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Detection and Rectification of Distorted Fingerprints

[#1]Prof. Bhavana Lanjewar, [#2]Satish Shelar, [#3]Shivkumar Shete, [#4]Ramkrishna Sagar, [#5]Rahul Karale

[1]bhavana.lanjewar@raisoni.net
[2]sshelar290@gmail.com
[3]shivkumarshete22@gmail.com
[4]sr9011602843@gmail.com
[5]rahulkarale27@gmail.com

[#12345]Department of Computer Engineering,
G.H.R.I.E.T., Wagholi, Pune.
Savitribai Phule Pune University, Pune, India.

ABSTRACT

Detection of the Distorted Fingerprints major causes to non-match in fingerprint at time matching fingerprint sample. This problem causes all the recognition of fingerprint algorithm application. It is complicated in negative type matching application. That means watch list and duplication application. In such way criminal user porpusly hide his fingerprint identification. In this paper we use the K-means, Canny-edge algorithm to detect and rectify distorted fingerprint image. Distortion and rectification is view as a regression problem where user input skein distorted fingerprint output is distortion field. To solve this problem K-means & Canny-edge fingerprint algorithm is use.

Keywords: Fingerprints Registration distortion, nearest neighbour, regression , PCA.

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I. INTRODUCTION

Fingerprint recognition system as advance within last few years there is a different types of challenges are detected in distorted fingerprint detections. The K-mean & Canny-edge algorithm is used for detection and rectification purpose. the FVC2004 DB1, NIST SD27,Tsinghua distorted fingerprint database, latent fingerprint database are use. In K-mean algorithm clustering concept is use. Clustering is nothing but the classification of object into different group or more precievly. the portioning the data set into sub set called cluster, so that the data in each subset share some common thread obtain according to some define distance major .

The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images.Step edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems.Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible In this paper distortion detection is viewed as to class classification problem for which the register orientation map and period map of fingerprint are use as the future vector.

Distortion and rectification is viewed as regression problem where input is distortion fingerprint and output is distortion fields to solve.

II. LITERATURE SURVAY

A. Latent Fingerprint algorithm:

Latent finger print matching algorithm is used to detect criminal activity. It is compared with plain finger print matching and rolled fingerprint, latent identification accuracy is significantly lower due to critical background and and overlapping structured in latent images.

According to the markup of various features typically used to extract various features from latent. To reduce this cost and to increase the consistency in feature markup, fully automatic and highly improved latent matching algorithms are used.

A study proposed by NIST system, That the accuracy of a latent matcher is highly affected by the precision of latent markup, especially when the latent images are not available

to the matches. One of the most famous cases involves identity based on latent matching fingerprint . Other cases of identifications have been reported by the extraordinary project. One of the priority of Next Generation Identification (NGI) is to supports the development of a lightning capability for latent fingerprint identification. An important component of this lightning capacity to develop a automatic latent feature extraction modules. This is highly used for

- Increasing the performance of latent matching system.
- Extend scalability and repeatability of latent feature extraction.

B. Novel Algorithm:

Novel algorithm is also important in distorted fingerprint identification and rectification of that distorted fingerprint. This algorithm works as to having a large database of the normal fingerprint and to take a distorted finger print as a input fingerprint and to rectify this fingerprint by using the period map and orientation map. This comparisons is taksplace with the normal fingerprint of that database. And after the comparisons to declare this finger print is a fingerprint. These algorithm works in 3 step as like

1) Removing scratches.

2) Features extraction.

3) Fingerprint compression.

C. ORB Algorithm:

ORB is stands for (oriented FAST and rotated BRIEF)is a fast local features detector. This technique attractive because of good performance and low cost.

Our main contributions are :

- The addition of a fast and accurate orientation component to FAST.
- The efficient computation of oriented BRIEF features.

To validate ORB we perform experiments that test the properties of ORB relative to SIFT.

D. Fingerprint matching algorithm:

This model computes a match score between two fingerprints which should be better for fingerprints from the same finger and low for those from different fingers.

Fingerprint matching is a difficult pattern recognition problem due to interclass variations (variations in fingerprint images of the same finger) and large intra-class variations. Meanwhile, interclass similarity can be large because there are only three types of major fingerprints patterns (arch, loop and whorl). Most fingerprints matching algorithm adopts one of four approaches : image correlation, phase matching, minutiae based representation is commonly used primarily because.

- Forensic examiners have successfully based on minutiae to match fingerprint for more than a century.
- Minutiae based representation is storage efficient and same finger as a match.

The matching pattern typically defines a representations between two fingerprint. The matching pattern define a threshold frequency which decide that such pair of representations are of the same finger or not.

Non regular contact: ridges structure from the finger is completely captured only when the ridges from particular finger produce images with optical contact. Some of the parts of the ridges may not come in completely contact with the optical such situations are non dual contact. This results in low contrast in noisy images.

Irr-replicating contact: ridges from certain fingers may change due to accidents, handling workout.

Feature

Extraction artifacts: it is an imperfect algorithm with certain issues like measurement errors in images.

Sensing act: Sensing act produce noise in the images. For example, residues are left over from the previous fingerprint capture. A typical finger-imaging system distorts the image of the object being sensed because of imperfect imaging conditions. In the FTIR sensing scheme, for example, there is a geometric distortion because of image plane is not parallel to the glass platen.

III. PROPOSED ALGORITHM

K-MEANS Algorithm:

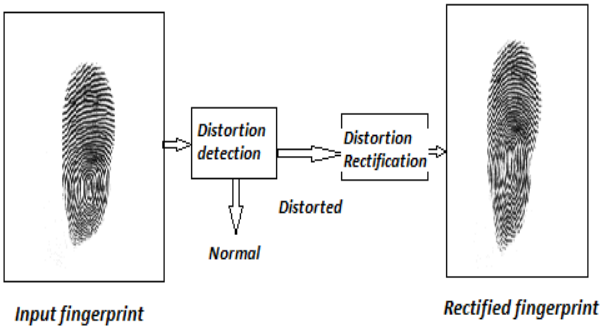
Previous algorithm uses number of methods in fingerprint detection but there is number of limitations occurs , i.e. criminal users may used previous algotithm to hids the identification because scanning of distorted fingerprints is not possible.
K-mean algorithm is used for detection rectification of the distorted fingerprint. The **k-means algorithm** is an algorithm used for Clustering number of objects based on attributes into k number of partition where $k < n$.
It is familier with expectation algorithm useful for Gaussians mixture in the data in which both attempt to find the centers of natural clusters. It assumes that the object attributes form a space. Clustering is the task of grouping a set of objects in a such way that objects are in the same group or more precisely, the process of organizing group of cell In the k–means algorithm algorithm distance measure determine similarity between two elements.

They include:

- The Euclidean distance (also called 2-norm distance) is given by:
- The Manhattan distance (also called taxicab norm or 1-norm) is given by:

Inner product space: The angle between two vectors can be used as a distance measure when clustering high dimensional data. Hamming distance (sometimes edit distance) measures the minimum number of substitutions are required to change one member into another. An algorithm for partitioning (or clustering) N data points into K disjoint subsets containing data points so as to minimize the sum-of-squares criterion

Where xn is vector representing the nth data point and uj is the geormentical centroid data points in Sj.



In the above fig. the K-means working is shown. This algorithm is give the input of distorted fingerprint, then it matching the corresponding subset of fingerprint to store in database. If corresponding is matching then it accept the fingerprint.

Canny-edge detector Algorithm:

The Canny edge detector is an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. The Canny edge detector applied to a colour photograph of a steam engine. Step edge detection is a technique to extract useful structural information from different vision objects and dramatically reduce the amount of data to be processed. It has been widely applied in various computer vision systems. Canny has found that the requirements for the application of edge detection on diverse vision systems are relatively similar. Thus, an edge detection solution to address these requirements can be implemented in a wide range of situations.

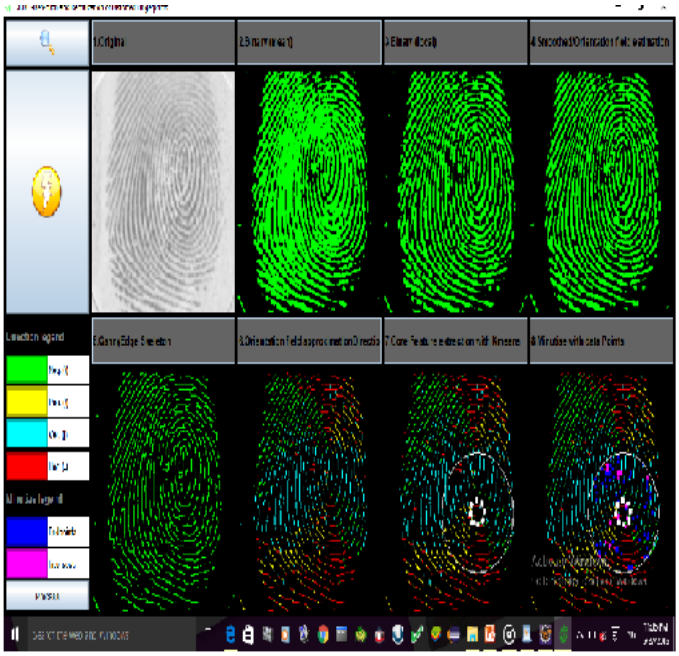
The general criteria for edge detection include:

Detection of edge with low error rate, which means that the detection should accurately catch as many edges shown in the image as possible The edge point detected from the operator should accurately localize on the center of the edge.

A given edge in the image should only be marked once, and where possible, image noise should not create false edges.

To satisfy these requirements Canny used the calculus of variations – a technique which finds the function which optimizes a given functional. The optimal function in Canny's detector is described by the sum of four exponential terms, but it can be approximated by the first derivative of a Gaussian.

Working of Canny-edge Algorithm:



IV. DISCUSSION AND COMPARRISON

In This Survey paper we discussed mainly on distorted skin fingerprints. Many algorithm are used in fingerprint detection but the distorted finger print many algorithm are not worked. The k-means & Canny-edge algorithm is used in distorted finger print detection. Distorted fingerprint problem is solve by this algorithm.by using the clustering concept the matching of fingerprint is resolved. The problem of criminal hide identity is solve by this algorithm.

Comparing the other algorithm the k-means & Canny-edge algorithm performance is better than existing. The same like novel algorithm is also work, but the k-means & Canny-edge is working better than other.

V. CONCLUSSION

The non-match of fingerprint and the criminal hide identity is solve by this algorithm. For this purpose to develop the detection and rectification algorithm to full fill this.
This paper describe the k-means & Canny-edge detection and rectification algorithm. For distortion detection, the registered ridge orientation map and period map of a fingerprint are used for vector featureand a SVM classifier is trained to classify the input fingerprint as distorted or normal.

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