

A NEW APPROACH OF ALTERED FINGERPRINTS DETECTION ON THE ALTERED AND NORMAL FINGERPRINT DATABASE

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Abstract

The Research work of this paper is to investigate the current techniques for Altered fingerprint detection. Pattern recognition modalities being used in the world are fingerprint, footprint, palm print. But these pattern recognition methods cannot identify the persons having altered finger. The objective of this research work is to propose an algorithm for Detection. The Proposed method for Detection is one of the most reliable methods of personal verification. This can be widely used in Criminal Identification, Access Authority Verification, ATM verification and many other citizen centric applications. The Proposed method SVM-KERNEL is effective search method over the large clustered fingerprint database.

Keywords: Altered Fingerprints, Detection, SVM-KERNEL, Verification, Identification

1: Introduction

The fingerprint recognition system is used for person authentication and identification in industries and many commercial applications. The fingerprint recognition does not have the efficiency in the case of fake fingerprints.

The recent research in pattern recognition is identification of alteration and to overcome the problem of existing security systems. Literature survey on the following papers was performed to select the reliable method for our research work.

A novel approach [1], is proposed to reconstruct fingerprint images from standard templates and examines to what extent the reconstructed images are similar to the original ones. The efficacy of the reconstruction technique has been assessed by estimating the success chances of a masquerade attack against nine different fingerprint recognition algorithms.

In [2] this paper, the spectral minutiae representation is a novel method to represent a minutiae set as a fixed-length feature vector, which enables the combination of fingerprint recognition systems and template protection schemes. This method is compatible with large minutiae databases and cost for integrating this new scheme is relatively low

In [3] Novel SVM algorithm is suitable for large data set and easily to identify the low quality of fingerprints by the large number of training set

In[4],local orientation is used for detection of altered fingerprints and this method could identify the 92% of the low quality fingerprints.

In Latent Fingerprint matching [6], propose a system for matching latent fingerprints found at crime scenes to rolled fingerprints enrolled in law enforcement databases which overcomes the difficulties in poor quality of ridge impressions, small finger area, and large nonlinear distortion. In addition to minutiae, extended features are also used including singularity, ridge quality map, ridge flow map, ridge wavelength map, and skeleton. In order to evaluate the relative importance of each extended feature, these features were incrementally used in the order of their cost in marking by latent experts. The matching accuracy should be improved

2: Research Method

This target can be mainly decomposed into image preprocessing, detection, classification, feature extraction, reconstruction and feature match. For each sub-task, some classical and up-to-date methods in literatures are analyzed. Based on the analysis, an integrated solution for multimodalities recognition is developed for demonstration. Demonstration program has been developed using MATLAB. For the program, some optimization at coding level and algorithm level are proposed to improve the performance of the fingerprint recognition system. These performance enhancements are shown by experiments conducted upon a variety of fingerprint images. Also, the experiments illustrate the key issues of fingerprint recognition that are consistent with what the available literature says. The system structure is given in fig(1)

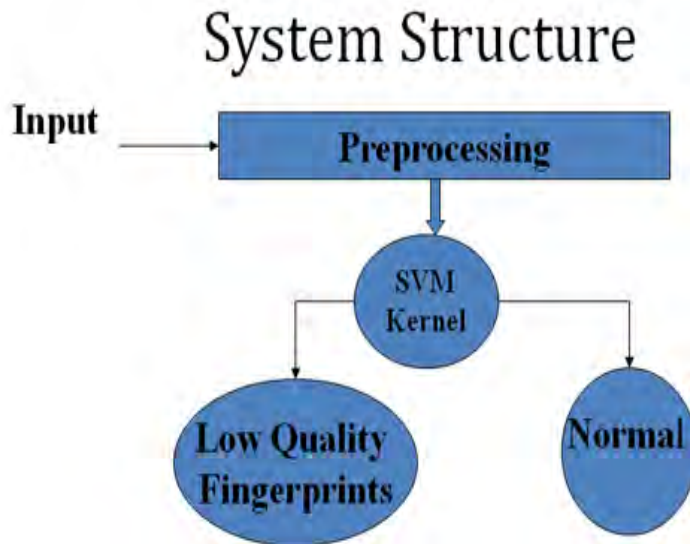


Fig 1: System Structure

3: DETECTION

In the table 1 we have described the different methods for detection with merits and demerits [5]. We have proposed fuzzy method for detection of altered fingerprints. This process is decomposed into orientation field extraction, orientation field estimation and any one type of the fingerprint is as output. The support vector classification approach is relatively recent development in statistical pattern recognition fig(2) has the algorithm level design

Table 1: Comparison of Detection Methods

Methods	Advantages	Disadvantage
1.NFIQ	It can identify the altered fingerprints	20% of altered fingerprints only identified
2.Neural Network	<ul style="list-style-type: none"> • Good accuracy in typical domains • Classification extremely efficient 	<ul style="list-style-type: none"> • Hidden Layers map to Lower Dimensional Spaces • Requires number of hidden units and layers • Training is expensive
3.SVM	<ul style="list-style-type: none"> • It maps to a very-high dimensional space • Training and classification is extremely efficient • good accuracy in typical domains 	<ul style="list-style-type: none"> • 92% of the altered Fingerprints were detected • Not suitable for large data sets

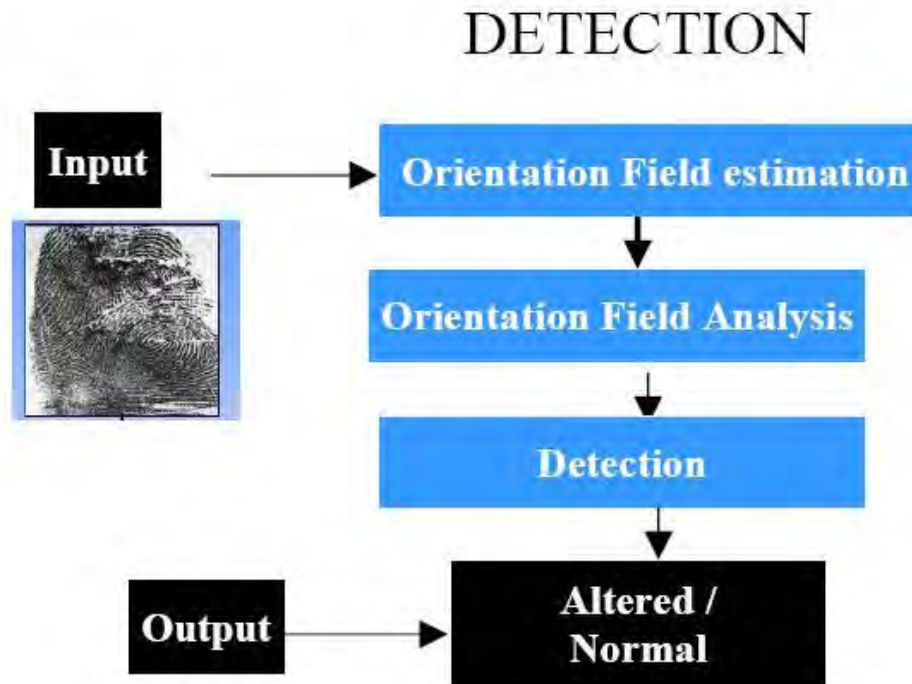


Fig 2: algorithm design

Algorithm

Input: fingerprint image

Step 1: Give the input image into Preprocessing

Step 2: after the preprocessing the image is given as an input to the SVM-Kernel

Step 3: orientation Estimation

Angle and orientation is estimated using the following formula (1) &(2)

Angle =affrinetransform(image)-----(1)

Orientation $O(x,y) = \text{Arctan}(\frac{\sin(\theta)}{\cos(\theta)})$ -----(2)

Angle=affrinetransform(image)

Step 4: orientation Analysis

If (O==0)

Display “It is altered Fingerprints”

Else

Display “It is normal Fingerprints”

Step 5:Output anyone type

3.1 Result and Discussion

To test proposed system, two databases were used. The famous databases are containing FVC2000, FVC2002 and FVC2004 from Neurotechnologija website which consists of 4000 images (2,000 fingerprint pairs) for our experiments, the first 1,000 pairs of fingerprints(F0001 to F1000 and S0001 to s1000) were used for training and the reaming 1,000pairs (F1001 to F2000 and S1001 to S2000) were used for testing.

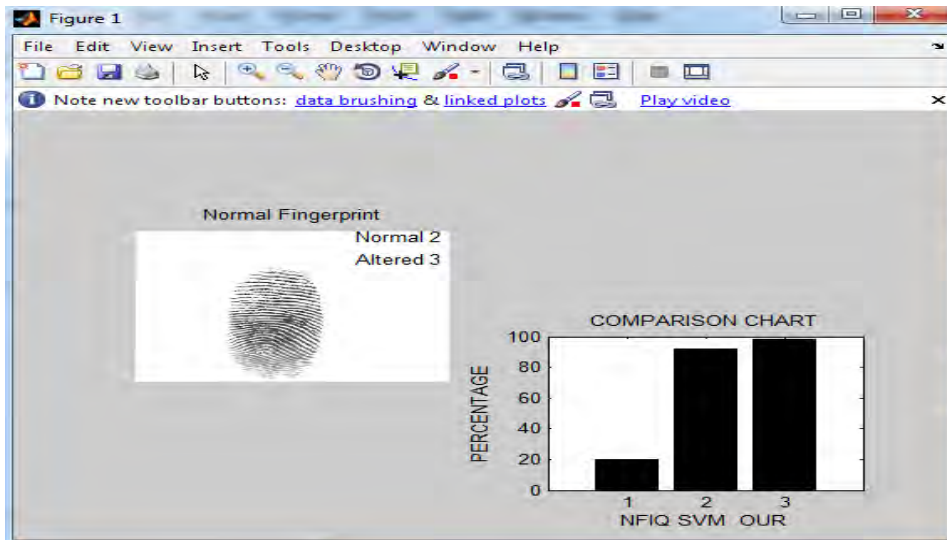


Fig 3: Result with comparison Chart

4. Conclusion

In this paper detection methods are discussed and new method is proposed because of this method we can find the altered fingerprints accurately, the proposed method is compared with the existing method and efficiency is given in fig(3), SVM-KERNEL method has given best result comparing with other methods. Also a program coding developed using MATLAB going through all the stages of the fingerprint detection is built. It is helpful to understand the procedures of altered fingerprint detection and demonstrate the key issues of fingerprint Detection.

5. References

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