Fingerprint Image Features Extraction using Visual Tracking Image processing Technique in MATLAB Simulation

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ABSTRACT

Visual Tracking is the identification and analysis of Image to extract the useful information. The more useful information or efficiency provides the better way to analyze the Image.(Recognition of any individual is a task to identify people. Human recognition methods such as face, fingerprints, and iris generally require a cooperative subject, physical contact or close proximity. These methods are not able to recognize an individual) therefore recognition using Image Processing techniques of Image's objects is relatively new technique without disadvantages. This project aims to visual tracking in images using his Images features and generate the dataset of useful information. Different parameters will be used for identify the image's values and ever the(majority of current approaches are model free which is simple and fast)efficient feature extraction methods to analyze the Images Features.

Keywords: Finger Print; weiner filter ; thinning ; Minutiae Extraction; ridges ending.

I. INTRODUCTION

1.1 Fingerprints

Fingerprints are often found on practically any solid surface, including the physical body. Analysts classify fingerprints into 3 classes per the sort of surface on that they are found and whether they are visible or not: Fingerprints on soft surfaces are probably to be three-dimensional plastic prints; those on arduous surfaces are either patent (visible) or latent (invisible) prints. Visible prints are shaped when blood, dirt, ink, paint, etc., is transferred from a finger or thumb to a surface. Patent prints are often found on a large form of surfaces: smooth or rough, porous or nonporous.

It's an imprints formed by the friction ridges of the skin and thumbs. They have long been used for identification due to their immutability and individuality. Immutability refers to the permanent and unchanging character of the pattern on every finger. Individuality refers to the uniqueness of ridge details across individuals; the uniqueness of a fingerprint are often determined by the pattern of ridges and furrows additionally as by options referred to as minutiae, that are some abnormal points on the ridges. However, shown by intensive analysis on fingerprint recognition, fingerprints are not distinguished by their ridges, but by the minutiae points. There are the some ways has been explained through which the fingerprint will be extracted:-

1.1.1 Collecting Patent Prints

1.1.2 Collecting Latent Prints

1.1.3 Alternate Light Source (ALS)

1.2. FingerprintRecognition:- Fingerprint recognition is that the method of examination questioned and identified fingerprint against another fingerprint to see if the impressions are from a similar finger or palm. It includes 2 sub-domains: one is fingerprint verification and also the other is fingerprint identification. Fingerprint verification is to verify the

authenticity of 1 person by his fingerprint. The user provides his fingerprint along with his identity info like his ID number. The fingerprint verification system retrieves the fingerprint model according to the ID number and matches the template with the real-time acquired fingerprint from the user. Sometimes it's the underlying style principle of AFAS (Automatic Fingerprint Authentication System). Manual fingerprint verification is thus tedious, time overwhelming and costly that's incapable of meeting today's increasing performance needs. an automatic Fingerprint identification system is widely adopted in several applications similar to building or space security and ATM machines. Also, it potentially prevents unauthorized admittance to access management systems, Time & attendance Systems, cellular phones, smart cards, desktop PCs, Workstations, vehicles and computer networks. Biometric recognition systems provide greate security and convenience than ancient ways of personal recognition.
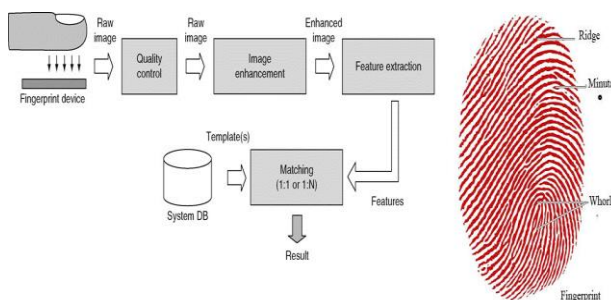
Figure 1. Fingerprint Matching

II. NEED AND SIGNIFICANCE

Image Visual Tracking the broad term used for the different purpose knowingly Biometric, Fingerprints Matching, etc. The aim of this thesis is to develop Fingerprints Matching methods for scanned imaging applications. The problem of fingerprints matching is difficult because of image texture and different points. If an image contains only homogeneous color regions, clustering methods in color spaces are sufficient to handle the problem. In reality, natural scenes are rich in color and texture. It is difficult to identify image regions containing different texture patterns.

Each region in the image contains a uniformly distributed texture pattern. The information in each image region can be represented by a few quantized colors, which is true for most color images of natural scenes. The colors between two neighboring regions are distinguishable.

III. PROPOSED METHODOLOGY

A fingerprint pattern will remain unchanged for the life of an individual.In the first stage we used weiner filter for denoise the fingerprint image .After denoising the image ,enhancement is done by using the thinning algorithm .after that we extract the feature of ihe image by using minutiae extraction technique.

3.1.Weiner Filter:- Weiner filter is used to reduced the noise from a signal.This is done by comparing the received signal with a estimation of a desired noiseless signal.before implimention of filter it is necessary to know the spectral properties of original signal and noise.The aim of this filter to minimum mean square error.

3.2.Thinning process:-
Thinning process refers to the process of reducing the thickness of the lines as possible with minimum losses. This process is so important to identify the exact pattern of the fingerprint image. Fingerprint thinning process can be offered the following performance:

    a. The lines of output fingerprint image should be a single pixel as possible.

    b. The lines of output fingerprint image should not have any discontinuity as possible.

    c. The lines of output fingerprint image should be return to its centre pixel as possible.

    d. Eliminate all redundancies and unwanted pixels.

3.3.Minutiae Extraction:-

Minutiae points are the major features of a fingerprint image and are used in the matching of fingerprints. Minutiae can be defined as the points where the ridge lines end or fork.

a. Minutiae points and Types

These minutiae points are used to determine the uniqueness of a fingerprint image. A good quality fingerprint image can have 25 to 80 minutiae depending on the fingerprint scanner resolution and the placement of finger on the sensor. So the minutiae points are the local ridge discontinuities and can be of many types. These types are:

I. Ridge ending is the point where the ridge ends suddenly

II. Ridge bifurcation is the point where a single ridge branches out into two or more ridges.

III. Ridge dots are very small ridges.

IV. Ridge islands are slightly longer than dots and occupy a middle space between two diverging ridges.

V. Ponds or Lakes are the empty space between two diverging ridges.

VI. Spurs is a notch protruding from a ridge.

VII. Bridges are the small ridges that join two longer adjacent ridges.

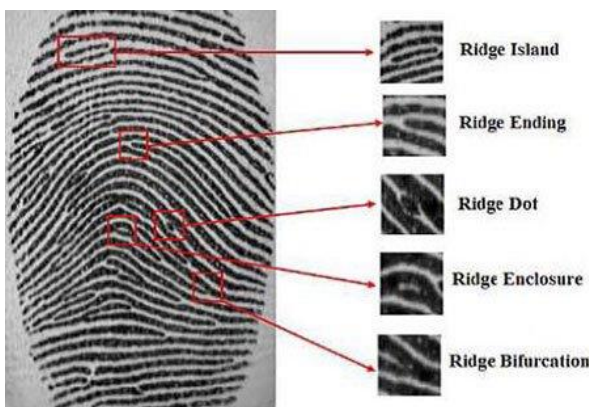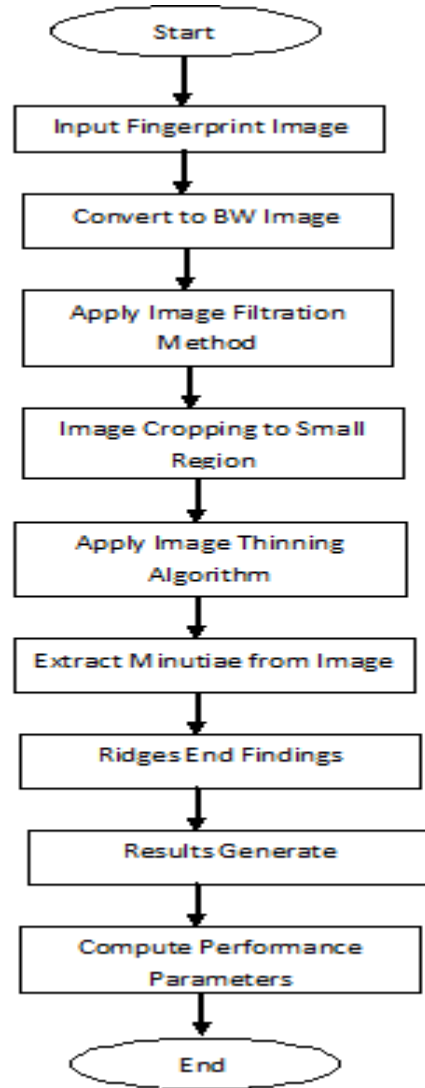VIII. Crossovers are formed when two ridges cross each other.

Figure 2

Flow Chart

IV. RESULTS AND DISCUSSION

4.1 Input Data

The above given steps have been implemented sequentially so that we can understand the concepts already implemented, the tools which are used, the inbuilt functions of MATLAB which are available and we have used them in our algorithm for implementation. The fingerprint image feature extraction process is been implemented by using the following steps:

1. The first step is image capturing and taken as Input.

2. Then the image will be saved by using a particular format.

3. Calculate the different values such as Minutiae Extraction, Image Filtration using Filtration Technique, Ridges Findings and generate the performance parameters such as PSNR value.Generate the results with Improved Quality.

4.2 Results

The Following results have been carried out after the research work. The technique to generate image features of fingerprint images is implemented using MATLAB. MATLAB is a tool for numerical computation and visualization. The basic data element is matrix. An image in MATLAB is treated as a matrix. MATLAB has built in support for matrices and matrix operations, rich graphics capabilities and a friendly programming language and development environment.

Table 1. PSNR and RMSE Results

	RMSE	PSNR
Input 1	0.11	67.21
Input 2	0.13	65.99
Input 3	0.14	65.14

V. CONCLUSION

Accurate personal detection is critical in wide range of applications such as national ID cards, electronic commerce, organizations and banking operations. Fingerprints are unique to an individual, and not even identical twins have identical fingerprints. Fingerprints consist of several main ridge patterns, including whorls, loops, and arches. Various human fingerprints patterns are collected using traditional and electronic devices then these patterns are converted to digital forms to be processed via the designed algorithm. Many modifications are introduced to the implemented algorithm to generate an optimal results. The implemented algorithm gives adequate results related to the other systems.

VI. REFERENCES

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