Contrast Enhancement and Feature Extraction Algorithms of Finger Knuckle Print Image for Personal Recognition

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Abstract- This paper presents a method Security is one from the important challenge in technology development. Many companies need secure system that may be used for human recognition. Biometric technology is an effective technique used to identify persons with parts from their bodies which can be identified by the physiological traits such as fingerprint , iris , palm print , hand geometry , retina , face , ear etc. These different biometric modalities are characterized by their easy use and difficult circumvent, for these reasons the hand based biometry have, recently, brought the attention of researchers, especially, the finger-knuckle-print. The Finger-Knuckle–Print (FKP)is defined with its rich texture is becoming a new challenge to identify persons. In this paper, we propose a new algorithm for personal recognition including two main steps.
Firstly, an enhancement algorithm based on Adaptive Histogram Equalization (AHE) is considered ti improve the contrast of input FKP images. Secondly, a new algorithm is proposed to extract minutiae from enhanced FKP image

Keywords**: -** FKP, contrast enhancement, AHE, features extraction.

I. INTRODUCTION

Biometric features have been widely used in personal authentication system because it is more reliable when compared to conventional methods like knowledge based methods e.g. password, PIN number and token based methods eg.passports, ID cards. Different physical or behavioral characteristics like fingerprint, face, iris, palm print, hand geometry, voice, gait, signature etc., have been widely used in biometric systems. Among these traits hand based biometrics such as palm print, fingerprint and hand geometry are very popular because of their high user acceptance. Recently it has been found that image patterns of skin folds and creases, the outer finger knuckle surface is highly unique and this can serve as distinctive biometric identifier. It has got more advantages when compared to finger prints. First it is not easily damaged since only the inner surface of the hand is used widely in holding of objects.. Secondly it is not associated with any criminal activities and hence it has higher user acceptance . Third it cannot be forged easily since people do not leave the traces of the knuckle surface on the objects touched/ handled. Also the FKP is rich in texture and has a potential as a biometric identifier. The rest of this paper is organized as the about the various methods used for capturing finger knuckle print

AFKP(Finger-Knuckle-Print)recognition system can be either a verification system or an identification system depending on the context of an application. The verification system authenticates a person's identity by comparing the captured image with his/her own template(s) stored in the system. It performs a one to one comparison to determine whether the person presenting herself/himself to the system is the person she/he claims to be. An identification system recognises a person by Checking the entire template database for a match. It involves a one to many search. The system will either make a match and subsequently identify the person or it will fail to make a match.

II. PROPOSED SYSTEM

Our proposed technique first sections an information We propose a new algorithm for personal recognition including two main Firstly, an enhancement algorithm based on Adaptive Histogram Equalization (AHE) is considered it improve the contrast of input FKP images. Secondly, a new algorithm is proposed to extract minutiae from enhanced FKPimage. Considered FKP images have a low contrast. To improve the performances of the recognition system, a pre-processing step seems to be necessary to enhance the contrast of the input FKP image and therefore facilitates the minutiae extraction step the histogram equalization method uses the same transformation applied on each pixel of the image. This technique gives good results when the distribution of pixel values is homogenous all over the image. when the image

Finger Knuckle :

Finger knuckle has High textured region. Many samples are available per hand and independent to any behavioural aspect. No stigma of potential criminal investigation associated with this approach. In FKP, features are centre of phalange joint, U shaped line around the middle phalanx, number of lines, length and spacing between lines. context of the region but does not contain temporal information because it is computed frame-by-frame. In order to incorporate temporal information, for a region, we aggregate its region-based features over a sequence of frames, resulting in the consistent

FKP Pre-processing

The backside of finger is to be captured using digital camera. The captured image is then loaded initially to the identification

system. Before using this image for processing so that processing can be efficient and accurate

Image Resize
The enhanced image will be of large in size, since it is captured through digital camera. The processing of large images will not provide exact result and may take more time. Hence the image is resized according to the requirement.

Enhancement:
The finger-knuckle surface represents a relatively curvature surface and results in non uniform reflections. FKP has low contrast and non-uniform brightness. To obtain the well distributed texture image, following operations are applied on FKP. Each FKP image is divided into sub-blocks of 11 × 11 pixels. Mean of each block is calculated which estimates the reflection of the block. The estimated coarse reflection is expanded to the original size of the FKP image using bi-cubic interpolation. For the coarse estimate of reflection, if the block size is very small, the estimate is almost same as the extracted FKP and if the block size is high, the estimate becomes improper. Based on the experiments, block size of 11 × 11 pixels has been chosen for computing the coarse estimate of reflection

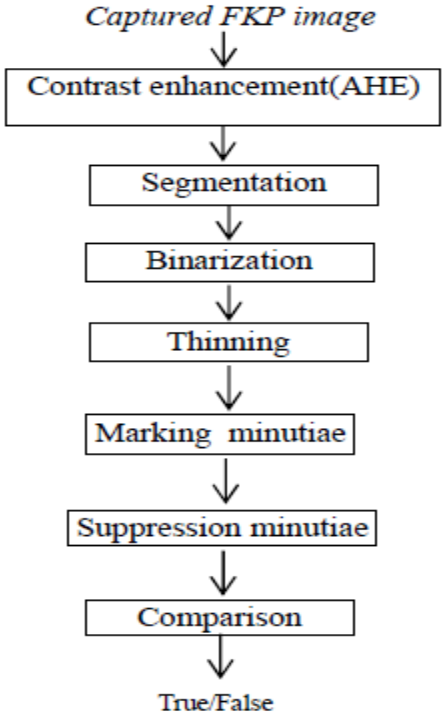
AHE Method:
The image into small rectangular areas called tiles, and enhances the contrast of these areas by adjusting their local histograms. This method is also known as contrast limited adaptive histogram equalization **(**CLAHE**)** Contrast Limited Adaptive Histogram Equalization Like almost every other MATLAB function, adapthisteq can be used with only one input (the image), with all other parameters set to default values. Such a usage is shown in the following script, in contrast to the histeq

Feature Extraction:
Features are extracted from all FKP images. AHE have been designed for extracting highly distinctive invariant features from images. Further, extracted feature vectors are found to be distinct, robust to scale, robust to rotation and partially invariant to illumination. Thus features can be matched correctly with high probability against features from a large database of FKPs. from FKP images are The left middle finger image in which feature points detected by AHE algorithm. If the images are carefully noticed, it can be identified that the AHE was capable of detecting feature

ROI (Region of insertion):
The extracted FKP image is divided into sub-images of size 12×12 pixels. The mean gray level of all the sub-images is then determined. This represents the reflection of the sub-images and this computed value is expanded into the original size of the extracted FKP using bicubic interpolation. The resulting reflection is subtracted from the original image to 103 obtain uniform brightness image which is subjected to histogram equalization to improve the contrast and to smoothen the boundaries between the sub images. The extracted image and enhanced image

Advantages:
- An enhancement process based on AHE is proposed for removing artefacts and improving FKP image quality. Also a new method of minutiae extraction is used.
- Less time consuming process

System Architecture:



III. CONCLUSION

Finger knuckle print being a new trait of biometrics, entered into a family of the biometrics few years ago. Finger knuckle print actually curved like line which is full of rich texture. This texture makes the finger knuckle as the unique features. All the previously designed image processing techniques that are used for the person identification biometrics can also be used with the finger knuckle print and promising results are obtained by using these techniques. From the context of this paper it is clear that the fusion techniques, among all the techniques are reported to be high recognition rate. From the discussion above it can be concluded that the finger knuckle print has very wide scope and it can be expanded to enhance the accuracy

IV. RESULT

During recognition, the corresponding features of enrolled and query FKPs are matched using nearest-neighbourhood ratio method and the derived AHE matching scores are fused using weighted sum rule to obtain fused matching score. The proposed system has been evaluated using publicly available PolyU database images. Weights assigned to AHE score were

tuned to get optimum accuracy, ROC has been drawn viz. Acomparisons to the persons been evaluated as0.800% respectively.

Step1: First take the input image

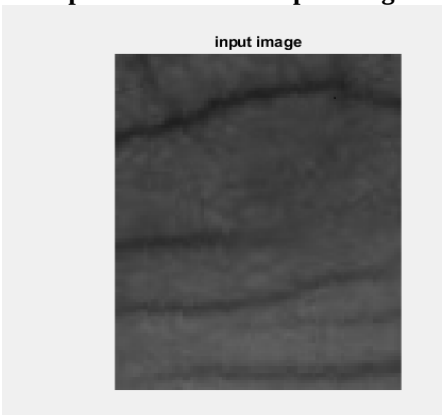


Fig.1: Input image

Step2 : After then converted in enhance ment

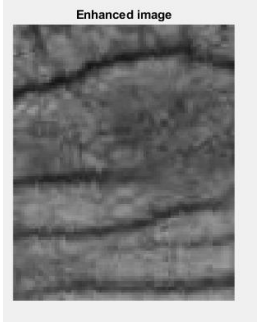


Fig.2: Enhancement image

Step3: after then converted binarization

Fig.3: Binarization image :

Step4: after then converted thinning minuate

Fig.4: Thinning applied minute image

Step5: Finally detecting in minute image

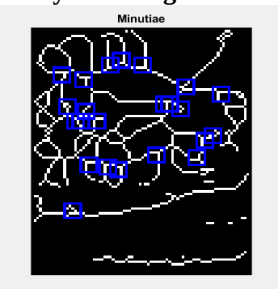


Fig.5: Minuate image

Step6: comparisons of persons knuckle prints

```
person1
person2
person3
person4
    1.0000         0         0         0
         0    1.0000         0         0
         0    0.4000    0.2000    0.4000
         0         0         0    1.0000


ans =

    0.8000
```

Confuse Matrix:

V. REFERENCES

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