



## Palm Print Recognition Using Ant Colony Optimization

**Mohit Trehan**

Asst. Prof. at Golden College of  
Engineering and technology  
Gurdaspur, Punjab, India

**Nitin Bhagat**

Asst. Prof. at Sri Sai College of  
Engineering and technology  
Amritsar, Punjab, India

*Abstract- Biometric authentication is done by using various biometric traits like face, finger iris and palm print. In this paper the palm prints have been used as simple biometric traits. The palm print database is collected by capturing the image from various individuals. The images have been used for the process of feature extraction and these features have been computed by normalizing the image. The minutiae from the images have been extracted by implementing rigid minutiae extraction approach. This approach extracts the region from the image to compute the minutiae. These features have been optimized by using ACO approach. In this paper ant colony optimization is used for evaluating best features for palm print recognition system.*

**Keywords: Palm Print, Thinning, Binarization, Minutiae and Ant Colony Optimization**

### I. INTRODUCTION

#### 1.1 BIOMETRIC

Biometrics refers to metrics related to human characteristics. Biometrics authentication is used in computer science as a form of identification and access control. It is also used to identify individuals in groups that are under surveillance. Biometric identifiers are the distinctive, measurable characteristics used to label and describe individuals. Biometric identifiers are often categorized as physiological versus behavioral characteristics. Physiological characteristics are related to the shape of the body. Behavioral characteristics are related to the pattern of behavior of a person, including but not limited to typing rhythm, gait, and voice. Some researchers have coined the term behaviorometrics to describe the latter class of biometrics.

Examples include, but are not limited to fingerprint, palm veins, face recognition, DNA, palm print, hand geometry, iris recognition, retina and odor / scent.

#### 1.1 PALM PRINT RECOGNITION

Palm print recognition inherently implements many of the same matching characteristics that have allowed fingerprint recognition to be one of the most well-known and best publicized biometrics. Both palm and finger biometrics is represented by the information presented in a friction ridge impression. This information combines ridge flow, ridge Characteristics and ridge structure of the raised portion of the epidermis. The data represented by these friction ridge impressions allows a determination that corresponding areas of friction ridge impressions either originated from the same source or could not have been made by the same source. Because fingerprints and palms have both uniqueness and permanence, they have been used for over a century as a trusted form of identification. However, palm recognition has been slower in becoming automated due to some restraints in computing capabilities and live-scan technologies. This paper provides a brief overview of the historical progress of and future implications for palm print biometric recognition. Palm recognition technology exploits some of these palm features. Friction ridges do not always flow continuously throughout a pattern and often result in specific characteristics such as ending ridges or dividing ridges and dots. A palm recognition system is designed to interpret the flow of the overall ridges to assign a classification and then extract the minutiae detail — a subset of the total amount of information available, yet enough information to effectively search a large repository of palm prints. Minutiae are limited to the location, direction, and orientation of the ridge endings and bifurcations (splits) along a ridge path. The images in Figure 2 present a pictorial representation of the regions of the palm, two types of minutiae, and examples of other detailed characteristics used during the automatic classification and minutiae extraction processes.

#### 1.2 NEED FOR PALMPRINT TECHNOLOGY

Biometrics has been an emerging field of research in the recent years and is devoted to identification of individuals using physical traits, such as those based on iris or retinal scanning, face recognition, fingerprints, or voices. As unauthorized users are not able to display the same unique physical properties to have a positive authentication, reliability will be ensured. Palm print is preferred compared to other methods such as fingerprint or iris because it is distinctive, easily captured by low resolution devices as well as contains additional features such as principal lines. Iris input devices are expensive and the method is intrusive as people might fear of adverse effects on their eyes. Fingerprint identification requires high resolution capturing devices and may not be suitable for all as some may be finger deficient. Palm print is

therefore suitable for everyone and it is also non-intrusive as it does not require any personal information of the user. Palm print images are captured by acquisition module and are fed into recognition module for authentication. Compared with face recognition palm print is hardly affected by age and accessories. Compared with fingerprint recognition palm print images contain more information and needs only low resolution image capturing devices which reduces the cost of the system. Compared with iris recognition the palm print images can be captured without intrusiveness as people might fear of adverse effects on their eyes and cost effective. Hence it has become an important and rapidly developing biometrics technology over the last decade. Limited work has been reported on palm print identification and verification, despite the importance of palm print features. The system functions by projecting palm print images onto a feature space that spans the significant variations among known images.

## II. LITERATURE REVIEW

**Gyaourova and A. Ross [1]** have proposed an indexing system that can either utilize the biometric matcher that is now present in the biometric framework or utilization another free matcher. File codes are created for every methodology utilizing the relating matcher. Amid recovery, the list code of the test is looked at against those in the display utilizing a likeness gauge to recover a rundown of competitor personalities for biometric coordinating. the proposed indexing system on a chimeric multimodal database brought about a diminishment of the inquiry space by a normal of 84% at a 100% hit rate. The principle element for the measure of speedup amid distinguishing proof was the entrance rate of the indexing.

**Dai and Zhou [2]** presents high determination approach for palm print acknowledgment with various highlights extraction. Highlights like details, thickness, introduction, and vital lines are taken for highlight extraction. For introduction estimation the DFT and Radon-Transform-Based Orientation Estimation are utilized. For details extraction Gabor channel is utilized for edges improvement as indicated by the nearby edge course and thickness. Thickness guide is figured by utilizing the composite calculation, Gabor channel, Hough change. What's more, to concentrate the foremost line highlights Hough change is connected. SVM is utilized as the combination system for the confirmation framework and the proposed heuristic tenet for the ID framework.

**Kong and D. Zhang [3]** have displayed a novel highlight extraction system, the Competitive Coding Scheme for palm print recognizable proof. This plan removes the introduction data from the palm lines and stores it in the Competitive Code. A precise match with a viable usage is created for contrasting Competitive Codes. Complete execution time for check is about 1s, which is sufficiently quick for genuine time applications. The proposed coding plan has been assessed utilizing a database with 7,752 palm print pictures from 386 unique palms. For check, the proposed strategy can work at a high real acknowledgement rate of 98.4% and a low false acknowledgement rate of  $3 \times 10^{-6}$ .

**Jiaa, Huang and Zhang [4]** have proposed palmprint confirmation in light of vigorous line introduction code. Adjusted limited Radon change has been utilized for highlight extraction, which removes introduction highlight. For coordinating of test picture with a preparation picture the line coordinating procedure has been utilized which is in view of pixel-to-region calculation.

**D. Huang, W. Jia, and D. Zhang [5]** proposed a novel calculation for the programmed arrangement of low-determination palm prints. Initially the foremost lines of the palm are characterized utilizing their position and thickness. Central lines are characterized and described by their position and thickness. An arrangement of directional line finders is conceived for vital line extraction. By utilizing these locators, the potential line initials of the central lines are separated and afterward, in light of the removed potential line initials, the important lines are extricated in their whole utilizing a recursive procedure. The nearby data about the removed piece of the foremost line is utilized to choose a ROI and afterward a suitable line identifier is decided to concentrate the following piece of the chief line in this ROI. In the wake of removing the foremost lines, a few tenets are exhibited for palm print characterization. The palm prints are arranged into six classes considering the quantity of the key lines and their convergences. From the factual results in the database containing 13,800 palm prints, the circulations of classes 1–6 are 0.36%, 1.23%, 2.83%, 11.81%, 78.12% and 5.65%, individually. The proposed calculation grouped these palm prints with 96.03% exactness

**Zhang, Kong, You and Wong [6]** have proposed Online Palm print Identification. The proposed framework takes online palm prints, and uses low determination pictures. Low pass channel and limit following calculation is utilized as a part of preprocessing stage. Roundabout Gabor channel utilized for highlight extraction and 2-D Gabor stage coding is utilized for highlight representation. A standardized hamming separation is requested coordinating.

## THE TECHNIQUES IMPLEMENTED

### Ant Colony Optimization

Ant colony optimization algorithm (ACO) is a probabilistic technique for solving computational problems which can be reduced to finding good paths through graphs. This algorithm is a member of the ant colony algorithms family, in swarm intelligence methods, and it constitutes some meta heuristic optimizations. Initially proposed by Marco in 1992 in his PhD thesis, the first algorithm was aiming to search for an optimal path in a graph, based on the behavior of ants seeking a path between their colony and a source of food. The original idea has since diversified to solve a wider class of numerical problems, and as a result, several problems have emerged, drawing on various aspects of the behavior of ants.

## III. PURPOSE METHODOLOGY

Palm print recognition is the process of using a biometric trait for developing an authentication system. Palm print contains different types of veins information for the processing of different gestures. Palm print images have been

captured by using different sensors that provide image of the palm prints. These sensors print the lines that cover under various palm prints. The normalization and preprocessing of these images has to be done by using thinning and binarization. In this process the thinning removes the back ground part from the image. The vein lines that are not completed must be fulfilled by the process of binarization.

In this purposed work the features of the palm print image has been extracted by minutia extraction approach. The minutia extraction from palm print image is marked by this approach. In this process ant colony bee optimization has been used as the optimization tool because the feature evaluated by the minute extraction are huge in amount to reduce the dimension of feature vector different parameters have been used which computes best particle for ant colony optimization. The ant colony optimization approach use different pheromones technology. The pheromones use different particle to compute the best fitness of the feature value. The selection of the features is depended upon the fitness value. The fitness value used for computation is directly proportion to the region of the palm print from which feature has been extracted. The features that have been optimized by using ant bee colony optimization approach have been selected as best evaluated features for palm print recognition.

In this purposed work features for database images has been computed by using minute extraction. These features have been stored as database features. The test image that has been loaded by the user the features of the image have to extracted and distance between database features and query image features have been computed by using distance classifier. The minimum distance between database images the query image is best matched images.

#### IV. RESULTS

This section provides the results for palm print recognition using various image dataset. The database images used for palm print recognition have been pre processed for feature extraction. The database features have been stored in a separate file according to the features computed. After this process all the images has been matched with different query image samples on the basis of distance classifier.

In the purposed work 30 samples of palm print have used for evaluation of the purposed approach. The features for these 30 database images have been computed. These features have been optimized using ant colony optimization approach that finds the best feature value on the basis of fitness function and selection of features. The database features and query image features has been used to find out the recognition of the sample.

The performance of the purposed work is evaluated on the basis of different parameters that parameters are False Acceptance rate, False Rejection Rate and accuracy.

Table 4.1 Parameters Table

Parameters	Minutia	ABC based
FAR	20.6	0.73
FRR	0	0
ACCURACY	79.4	99.27

These results have been computed by analyzing various parameters for palm print recognition. On the basis of these parameters the comparison between purposed and previous work has been evaluated.

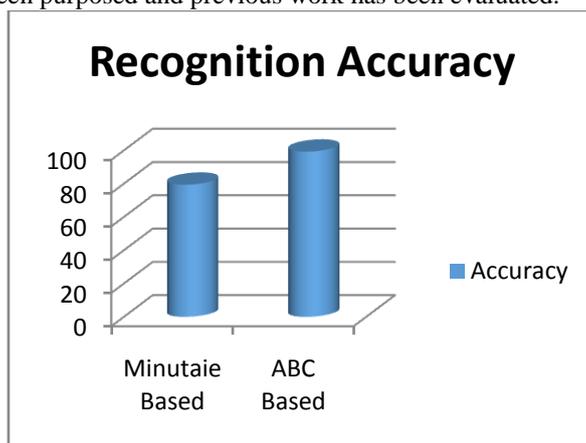


Fig 4.1 Graph for Accuracy

This graph represents the accuracy defined by the previous and purposed work. The graph represents that palm print with ant colony bee optimization provides much accuracy as compare to the approach minutia extraction.

#### V. CONCLUSION

Palm print recognition is an biometric authentication model that can be used for various prospective. Palm print contains various points and veins on the human body parts. These can be utilizing as biometric trait because the identity of the palm print is unique for each individual. Due to uniqueness the palm print is a secure biometric trait. In this paper the features of palm print images have been extracted by using thinning and binarization. These features have been

optimized by using and artificial intelligence approach that is ant colony optimization. By analyzing the results one can conclude that purposed approach provides better results as compare to previous approach in both perspective of accuracy and false acceptance rate.

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