Fingerprint Based Gender Classification by using Fuzzy C- Means and Neural Network Model

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Abstract*: Fingerprint contains ridge and depression that along type distinctive patterns. A fingerprint Biometric attribute is one amongst the necessary attribute operating with sensible ends up in the gender classification. The arrange agreements with the matter of gender classification mistreatment fingerprint pictures. The project planned a way for classifying the gender supported feature extraction. The connected feature to be removed and differentiate the gender is Gabor filters and trivia extraction and ROI. The extracted feature is employed to coach artificial neural network supported the extracted knowledge.*

Keywords: Finger Print, Gabor Filters, ROI , ANN , Gender Classification

I. INTRODUCTION

 A unique finger pattern is the extraction of patterns with edges and valleys. The endpoint and point of edges is so called as ridges. Fingerprint minutiae extraction is the mix of condition and mix of hereditary. Same Character unique finger print patterns are different. The edges of unique finger print pattern are not change from birth to till date.

Following are the some of applications of gender based:-

E-commerce: At any personal authentication system like e-commerce, Internet access, online banking, ATM card and all other systems like phones etc.

E-Governance: Digital Signature, Driving license, passport control, Steganography.

Forensic applications: such as, corpse identification, criminal investigation, terrorist identification, parenthood determination, and missing children.

Many social and structure communications and services nowadays rely on gender of person performs the role. Fingerprint classification is a crucial pre-processing and verification step in fingerprint identification. During this analysis, it investigates the matter of gender classification from fingerprint. The work has been motivated by studies in measurement, biometric Characteristic and pattern recognition suggesting that it's doable to tell apart between male and feminine fingerprints.

II. LITERATURE REVIEW

 Hong et al [1] as proposed an algorithm to assurance that the presentation of a fingerprint system will be strong to the value of input fingerprint image. Fingerprint improvement procedure, which can increase the clearness of ridge and valley structures of fingerprint image based on the valued limited ridge path and occurrence. It gives the results that including the improvement algorithm improve both the ridges and valley structure and the confirmation accurateness.

Capelin. et al [2] as developed a new system which will construct a finger print image from the templates. Author Developed a for building fingerprint image from regular patterns. It provides the results that the remodeled image is incredibly accurate; there's an opportunity to cheat trendy industrial fingerprint recognition system.

Feng et al [3] as projected a method for finger print angle field reconstruction from the templates. They propose a Gaussian based technique for fingerprint direction and retrieving the patterns. Within the technique, previous proof concerning ridge flow options is taken into account terribly accurately excellent the ridge direction. The author results show the projected method gives finger print based classification and presentation of finger print matching.

Abdullah and Abash [4] proposed global algorithm for feature extraction for gender classification. The algorithm gives 70% of classification rate when it compared to manual method.

Felon and Fate Ajala [5] as planned fingerprint based mostly age and gender detector system victimization fingerprint pattern analysis. The Proposed method uses a back propagation technique for gender classification and age classification. It offers the result overcome the restrictions of earlier technique and formula with competitive and satisfactory results.

Existing System

The existing system used ridge dimension, ridge thickness to depression thickness quantitative relation (RTVTR), and ridge density as options and used Support Vector Machine (SVM) for gender classification. This technique is experimented with the interior dataset of four hundred fingerprints out of that two hundred were male fingerprints and two hundred were feminine fingerprints. They found male-female may be properly classified up to ninety one.

Problem Statement

   Person identification exploitation fingerprint algorithms are well refined and are being established everywhere the planet for security and authentication it's useful for anthropologists to classifying gender from the fingerprints that acquire from strip-mined articles and additionally for crime investigators to reduce the fashion of the suspects. to enhance the performance of fingerprint gender classification a lot of, the biometric options just like the ridge count, ridge thickness to depression thickness quantitative relation (RTVTR), white lines count, ridge count imbalance, trivia map (MM) orientation co one-dimensionality maps (OCM), Dennis Gabor Feature maps(GFM) and orientation map (OM) for pattern kind, 2nd ripple remodel (DWT), Principal element analysis (PCA) and Linear Discriminate Analysis (LDA) options are extracted. The classification is performed exploitation symbolic logic - C suggests that (FCM), and Neural Network (NN) technology. The analysis work is aimed in developing the algorithms for classifying the gender through fingerprint obtained.

III.PROPOSED SYSTEM

The proposed work for the gender classification and age classification is done by the following methodologies.

Finger Print Image Enhancement

To enhance the finger print images we have image processing technique like RGB to Gray, Thinning and segmentation technique.

Segmentation:

In Computer vision segmentation means partition the image into multiple segments.

The aim and goal of segmentation is to partition the image into multiple segments like line, curves etc.

Gabor filters:

In image process, a Dennis Gabor filter may be a linear filter used for texture analysis, which implies that it primarily analyses whether or not there area unit any specific frequency content within the image in specific directions during a localized region round the purpose or region of research.

Binarisation:

Image binarisation is the method converting RGB image into Gray Scale that is Black white Image.

This is so what called as Image thresholding which may produce output of two levels of gray.

Thinning:

Thinning may be a morphological operation that's wont to take away chosen foreground pixels from binary pictures, somewhat like erosion or gap. It may be used for many applications, however is especially helpful for skeletonization.

Gender Classification Using Extracted Feature Reading

The classification is performed with the applying of Neural Network (NN) technology. They consists of a synthetic network of functions, known as parameters, that permits the pc to be told, and to fine tune itself, by analysing new information. every parameter, typically additionally brought up as neurons, could be a operate that produces associate output, once receiving one or multiple inputs. Those outputs square measure then passed to consequent layer of neurons, that use them as inputs of their own operate, and turn out any outputs. Those outputs square measure then passed on to consequent layer of neurons, then it continues till each layer of neurons are thought of, and therefore the terminal neurons have received their input. Those terminal neurons will result into the model.

Age group estimation of finger Extracted feature reading

The age group estimation is a classification task which is performed with the application of Neural Network (NN) technology. All the samples are divided into 14 age groups. A feedforwrd neural network with back propagation will be used for classification.
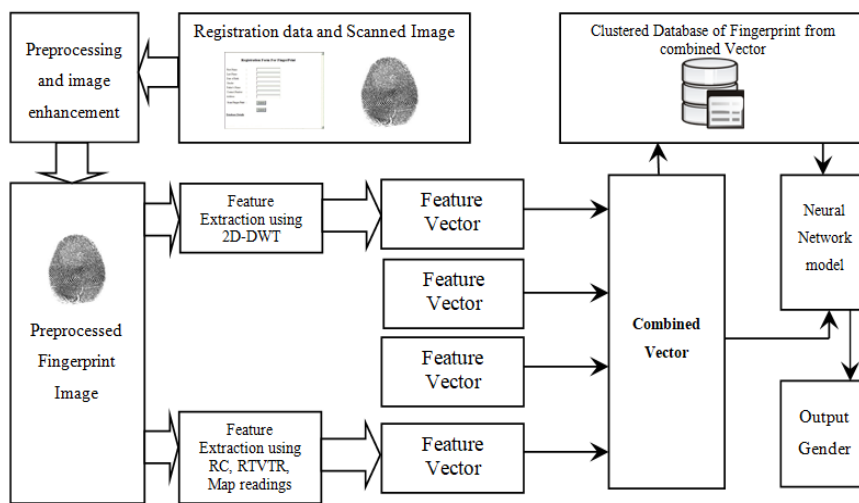

Fig1. Proposed System Architecture
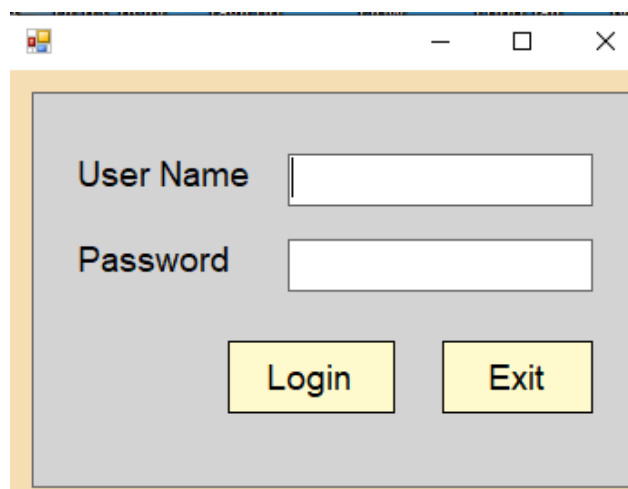
IV. RESULT

1. **Login window**

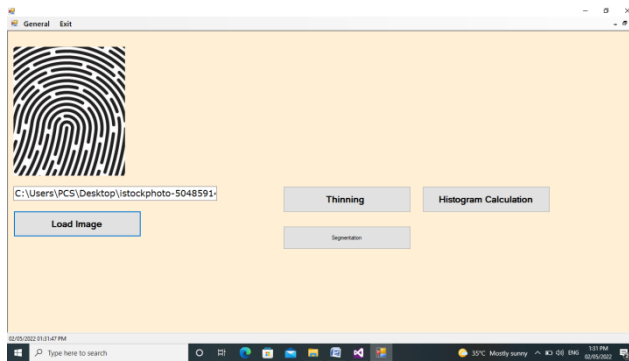Fig2 Login Window

2. Main Form

Fig3 Main Form

3. Load Image
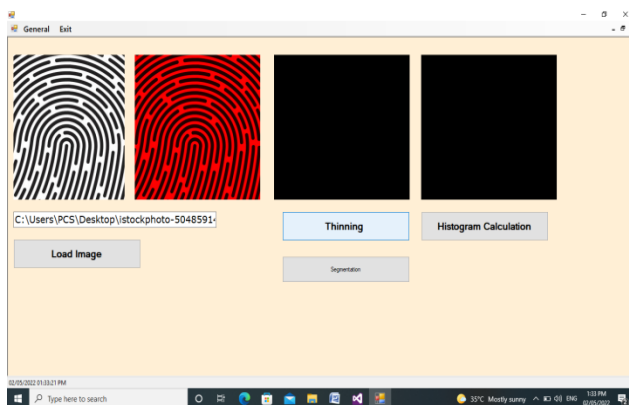

Fig4 Load Image

4. Thinning

Fig5 Login Window
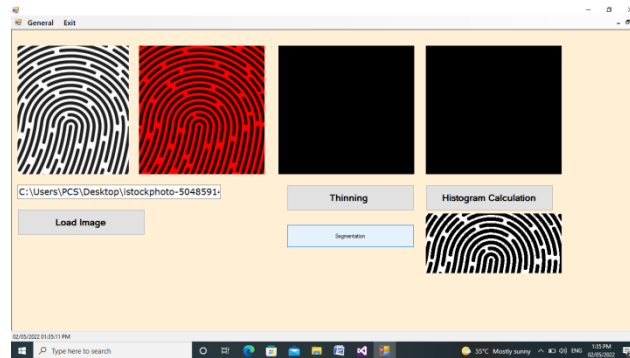
5. Segmentation Result

Fig6 Segmentation

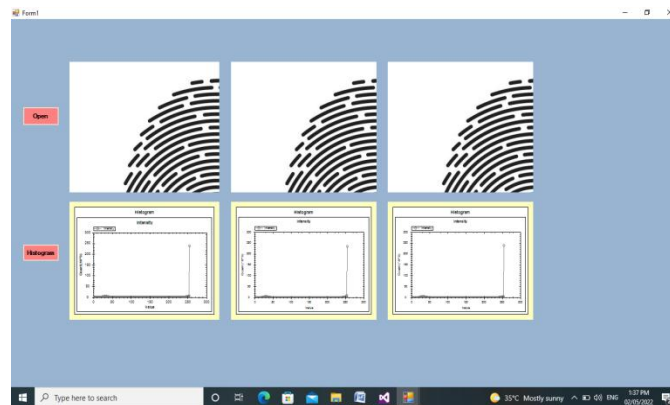## 6. Histogram Calculation

Fig7. Histogram Calculation

V. CONCLUSION

As the fingerprints are distinctive for people within the universe, it provides a singular identification and there's little question that fingerprint proof is most acceptable and reliable proof. Most of the normal strategies utilized in identification of gender gave the satisfactory results however economical try with higher accuracy. Clarity of image, frequency domain analysis, singular price decomposition techniques etc. can play a awfully vital role to extend the potency and still there's a scope to figure on this to enhance the results.

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