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Detection Of Fingerprint Using CNN

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Abstract - In present-days, the technological development in the field of data collection, processing, storing along with the field of research in pattern recognition, machine learning and deep learning serves a biometric person recognition processing fingerprint. In this work, the proposed model is a classification system to recognize and match images of fingerprints. A CNN architecture is used to develop a model for detection. The present study uses approach to ensure the performance of the system. Fingerprint recognition system used for identifies the entity who involved in the database helps to automate fingerprint identification process. Pre-processing was performed with fingerprint thinning and minutiae extraction with method. Feature extraction will be done by the CNN classifier

Keywords : Image Processing, Python Language, CNN

I. Introduction

Biometric characteristics and the different attributes allow people to successfully identify and authenticate the various access control for national and global security system.authentication technologies are used in security awareness in many places, with increasing financial activities. Traditional authentication such as passwords, personal identification numbers, smart cards were largely unable to meet convenience, reliability and security requirements in a wide variety of applications Such traditional methods for acquisition of fingerprint images by pressing finger against the surface that are hard (such as, silicon, glass, polymer, etc) can often lead to a partial or degraded images due to placement of improper fingers. As a result, full fingerprint potential is not realized. Hygiene is serious issue in contact-based system. To address issues mentioned in above technique, touchless finger imaging systems have emerged in the recent years. As unique data is available from fingerprint images, such approach can be used in getting accurate personal identification

II. Methodology

A. Block Diagram`

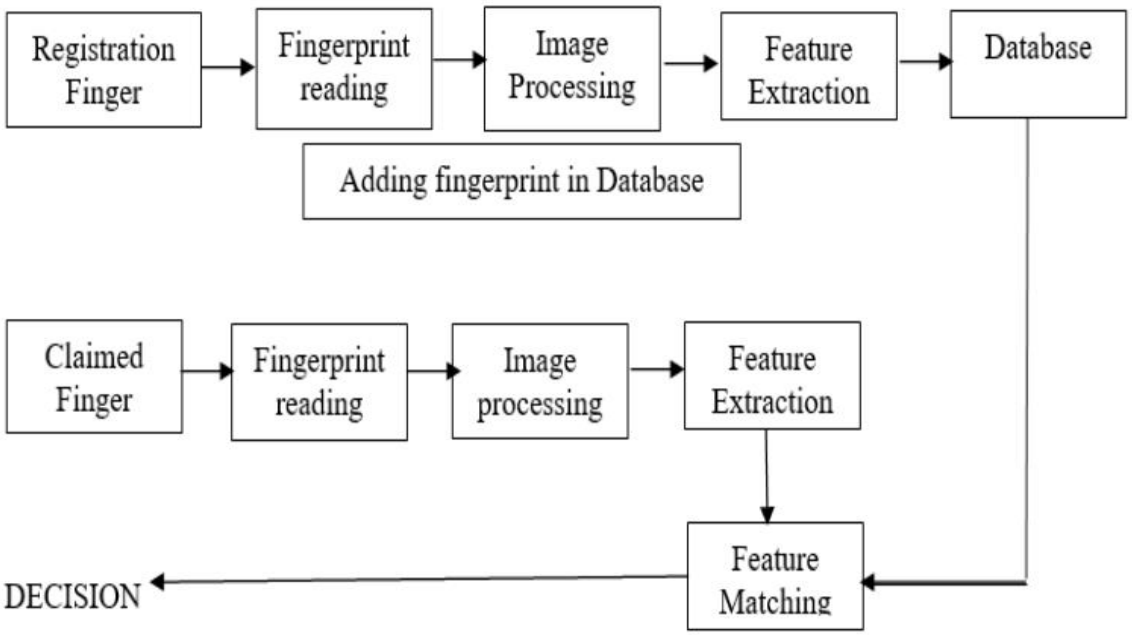


Fig. 1 Block Diagram of Data Logger

Fig. 1 Data Logger

B. • Registration Finger-: In this process we take fingerprint as input and store it in database

C. • Fingerprint Reading-: After registration of finger our algorithm reads the finger to extract the features.

D. • Image processing-: In this block various operation are performed on the image to enhance its quality and clarity for extraction of features.

E. • Feature Extraction-: In this block various features of fingerprint are accepted like various characteristics point of minutae point

F. • Database-: In this phase extracted feature of registred fingerprint are stored to compare it with the other fingerprint for matching.

G. • Claimed Finger-: Now claimed finger is captured to match it with registered finger and same operation are performed on as the registered fingerprint.

H. • Feature Matching-: In this block the feature are matched for recognition **Flow Diagram**

III. EXPERIMENTATION

Steps-:

1)Enrolling Fingerprint-: • For matching fingerprint first we have to do fingerprint registration and extracting features from fingerprint. • For contactless fingerprint we have to capture images of fingerprint from any camera device.[2] • The quality of images obtained from this devices may not be high quality images so we have to perform operations on our image to make it more clear.

2)Fingerprint Enhancement-: • After enrolling fingerprint we perform fingerprint enhancement on our images. • It includes-;

1. Normalization: An input fingerprint image is normalized so that it has a prespecified mean and variance.

2. Local orientation estimation: The orientation image is estimated from the normalized input fingerprint image.

3. Local frequency estimation: The frequency image is computed from the normalized input fingerprint image and the estimated orientation image.

4. Region mask estimation: The region mask is obtained by classifying each block in the normalized input fingerprint image into a recoverable or a unrecoverable block.

5. Filtering: A bank of Gabor filters which is tuned to local ridge orientation and ridge frequency is applied to the ridge-and-valley pixels in the normalized input fingerprint image to obtain an enhanced fingerprint image.

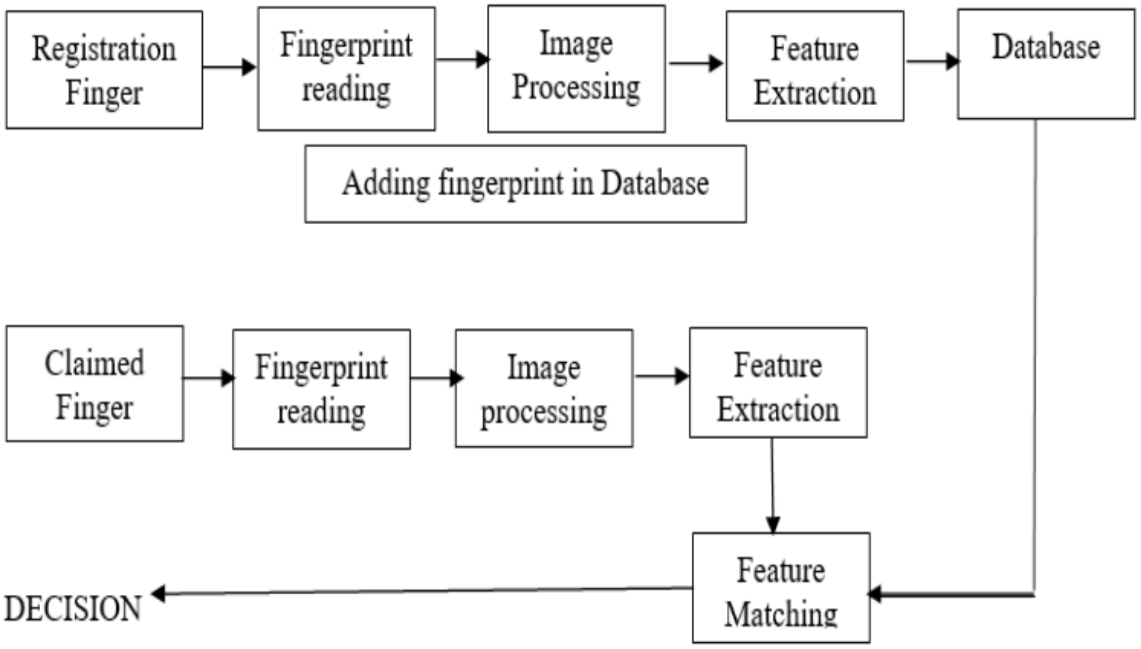


Fig.2 Fingerprint Enhancement

3) Feature Extraction Using CNN-: • A CNN is not only a deep neural network with many hidden layers but also a large network that simulates and understands stimuli as the visual cortex of the brain processes.

• CNN is a neural network that extracts input image features and another neural network classifies the image features. The input image is used by the feature extraction network.

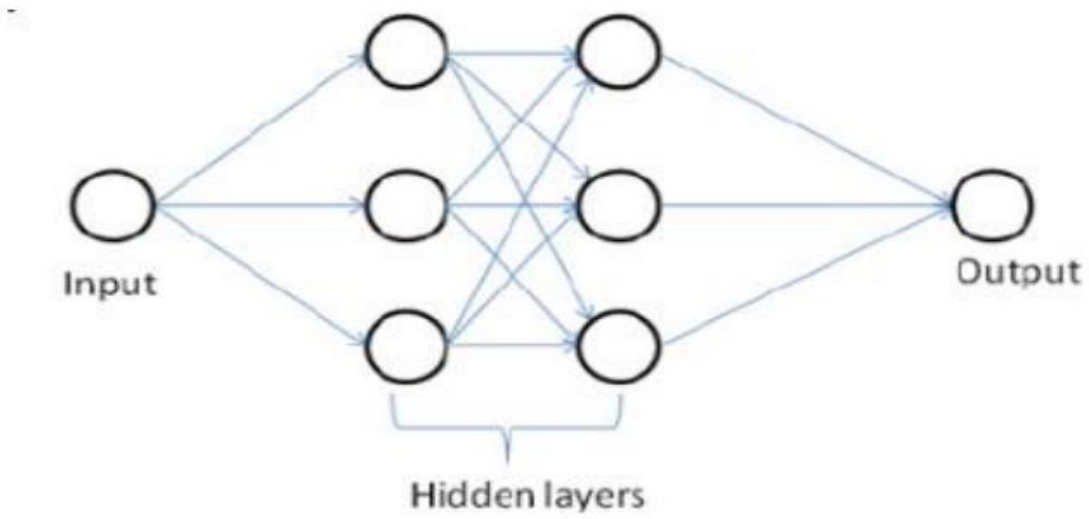
• The neural network classification then works on the basis of the image features and produces the output.

• The neural network for feature extraction includes convolution layer piles and sets of pooling layers. As its name implies, the convolution layer transforms the image using the process of the convolution.

• It can be described as a series of digital filters. The layer of pooling transforms the neighboring pixels into a single pixel.

• The pooling layer then decreases the image dimension. As CNN's primary concern is the image, the convolution and pooling layers' procedures are intuitively in a two-dimensional plane. This is one of CNN's distinctions with other neural networks.

• By extracting features we can now move forward to our next step i.e. to compare the input to our extracted features.



Convolutional Neural Network

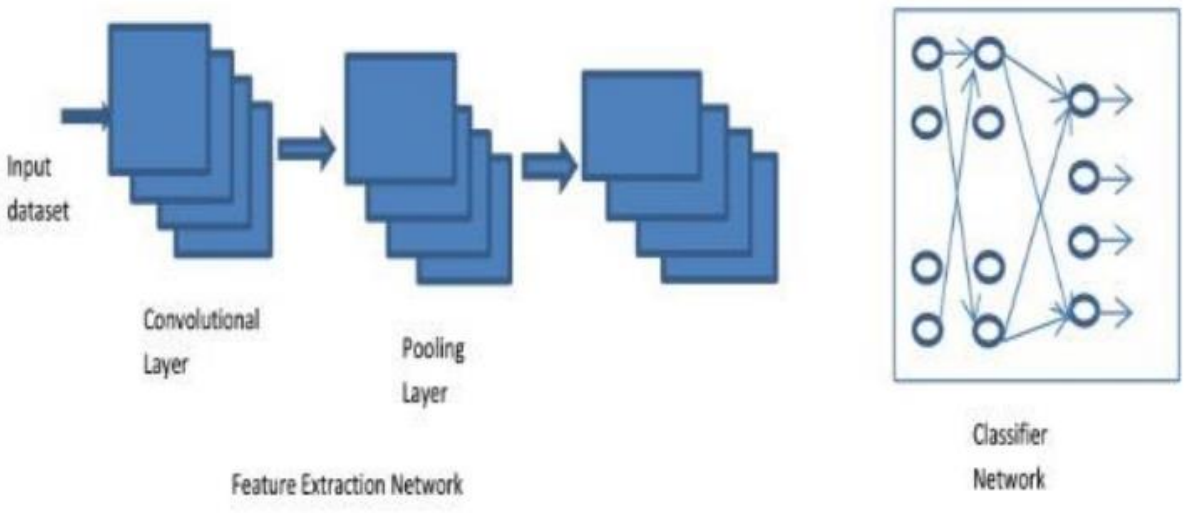


Fig.3 Convolutional Neural Network

IV.Result

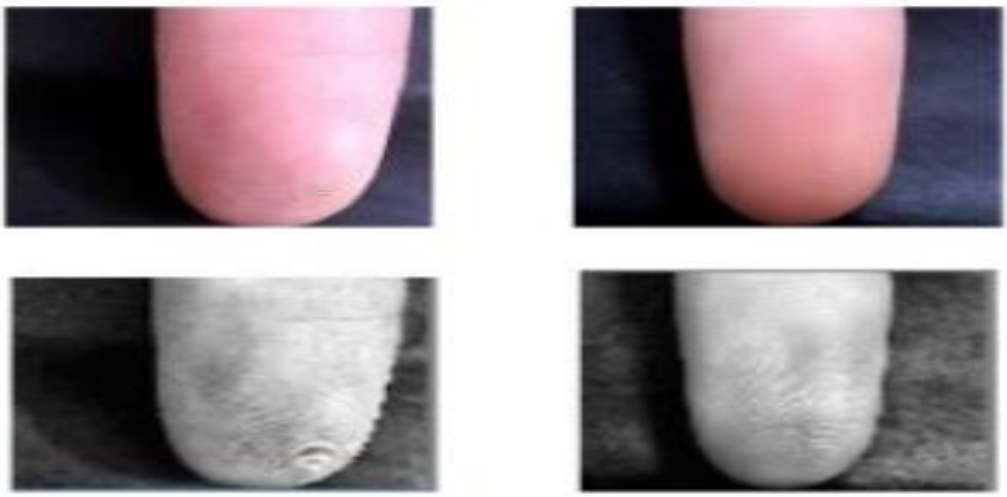


Fig.4 Processed images of fingerprint

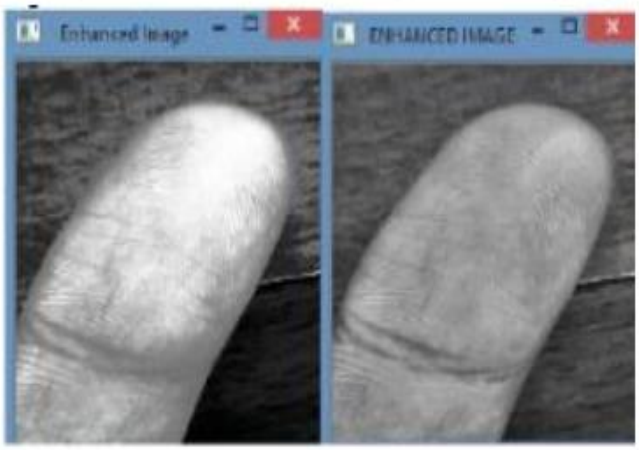


Fig.5 Images with contrast adjustment

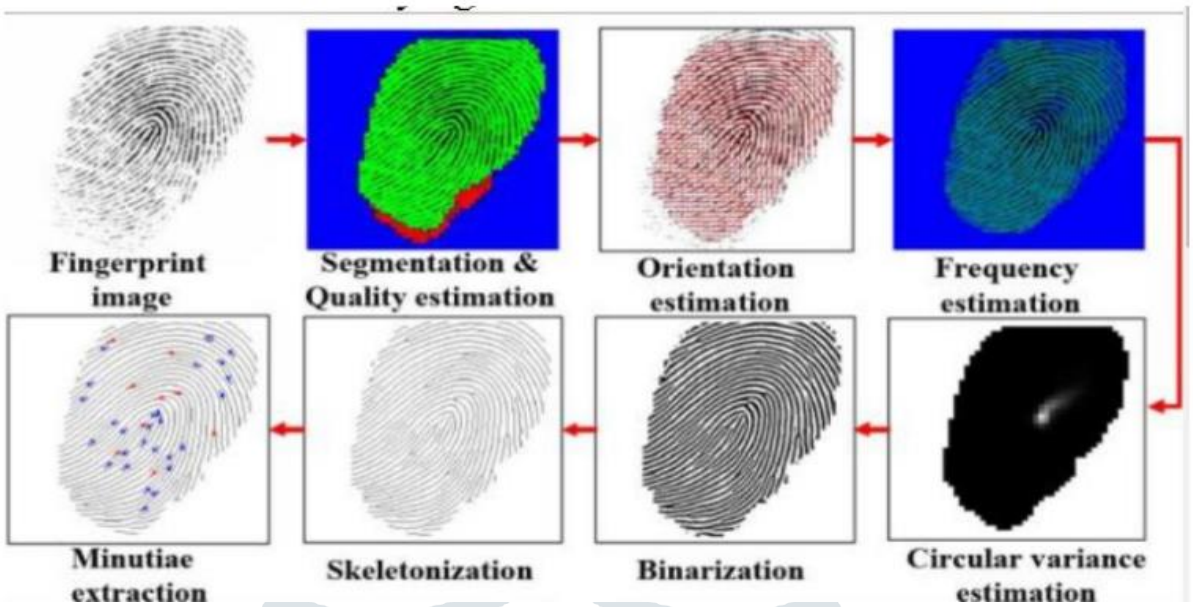


Fig.6 Feature Extraction of Fingerprint

V. Conclusion

In contactless fingerprint systems, especially for un-pinned and unconstrained setups, the presence of incorrect alignments and excessive rotations of the finger can drastically reduce the recognition accuracy of the biometric system. A model is tested which achieved more accurate identification. Higher acc

uracy of recognition, low complexity and low storage requirements can make it popular for deployment. Easy implementation.

VI.References

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