

# Palmprint Region of Interest (ROI) Extraction

Abdul Kareem Z. Mohammed, Jamila H. Saud

**Abstract**— palm print is one of most vital traits which play an important role in biometric system identification since its uniqueness for each individual. The problem with palmprint is how to extract region of interest (ROI) which have interesting information, some of ROI extraction consume more time or High error rate , the goal is to get better extraction rate, the proposed method covert image into gray scale, apply enhancement filter, convert into binary image to get cutting coordinates, and crop the enhanced image based on achieved coordinates. The proposed approach reach high degree of region of interest (ROI) extraction this approach was applied to more than one dataset, Delli Dataset, special built dataset ... etc.

**Index Terms**— palmprint, feature extraction, Region of interest extraction, ROI, image conversion .

## I. INTRODUCTION

Palm prints can be used for criminal, forensic, or commercial applications. Palm prints, typically from the butt of the palm, are often found at crime scenes as the result of the offender's gloves slipping during the commission of the crime, and thus exposing part of the unprotected hand [1]. Palmprint play vital role in biometric identification and recognition system [2] [3]. Where biometric system has two categorize traits: physical and behavioral. The physical like fingerprint , palm vein, palm print, iris ,tongue, hand geometry, hand dorsal, etc., while the behavioral traits is voice ,signature ,keystroke ,etc.[4][5]. In order to obtain an effective palmprint identification system, palmprint ROI is use to get interesting part which has principle lines, permanent wrinkles. the presented method convert color image into gray scale and apply enhancement filter (Gaussian sharpen) to clarify more details) principle lines, wrinkles). The rest of paper is organized as follows: section II related work ,section III presents dataset, section IV introduce image conversion , section V explain enhancement process , section, VI show binary image , section VII Proposed ROI Extraction method , section VIII results and discussion , section IX conclusion.

## II. RELATED WORK

Author and Researchers developed their approach for palmprint acquisition and ROI extraction. Next some of this approach is explain.

In [6] authors have acuire hand images for 170 person via a CCD camera without using any pegs for hand placement. Valley points between fingers are employ as index points to align the hand image such that palm region has minimal

rotation and translation errors. The maximum square region that can fit the palm area is selected as ROI of palm print and the square region is centered on the axis running through the gap between middle finger and ring finger. [7] authors have taken hand images for 50 person via a flatbed scanner. The central line of middle finger is considered as principal axis in locating the palm print ROI. A fixed size ROI is extracted from the palm region. A scanner platform is used by Tee connie et al. in [8] to capture hand images. Two mid points, one at the bottom finger region of index finger and another at bottom finger region of little finger are computed to form the base line. A square region with base line found as one side is cropped as ROI of palm print. Han et al. [9] proposed a novel method of the extraction of the region of interest under unconstrained scenes by detecting shape and color of palm, Li et al. [10] proposed a new ROI extraction method, by considering the distance between corner points and contour centroid.

Our Goal is to improve the performance of existing palm image selection methodology by region based segmentation.

## III. DATASETS

Palmprint data set is IIT Delhi , this dataset consist of 235 volunteer , the age of these people are range between 12 – 57 years , and acquire in July 2006 – July 2007 , each one give about 7 sample for per hand , the format of these image is bitmap (bmp ) , all sample is associated with integer identification number , the quality (resolution ) of the image is 800\*600 pixel . The volunteer are the IIT Delhi staff, and student, it is touchless palmprint dataset. Figure (1) shows sample of dataset images.



Figure (1) original image

## IV. IMAGE CONVERSION

Color image must convert into gray scale image to eliminate time consuming and mathematical calculation for image Algorithm (1 ) show image conversion operation. Figure (2) presents gray scale image

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## Palmprint Region of Interest (ROI) Extraction

Algorithm(1) :Image conversion	
Input	color image
Goal	Gray scale image
Output	Gr_im
Begin: Step1: for i = 0 to row // row number for j = 0 to Colum //column number Get im-pixel-value (i,j (R,G,B)) avg (R+G+B) Set im-pixel-value(i,j(avg, avg, avg)) Next j; Next i Step2: return Gr_im End	

Algorithm(2) :Gray to binary conversion	
Input	Gr_im ,threshold_value
Goal	Binary image
Output	BI_im
Begin: Step1: for i = 0 to row // row number for j = 0 to Colum //column number Get Gr_im-pixel-value (i,j (R,G,B)) If( Gr_im.R>= threshold_value) Set BI_im-pixel-value(i,j) to 255 Else Set BI_im-pixel-value(i,j) to zero Next j; Next i Step2: return BI_im End	



Figure (2) gray scale image

### V. ENHANCEMENT PROCESS

The original image sometimes contains noise due to movement during shooting or because of the lack of accuracy of the camera, and to reduce this noise and improve the captured image it must pass through the enhancement filter , Gaussian sharpen is use for this process Figure (2) shows enhanced image

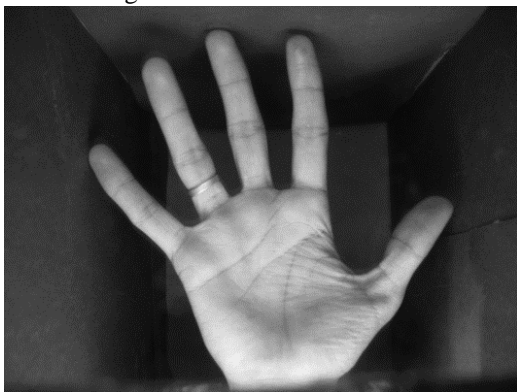


Figure (3) enhanced image

### VI. BINARY CONVERSION

Convert the optimized image to a binary image in order to obtain correct cutting coordinates while retaining the optimized image based on Algorithm (2) .Figure (3) presents binary image

Algorithm (3) : Palmprint Region of Interest extraction	
Goal : Region of interest extraction For Palmprint	
Input : Gr_image , RoI_size	
Output : Palm_RoI	
Begin:bbb Step1 : convert Gr_image into binary_image Step2: for x = 1 to binary_image width for y = 1 to binary_image height color ←get binary_image pixel value (x,y) for i = x to x+150 for j = y to y+150 if ( all pixel in sub image is white ) point1[x,y]←x point1[x,y]←y end if Next Next Next Next Next Step 3 :for x = 1 to Gr_image width for y = 1 to Gr_image height P1 ← first X in point1[x,y] P2 ← first Y in point1[x,y] P11← last X in [x,y] P22← last Y in [x,y] Next Next Xcord← (p11-p1/2)- RoI_size /2 Palm_RoI← crop(Gr_image, Xcord , p2 , RoI_size) Step2 : return Palm_RoI End	



Figure (4) binary image

## VII. PROPOSED ROI EXTRACTION METHOD

Scanning each position of binary image starting with first position in the form of array (each pixel with its neighbors), In order to check whether the pixels and its neighbors are white, that means it has reached the palm. The goal of this operation is first to get rid of the fingers and secondly to know the beginning and end of the palm, then specify middle point between of previous points which act as center to crop image .the operation is accomplish via proposed algorithm (3)

## VIII. RESULT AND DISCUSSION

The results of the proposed method are the most important part of palmprint image which is called region of interest (ROI) , Figure (5) show ROI image .

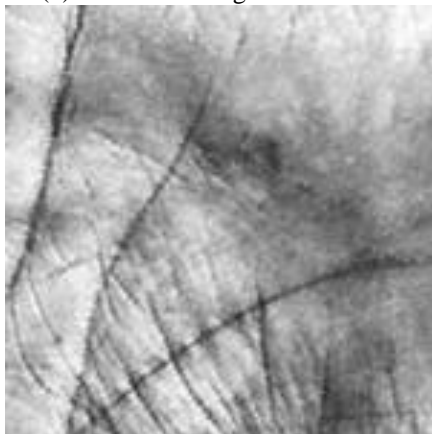


Figure (5) palmprint ROI image

## IX. CONCLUSION

Palmprint region of interest (ROI) is the most interested part of captured image .in this paper the proposed method transfer original image through preprocessing steps ( image conversion , image enhancement ) , then enhanced image go into presented algorithm for coordinate determining by scanning whole image to locate the first point of palm and last pint and make crop according to achieved coordinates. The proposed method achieved high result of cropping.

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