Human identification on the basis of finger dorsal image

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***Abstract*—there are several methods of human identification likewise human fingerprints we can use finger dorsal pattern and it is unique. High frofile premices huan forencics and different biometrics are the applications of this innovative biometric method. The surface area of wo different phalanx that is proximal phalanx joining middle phalanx helps to find the human identity. There were lot of difference in conventional finger knuckle identification and other is contact based identification with the help of finger prints. Index terms-biometrics of finger knuckle, proximal phalanges and middle phalanges, finger knuckle, biometrics of finger dorsal, segmentation of knuckle, biometric fusion.**

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I. INTRODUCTION

This paer explains the method to develop human identification securely that is convenient and reliable.the approach presented here is of all our framework has multi resolution detection scheme and other is our methode is template free .there is no need to make lot of computations for matching the template to image feature of various oriantations.

We all know that the anatomy of human hands is very complicated. The bending of the finger to the forward makes it easy and technique to find the template because the backward bending is rarely possible. The application area of method that allows this kind of analysis is continuously growing as finger dorsal iamge analysis is becoming more relevant in identifying process.

A normal human hand has 4 fingers each of which has three bone segments and three joints. Accurate segmentation of region of interest of images have important role to do personal identification accurately by the use of minore finger knuckle pattern. The segmentation able to generate normalized and ROI (rigion of interest) images from dorsal images. In absence of finger docking frame the acquired images illustrate fingers with different poses,locations and scale changes. Also changing of finger nails,width,pigmentations ,phalangal points they create several challenges to create characteristics of the segmentation.

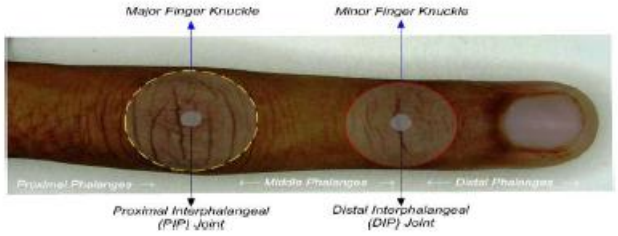


Fig 1. Image sample from a typical finger dorsal surface image identifying the *major* and *knuckle* pattern regions with respect to the PIP/DIP joints.

Fig 2: Simplified Block Diagram illustrating key steps in matching of major finger knuckle test images with equivalent images

II. METHODOLOGY

A. *image acquation*

250 middle finger images or dorsal images acquired from number of subjects was used to accertain the superiority of different matchers considered in this paper.the images of malae or females volunteers are acquired with different environment condition.

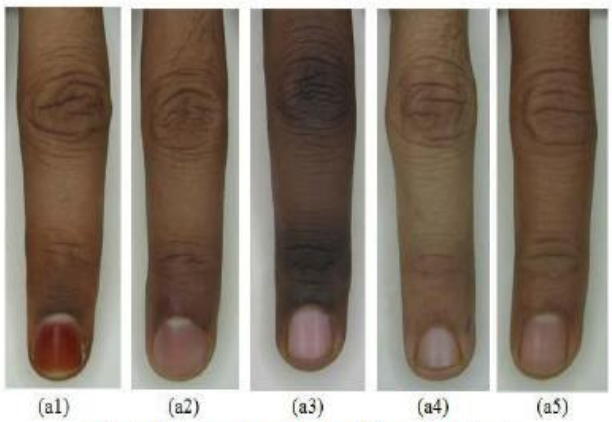


Fig 3: Images taken by 5 different subjects

B. descrete wavelet transform (Haar)-

The frequency domain transform we applied in this research is Haar-DWT, the simplest DWT. A 2-D Haar-DWT has two operations: First horizontal operation and second the vertical one. Procedures for a 2-D Haar-DWT are containing for steps: Step 1: At first, left to right scanning of pixels then addition and subtraction operations on neighboring pixels. Left side store sum and right side store difference in Figure 4. The pixel sums represent the low frequency part (denoted as symbol L) while the pixel differences represent the high frequency part of the original image (denoted as symbol H).

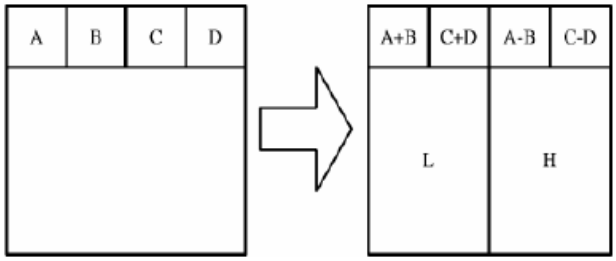


Fig 4: Horizontal operation on first row

Step 2: Secondly, scan the pixels from top to bottom in vertical direction. Perform the addition and subtraction operations with neighboring pixels and then store the sum on the top and the difference on the bottom as illustrated in Figure 5. Repeat the operation .We will obtain LL, HL, LH, and HH 4 sub-bands respectively. The LL sub-band contains low frequency part so appears like original image

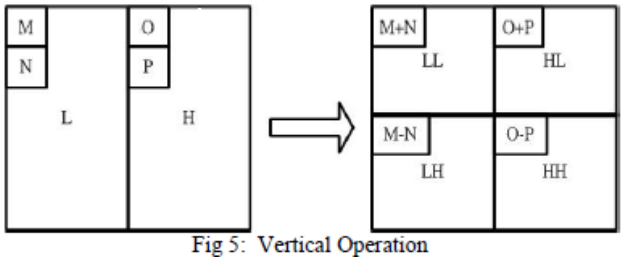


Fig 5: Vertical Operation

C. LBP(local binary pattern)-

The local binary pattern (LBP) encoding can take different knuckle patterns and present multi scale texture.the boundry pattern for every pixel considered at Zc, with surrounding or neighboring pixels Zp is computed as

$$h\left(z_p - z_c\right) = \begin{cases} 1, z_p - z_c \geq 0 \\ 0, Otherwise \end{cases} \quad (1)$$

Hence binomial weights 2*p to the above equation we get the LBP code generating curresponding pixels Zc.*

$$LBP\left(z_r\right) = \sum_{p=0}^{P-1} h\left(z_p - z_c\right) 2^p \quad (2)$$

Where p is total number of pixels in the local regions and p=0,1,2,3,4,5…….p-1. By using the local histogram we can generate LBP discriptors by compairing histogram intersection we will measure the similarity between 2 different discriptors as,

$$S_G^{1,2} = \sum_{i=1}^{W} min\left(g_i^1, g_i^2\right) \quad (3)$$

Where g1 and g2 are discriptors.
W=number of histogram bits.

Now by the gray scale image the uniform histogram at the output imag e can be obtained . A basic method is histogram matching (HM) and for colour mapping following steps.

-first compairing two histogram no need to deal with multiple histogram at a time.

-other is HM approximate at a time but it is not able to provide optimal solution for other matrics.

III. FIGURES

FIG 6: INPUT IMAGE

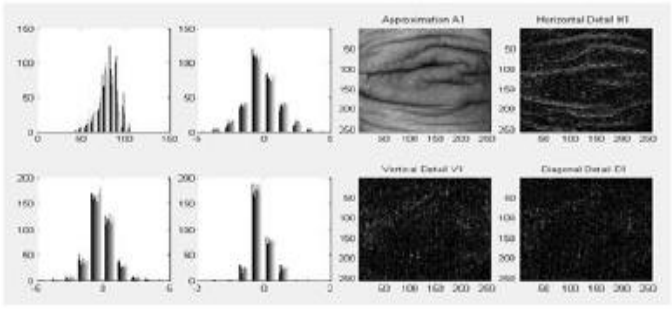
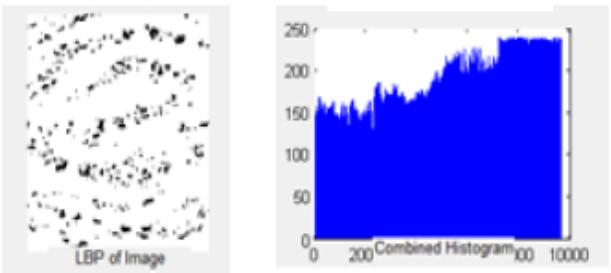


FIG 7: HISTOGRAM OF IMAGE INCLUDING APROXIMATION A1, HORIZONTAL DETAIL H1, VERTICAL DETAIL V1, DIAGONAL DETAIL D1



8 (a) 8(b)

Fig: 8 (a) LBP of Input Image, Fig 8 (b) Combined Histogram of Image

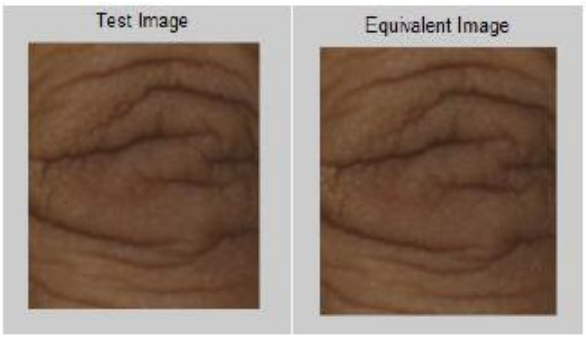


figure 9- test image and equivalent image.

IV. MATHS.

In this paper we take the 40 image training set and after apply 5 different images, that is combination of known and unknown testing images. After apply our methodology we get 3 match and 2 mis match images. So we know that
FAR= {Mismatch/ (Match + Mismatch)}
FRR= {Match/ (Match + Mismatch)}
FAR= {3/ (7+3)} =0.30 FRR= {7/ (7+3)} =0.70

V. CONCLUSION.

The possibility of employing minore finger knuckle images for identification purpose was successfully investigated by this paper.higher matching accuracy is achieved in this paper it also shows that the with the help of only minore knuckle or only major knuckle the performance the performance will affect.so for the improvement in performance both images have equqal role.

PIP and DIP joints are shown in figure2.have significant backward motion and therefore require some mechanism to precent subluxation.the knuckle pattern formed due to stress Or folding pattern of additional dorsal skin of PIP and DIP,joints,closely reflects anatomy of his/her figures.

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