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USING EDGE DETECTION TECHNIQUE COMPRESSION OF FINGER PRINT IMAGES

A.S.Prabhakaran[1] R.Karthick[2]

[1]ASSISTANT PROFESSOR, Muthayammal Engineering college,Namakkal,Tamilnadu.

[2]*M.E (2nd year),* Muthayammal Engineering college,Namakkal,Tamilnadu

[1]aspkaran@gmail.com, [2]er.ramckarthik@gmail.com

Abstract

In this paper, a progressive fingerprint image compression using edge detection scheme is adopted. Fingerprint recognition based on extraction of connected boundaries components edge detection is proposed in this paper. the algorithm is proposed is proposed to create a connected boundaries components using the local features minutiae points in finger print image as object image, one can draw a map connect this point so the work will be able to segment any part of the fingerprint image by finding the map of the part by boundaries algorithm. The proposed scheme can serve as a low cost pre-processing step for high level tasks such shape based recognition. The development of the paper confirm the effectiveness of the proposed algorithm.

Keywords*:* image processing, finger print recognition, image segmentation, object detection.

1. Introduction

Image processing:

1. Introduction to image processing.

What is an image? An image is an array, or a matrix, of square pixels (picture elements) arranged in columns and rows.

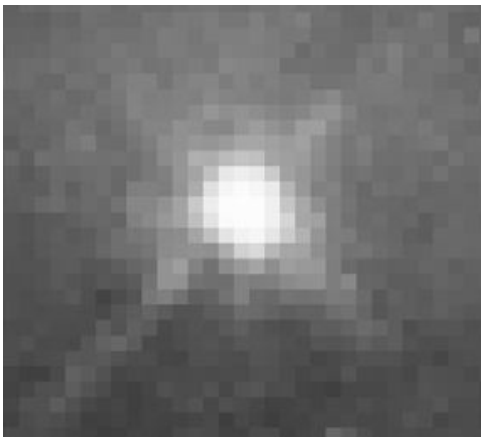

Figure 1: An image — an array or a matrix of pixels arranged in columns and rows.

In a (8-bit) greyscale image each picture element has an assigned intensity that ranges from 0 to 255. A grey scale image is represent as a black and white image, it emphasizes that such an image will also include many shades of grey.

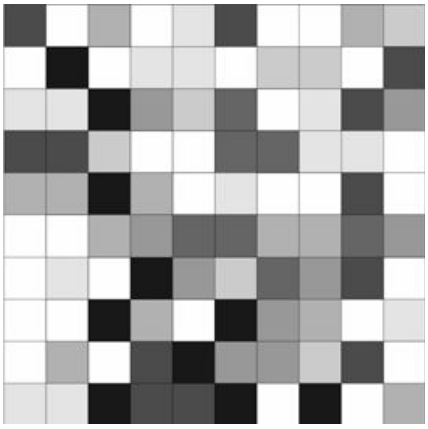

Figure 2: Each pixel has a value from 0 (black) to 255 (white).

A normal greyscale image has 8 bit colour depth = 256 greyscales. A "true colour" image has 24 bit colour depth = 8 x 8 x 8 bits = 256 x 256 x 256 colours = ~16 million colours.

Some greyscale images have more greyscales, for instance 16 bit = 65536 greyscales. In principle three greyscale images can be combined to form an image with 281,474,976,710,656 greyscales.

There are two general groups of 'images': vector graphics (or line art) and bitmaps (pixel-based or 'images'). Some of the most common file formats are:

GIF — an 8-bit (256 colour), non-destructively compressed bitmap format. it used for web. Has several sub-standards one of which is the animated GIF.

JPEG — a very efficient (i.e. much information per byte) destructively compressed 24 bit (16 million colours) bitmap format. It mainly used, for web and Internet (bandwidth-limited).

TIFF — the standard 24 bit publication bitmap format. Lempel-Ziv-Welch (LZW) compression.

PS — Postscript, a standard vector format. It Has efficient sub-standards and can be difficult to transport across platforms and operating systems.

PSD – a dedicated Photoshop format that keeps all the information in an image including all the layers.

1.2 Colours

For science communication, the two main colour spaces are RGB and CMYK.

1.2.1 RGB

The RGB colour model relates very closely to the way we perceive colour with the r, g and b receipts in our retinas. RGB presents the additive colour mixing and is the basic colour model used in television or any other medium that projects colour with light. It depends on the basic colour model used in modern computers, web animations (graphics), the RGB cannot used for print production.
The secondary colours of RGB – cyan, magenta, and yellow – are formed by mixing two of the primary colours (red, green or blue) and excluding the third colour. Red and green mixes to make yellow, green and blue to made cyan, and blue and red comes from magenta. The mixture of red, green, and blue has full intensity to makes white.

In Photoshop using the "screen" mode for the different layers in an image will make the intensities mix together according to the additive colour mixing model. It is a analogous to slide images on top of each other and shining light through them.

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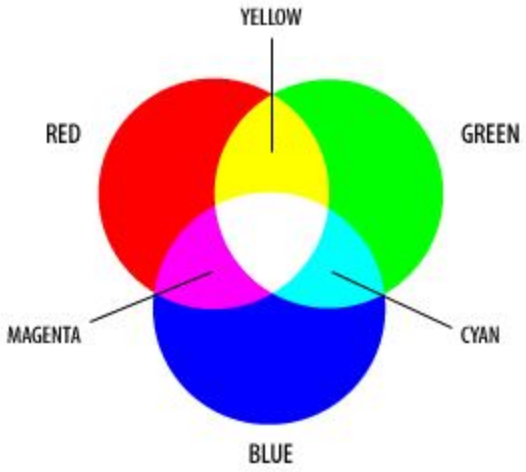
1.2.2 CMYK

The 4-colour CMYK model used in printing lays down overlapping layers of varying percentages of transparent cyan (C), magenta (M) and yellow (Y) inks. In addition a layer of black (K) ink can be added. In CMYK uses the subtractive colour model.



2. Object Detection:

The Object Recognition module provides a way to identify specific trained objects within the current image. Once the module is trained with sample template images it will identify those objects within the current image depending on the filtered parameters of confidence, size, rotation, etc.

Several of the techniques will account for different object sizes, location and in plane rotation (roll) of the object as well as variations in lighting and contrast. It will NOT account for significant rotation of the object in the X and Y (pan and tilt) directions. Should you need to identify a 3D object in any orientation you will need to include template examples of each orientation?

FEATURE POINTS:

This method will identify interesting points within the template using a modified fast feature detector and match those points with those detected within the current image. The identified points are typically corner-like points that exhibit restraining forces in each direction (i.e. the highest edge signal in both X and Y directions will be maximal at the point's position). This helps to stabilize point choices in both the template and image such that most (but not all) points will be detected between the template and image. Once this correlation has been done the most likely template is then tested for at that location using a slower cross correlation technique. This technique is a good standard technique assuming there is enough internal texture within the object (think of a book cover) and is fast enough for most purposes.

3. Finger Print Recognition:

Fingerprint Identification is the method of identification using the impressions made by the minute ridge formations or patterns found on the fingertips. No two persons have exactly the same arrangement of ridge patterns, and the patterns of any one individual remain unchanged throughout life. Fingerprints offer an infallible means of personal identification. Other personal characteristics may change, but fingerprints do not. Fingerprints can be recorded on a standard fingerprint card or can be recorded digitally and transmit-ted electronically to the FBI for comparison. By comparing fingerprints at the scene of a crime with the fingerprint record of suspected persons, officials can establish absolute proof of the presence or identity of persons.

Already Done

Research Fingerprint Acquiring

Research Fingerprint Analyzing

Research Fingerprint Recognition Algorithms

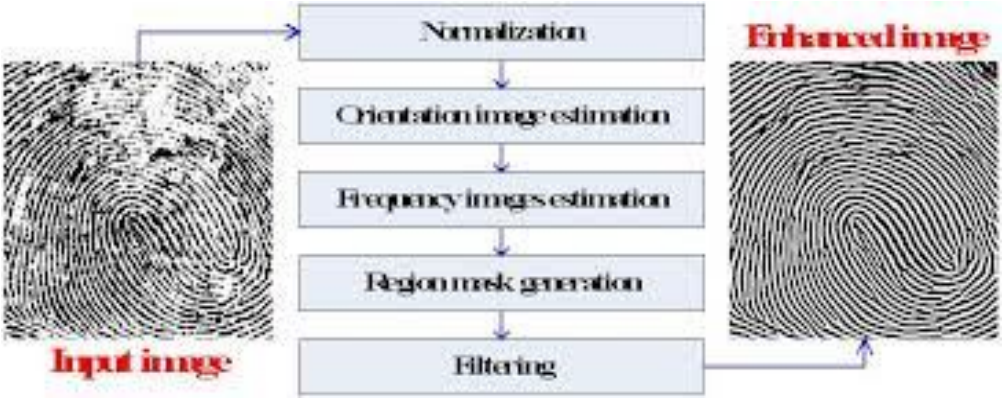
Including detection Minutiae and learned based templates

Current State

It Reduced Fingerprint Recognition easily to using detection algorithms.

Solving the algorithm for given problem

It Take two fingerprint images and evaluate if they come from the same finger.



Assumption: It takes no two fingers in the yield the same fingerprint and that fingerprints do not change in time.

Much experiment has been developed to validate these results of assumptions.

Complex

Due to a segmentation of each condition the same fingerprint scanned twice can look very different

How finger is oriented on scanner

Condition of finger (it does not dry, scarred, wet, etc)

No completely accurate method exists

Many current recognition techniques can tell with a degree of certainty if two fingerprint images match (i.e. come from same finger)

First try

The fingerprint edges are represent as graph structure.

Bifurcation and ending points would become nodes and the edges would be edges

It due to complexity in matching sub graphs

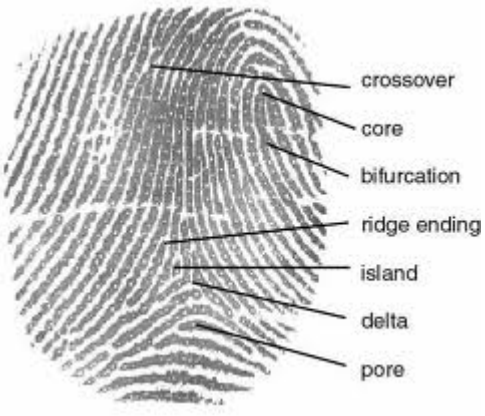
Currently Explored Method

It Reduce the fingerprint recognition problem of topographical equivalence

Topological Equivalence

Ridges of fingerprint are the just lines it when leave the frame of view go off to infinity

If two fingerprints can be shown to be nearly topologically equivalent then they are most likely the same fingerprint



4. Conclusion

Fingerprint image can be acquired by a co-operative and non co-operative person; hence it is easy to create a database for security purpose. In this paper edge detection based Fingerprint Recognition using Non Minutiae Features is proposed. The features of fingerprint such as Directional Information, Centre Area and Edge Parameters are extracted from all the three levels by considering four sub bands. The matching between test and data base fingerprint are verified using Euclidean distance of edge detection. The FAR, FRR and TSR values are better in case of proposed algorithm compared to the existing algorithm. In future the algorithm may be used for spatial domain and other transform domains.

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