is to the extraction of an minutiae representation and its registration which are the important factors of the fingerprint matching algorithms.

4.2 PORES

Latent Fingerprint Indexing: Fusion of Level 1 and Level 2 Features. Introduced an indexing technique primarily based for the latent's, that combines the multiple level 1 and 2 features to the filter in a large portion of the background and database with maintaining a latent matching accuracy. These consist of an combines the minutiae and singular points bases on the and orientation field and the frequency and information. These approach consists of an combining the constrained based on the version of the three indexing .Indexing and a new orientation field is a descriptor indexing technique that uses an hash function and filtering based on the single points that is an averaged ridge period comparison. Orientation field descriptor indexing is carried out first by converting the descriptor in a binary vector, using a hash function, similar to as above. The indexing score based on each one of these specific features is combined to obtain the final indexing score.

Coarse to the Fine Ridge Structure Dictionary. Latent fingerprint matching is playing a critical role in an identification suspects and criminals. They also compared with the rolled and plain fingerprint matching and latent identification accuracy is significantly lower due to complex background noise and poor ridge quality and overlapping

structured noise in latent images. To reduce this mark up cost and to improve the consistency in feature mark up, fully automatic and highly accurate latent matching algorithms are needed to improve these algorithms. In this paper, a dictionary-based approach is proposed for automatic latent segmentation and enhancement towards the goal of achieving lights-out/latent identification systems. These can be further improved with the followings 1) direct matching with the accuracy. 2) A better performance of the results. 3) Improve the computational efficiency of the algorithm. The proposed algorithm outperforms the level-2 and level-3 is proposed.

CONCLUSION AND FUTURE WORK

Separating such an overlapped fingerprints into the component fingerprints is an important use of latent fingerprint identification. Latent fingerprints founded at the crime scenes will provide crucial evidence in the law enforcement agencies. The latents are typically searched against a large fingerprint database which is the collection of rolled or plain fingerprints of previously. Apprehended criminals due to the poor quality of the latent's to deal with complex background noise in the latent, we propose incorporating feedback from

- Exemplar feature is to extract the latent with the eventual goal of improving the latent matching accuracy.
- We devise a method to use information in exemplar for refining the latent features and then develop a feedback paradigm to use the refined latent features to resort the candidate list based returned by a latent matcher. An experimental result shows a good improvement in the latent matching accuracy using the feedback mechanism.
- We also propose global based criteria to decide if feedback is needed for a latent query. A local based quality of a based criterion is used to determine that the regions are the latent to identify the regions in an exemplar for providing the feedback.

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