REVOLUTIONARY EXTENDED SPATIAL POINT EXTRACTION USING CIRCULAR TECHNIQUE (RESPECT)

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***Abstract*— we are here proposing a new algorithm to make a simpler approach to Fingerprint Recognition, to reduce False Rejection due to accident and to reduce the problem due to shrinking of finger due to winter season or water, namely Revolutionary Extended Spatial Point Extraction using Circular Technique for fingerprint recognition (R.E.S.P.E.C.T).**

***Keywords- F*ingerprint; Biometric.**

I. INTRODUCTION

Fingerprint is one of the wonders in the biometric and forensic science. Day by day it is groomed and turned into digital application. But for some technical problems it is now in little back foot. But we introduce a new mechanism to store the corresponding data and some reference points. It has a low space complexity, simple logical fundamental side to understand and high distinguish factor.

After crossing the thresholding of old traditional and complex mechanisms, we introduce a totally new mechanism which does not bother with types of curve, pattern recognition, special features like core, delta, bifurcation points and all of these kind of complex things. It deals only with the shape of the finger and takes the border ridges as the reference to the fingerprint. The database contains a small dynamic array and a special serial marking for each array.

This is an approach to make fingerprint recognition technology more ease of use in our daily life for security, forensic, and other biometric purposes.

This paper is inspired by our previous paper namely Revolutionary Spatial Point Extraction Technique for Fingerprint Recognition (R.S.P.E.T).

In that paper we had made a new technology with low space complexity, simple data structure and simple fundamental logics.

That method worked with eight directional searching algorithm to calculate the distance from the middle point, according to a rectangular border with respect to most *LEFT, RIGHT, TOP* and *BOTTOM* points of that image, to the every 45 degree cross section of the border ridges of that image.

II. INTRODUCTION TO BIOMETRIC

Biometrics consists of methods for uniquely recognizing humans based upon one or more intrinsic physical or behavioral traits.

Biometrics is the science and technology of measuring and analyzing biological data. In information technology, biometrics refers to technologies that measure and analyze human body characteristics, such as fingerprints, eye retinas and irises, voice patterns, facial patterns and hand measurements, for authentication purposes. Authentication by biometric verification is becoming increasingly common in corporate and public security

systems, consumer electronics and point of sale (POS) applications. In addition to security, the driving force behind biometric verification has been convenience. Biometric devices, such as finger-scanners, consist of: A reader or scanning device, Software that converts the scanned information into digital form and compares match points, a database that stores the biometric data for comparison.

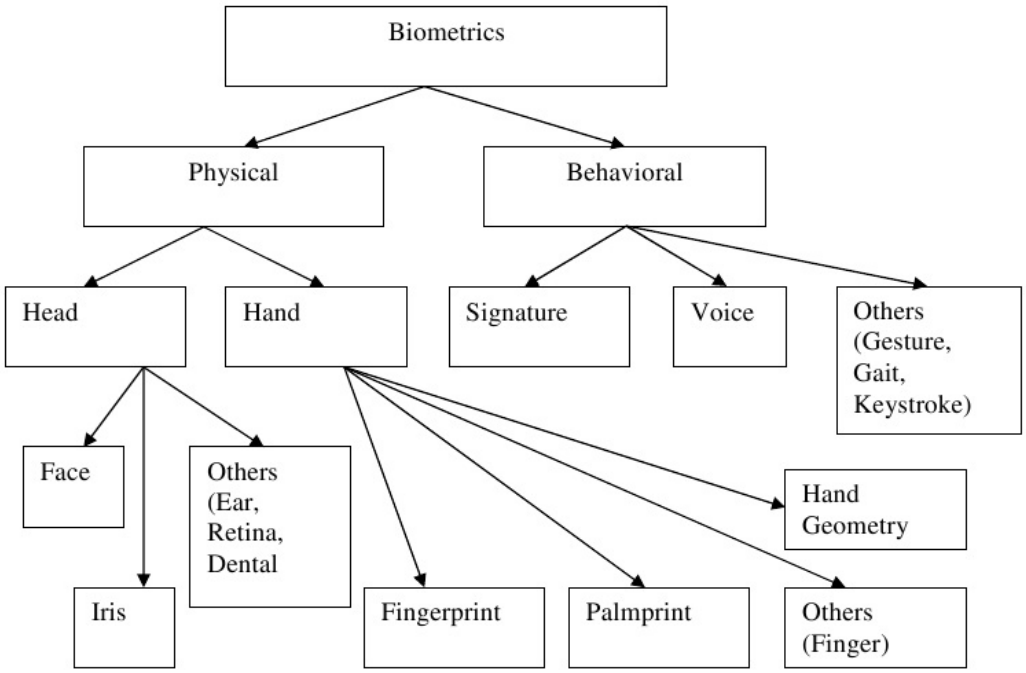


Fig 1: Various Biometrics

Biometric identifier	universality	Distinctiveness	Permanence	Collectability	Performance	Acceptability	Circumvention
DNA	H	H	H	L	H	L	L
Ear	H	M	H	M	M	H	M
Face	H	L	M	H	L	H	H
Facial thermogram	H	H	L	H	M	H	L
Fingerprint	**M**	**H**	**H**	**M**	**H**	**M**	**M**
Gait	M	L	L	H	L	H	M
Hand geometry	M	M	M	H	M	M	M
Hand vein	M	M	M	M	M	M	L
Iris	H	H	H	M	H	L	L
Odor	L	L	L	M	L	M	M
Retina	H	H	M	L	H	L	L
Signature	L	L	L	H	L	H	H
Voice	M	L	L	M	L	H	H

Table 1: Comparison of various biometric

We can see that fingerprint has a good balance about everything from the above table.

III. INTRODUCTION TO FINGERPRINT SYSTEM

Fingerprints are graphical flow-like ridges present on human fingers. They are fully formed at about seven

months of fetus development and finger ridge configurations do not change throughout the life of an individual except due to accidents such as bruises and cuts on the fingertips. This property makes fingerprints a very attractive biometric identifier. Fingerprint system can be separated into two categories Verification and identification.

Verification system authenticates a person's identity by comparing the captured biometric characteristic with its own biometric template(s) pre-stored in the system.

It conducts one-to-one comparison to determine whether the identity claimed by the individual is true. A verification system either rejects or accepts the submitted claim of identity.

Identification system recognizes an individual by searching the entire template database for a match. It conducts one-to-many comparisons to establish the identity of the individual. In an identification system, the system establishes a subject's identity (or fails if the subject is not enrolled in the system database) without the subject having to claim an identity.

IV. Advantages over Other Technologies

There is much kind of technologies for fingerprint recognition but in all cases some basic problems during collecting the fingerprint. Basically maximum problems arise at the time of scanning the fingerprint.

We discus here only about two types of drawbacks which can be overcome by this new method.

Firstly, after taking the enrolment copy of the fingerprint, in case there will be kind of accident happened and any cut mark will be found in finger then FALSE REJECTION will be occurred. But by the use of this new method this problem will be solved as it works only with the border area and middle point of the fingerprint.

Secondly, after taking the enrolment copy of the fingerprint in the winter season the fingers are used to sink and FALSE REJECTION happened. But by using this new method this problem will be solved.

V. Proposed Work

We are going to introduce a project proposal about fingerprint recognition technique with the help of our previous paper RSPET [11].

Here we are going to cover the fingerprint image with a circle, with the help of the middle point, according to a rectangular effected area, calculated using the top-most, bottom-most, right-most and left-most points of the fingerprint image.

VI. Algorithm

Step 1:- Take an image of fingerprint through a scanner.

Step 2:- Convert that image to a .pgm file in ASCII mode.

Step 3:- Use a filter to remove the noise.

Step 4:- Use thresholding to binarize the image.

Step 5:- Do the thinning of the fingerprint image.

Step 6:- Calculate the four extreme points of the picture for border. i.e. Left, Right, Top, Bottom.

Step 7:- Make a rectangle using the four extreme points and calculate the middle point.

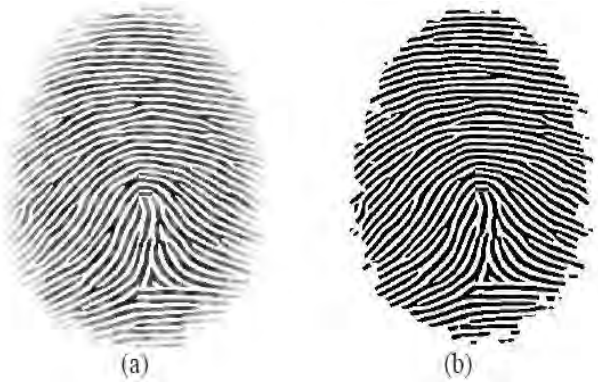
Step 8:- Calculate the lowest distance between the middle point and the extreme four points, to be used as the radius of the circle to be drawn.

Step 9:- Using the calculated middle point, draw a circle and store the distance of the points where the circle cuts the thinned fingerprint image, from the middle point in a dynamic array.

Step 10:- Keep that array with a reference name or number in database.

VII. A MODEL ANALYSIS OF RESPECT

PHASE -I:- (step1,2,3,4)

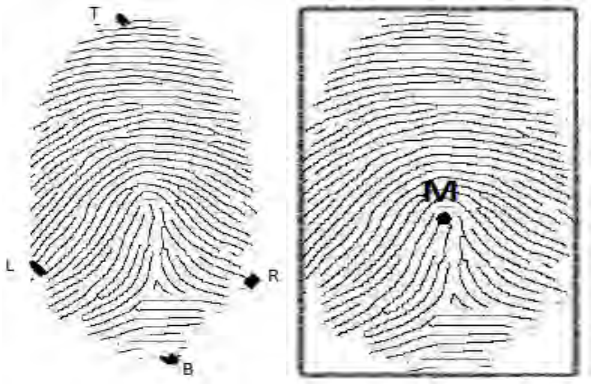


(a) Original image (b) After filtering and binarization

PHASE-II:- (step 5)

(a) Binarized Fingerprint , (b) Image after thinning

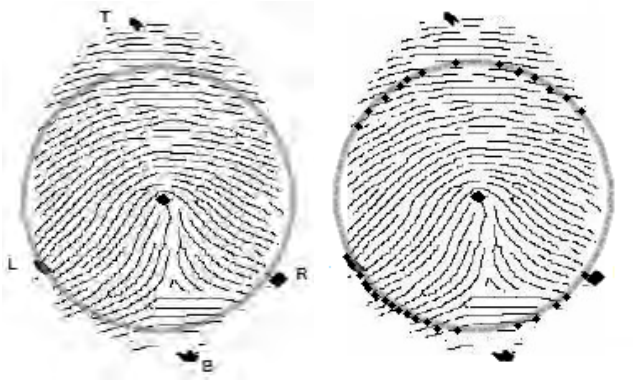
PHASE III:- (step 6,7)



(a) (b)

(a) Find the extreme left, right, top, and bottom point. T:- top; L:-left; B:-bottom; R:-right.
(b) Draw the rectangular border & find the middle point. M:- middle point

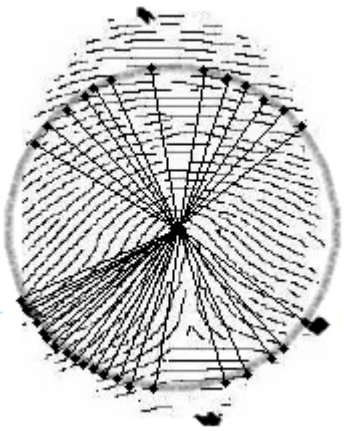
PHASE-IV:- (step 8,9)



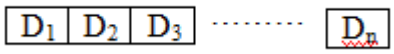
(a) (b)

(a) Circle drawn, (b) Reference points noted.

PHASE-V:- (step 9,10)



DISTANCES FROM MIDDLE POINT



DYNAMIC ARRAY OF DISTANCES

VIII. ADVANTAGES AND DISDVANTAGES

There are some advantages of this algorithm such as the output of this technology occupy much less space for an image, it will take less time to store and check that image. This algorithm is easy to implement. Some minor accidental cases will be managed. Shrinking of finger will be managed. There will be no question about False Acceptance case.

But there is a big question about False Rejection as a result of fault during taking the image of fingerprint. And also growth of a finger cannot be considered.

IX. CONCLUSION

This new approach to fingerprint (recognition digitally) will rescue the lost glory of this technology. This approach takes a very small space in database to store the corresponding data for an image. This has high efficiency about distinguished factors and with less complexity than other technologies, it is a very simple approach but without any complexity of curvature, pattern recognition.

Actually this approach will make this digital fingerprint recognition technology more simple and easy in our real life.

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