

# A Review on Various Approaches of Palm print Recognition

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**Abstract:** *Biometrics is portrayed as the exceptional (individual) physical/wise properties or attributes of human body. These qualities and attributes are used to perceive each human. These characteristics and traits are used to identify each human. Any details of the human body which differs from one human to other will be used as unique biometric data to serve as that person's unique identification (ID), such as: retinal, iris, fingerprint, and palm print and DNA. In the previous work, a course to fine minutiae-based latent palm print matching technique where feature extraction is on the basis of minutiae extraction algorithm and then matching is basis of that features. We read various algorithms of feature extraction.*

**Keywords:** Biometric, Face, Finger, Iris, Palm Print Recognition, Bacterial forging optimization, Unique Identification

## 1. Introduction

### 1.1 Biometrics

A brief establishment of biometric and biometric security structures will give a more conspicuous cognizance of the thought of framework security. Biometrics is portrayed as the exceptional (individual) physical/wise properties or attributes of human body. These qualities and attributes are used to perceive each human. Any purposes of enthusiasm of the human body which changes from one human to other will be used as remarkable biometric data to serve as that individual's momentous (ID, for instance, retinal, iris, interesting finger impression, and palm print and DNA. Biometric structures will accumulate and store this data with a particular deciding objective to use it for checking individual identity. The mix of biometric data systems and biometrics affirmation/ ID advances makes the biometric security structures. Biometric security system is a lock and catch framework to control access to specific data. To get to the biometric security system, an individual will need to give their phenomenal qualities or properties which will be composed to a database in the structure.

### 1.2 There are four basic criteria for biometric security system:

- Uniqueness
- Collectability
- Performance
- Acceptability

**1.2.1 Uniqueness:** - Uniqueness is considered as the priority one requirement for biometric data. It will indicate how differently and uniquely the biometric system will be able to recognize each user among groups of users. For instance, the DNA of each person is unique and it is impossible to replicate.

**1.2.2 Collectability:** - The collectability parameter requires the collection of each characteristic and trait by the system in order to verify their identification.

**1.2.3 Performance:** - Performance is the next parameter for the system which outlines how well the security system works. The accuracy and robustness are main factors for the biometric security system. These factors will decide the performance of the biometric security system.

**1.2.4 Acceptability:** - The acceptability parameter will choose fields in which biometric technologies are acceptable.

### 1.3 Biometric Modalities

Biometric modality refers to a system built to recognize a particular biometric trait. Face, fingerprint, hand geometry, palm print, iris, voice, signature, gait, and keystroke dynamics are examples of commonly used biometric traits.

#### 1.3.1 Face

Face recognition is a non-nosy technique, and facial pictures are most likely the most widely recognized biometric trademark utilized by people to make an individual recognition. Static or video images of a face can be used to facilitate recognition. Modern approaches are only indirectly based on the location, shape, and spatial relationships of facial landmarks such as eyes, nose, lips, and chin, and so on.

#### 1.3.2 Fingerprint

The patterns of ridges and valleys on the —frictionridge” surfaces of fingers—have been used in forensic applications for over a century. Friction ridges are formed in utero during fetal development, and even identical twins do not have the same fingerprints. The recognition performance of currently available fingerprint-based recognition systems using prints from multiple fingers is quite good. One factor in recognition accuracy is whether a single print is used or whether multiple or ten prints are used.

#### 1.3.3 Palm print Identification System

Palm print based individual check has immediately entered the biometric family because of its simplicity of obtaining, high client acknowledgement and unwavering quality. Palm

print not just has the interesting data accessible as on the unique finger impression yet has significantly more measure of subtle elements regarding main lines, wrinkles and creases.

#### 1.3.4 Iris

We are living in the age, in which the demand on security is increasing greatly. Consequently, biometric recognition, which is a safe, reliable and convenient technology for personal recognition, appears. Iris recognition is the procedure of perceiving an individual by dissecting the irregular example of the iris. The computerized system for iris recognition is generally youthful, existing in patent since just 1994. The iris is a muscle inside the eye that directs the extent of the pupil, controlling the measure of light that enters the eye.

#### 1.3.5 Speech

Speech is a combination of both physical and behavioral biometrics traits. The features of an individual's voice are based on the shape and size of the appendages (e.g., vocal tracts, mouth, nasal cavities, and lips) that are used in the synthesis of the sound. Physical characteristics of behavior part of speech change with the age, because of some medical conditions such as cold etc. A text-dependent voice recognition system is based on the utterance of a fixed predetermined phrase i.e. password.

#### 1.4 Working of Palm Recognition

In palm recognition a 3-dimensional image of the hand is collected and compared to the stored sample. Palm recognition devices are cumbersome artifacts (unlike fingerprint and iris recognition devices) but can absorb performs a great amount of identification acts in a short time. They are therefore preferably installed in situations where a large number of people are identified, as in airports.

#### 1.5 Advantages of palm recognition: -

- 1) Palm prints contain more information than fingerprints so they are more distinctive.
- 2) Palm print capture devices are much cheaper than iris devices.
- 3) Palm prints contain additional distinctive features such as principal lines and wrinkles, which can be extracted from low-resolution images.
- 4) By combining all of the features of a palm, such as palm geometry, ridge and valley features, and principal lines and wrinkles, it is possible to build a highly accurate biometrics system.

## 2. Review of Literature

**Cootes T.F., Taylor C.J. et al [1]** "Active shape model-Their training and application" In this paper, they demonstrate that dynamic shape model adventure in the straight definition of PDMs in an iterative hunt method equipped for quickly finding the displayed structure in uproarious, jumbled quickly finding the pictures regardless of the possibility that they are mostly blocked. Objects distinguishing proof and area are strong in light of the fact

that the models are particular in the sense that examples are compelled to be like those in the preparation set.

**Francic Ivan. Et al [2]** "Techniques and Recent Directions in Palm print and Face Recognition". In this paper, face and palm print are two biometric attributes with the most astounding client acknowledgement. Frameworks in view of face speak to 19% of the biometric piece of the overall industry. There exist a mixed bag of systems, both element based and appearance-based, that can be utilized as a part of palm print and face biometric frameworks to concentrate important components and perform coordinating. Biometric combination can be utilized to consolidate various types of components, regularly got from the same biometric attribute, to enhance the execution of the framework

**Junlin Hu, YanxueXueYongwei. Et al [3]** "Palm print Recognition Based on Multiple Feature Information Fusion" In this paper, they apply 2D Gabor channel, MFRAT and ODLPP to concentrate three various types of palm print elements including composition highlight, vital lines and appearance highlight. And after that perform numerous component combination on the choice level to further enhance the palm print acknowledgment exactness. The strategy has been tried on Poly U palm print database and the trial results showed its viability, which likewise demonstrated that data combination based palm print acknowledgment can be moved forward.

**KarthikNandakumar. Et al [4]** "Local correlation base fingerprinting" In this paper, a relationship based unique mark matcher that uses nearby connection of locales around the details to focus the level of match between two finger impression pictures. This strategy utilizes a no doubt understood calculation for details extraction and uses Procrustes examination of relating edge bends to adjust the inquiry to the format. The two pictures are upgraded utilizing Gabor filter banks and the standardized cross-connection is utilized as the nature of the particulars match. The execution of our calculation is somewhat second rate compared to that of the 2D dynamic programming based details matcher, essentially because of the powerlessness to handle unique finger impression pictures of low quality. Nonetheless, incorporating the proposed calculation with the 2D dynamic programming based coordinating yields a superior coordinating.

**WuaXiangqian, Zhang David, WangaKuanquan, et al [5]** "Palm printing classification using principal lines" In this paper, an arrangement of directional line locators is concocted for important line extraction. By utilizing these indicators, the potential line initials of the important lines are separated and after that, taking into account the extricated potential line initials, the essential lines are removed in their whole utilizing a recursive procedure. The neighborhood data about the extricated piece of the primary line is utilized to choose a return on initial capital investment and after that a suitable line indicator is decided to concentrate the following piece of the key line in this return for capital invested.

**Zhang David, FeGuangming Lu, Wei Li, et al [6]** "Palm print Recognition Using 3-D Information" In this paper,

investigated another method for palm print based biometrics: 3-D palm printing recognition. A structured- light imaging-based 3-D palm print information securing framework was created. After the 3-D palm print picture is caught, the return for capital invested is separated to generally adjust the palm and uproot the pointless cloud focuses. This paper proposed the shape based component extraction calculations to concentrate the MCI, GCI, and ST highlights. A quick element coordinating system and score-level and highlight level combination methods were utilized to group the palm prints.

### 3. Approaches Used

**Principal component analysis (PCA):** PCA is mostly used as a tool in exploratory data analysis and for making predictive models. PCA can be done by eigen value decomposition of a data covariance matrix or singular value decomposition of a data matrix, usually after mean centering (and normalizing or using Z-scores) the data matrix for each attribute. The results of a PCA are usually discussed in terms of component scores, sometimes called factor scores and loadings. PCA is the simplest of the true eigenvector-based multivariate analyses. Often, its operation can be thought of as revealing the internal structure of the data in a way that best explains the variance in the data. If a multivariate dataset is visualised as a set of coordinates in a high-dimensional data space (1 axis per variable), PCA can supply the user with a lower-dimensional picture, a projection or "shadow" of this object when viewed from its most informative viewpoint. This is done by using only the first few principal components so that the dimensionality of the transformed data is reduced.

**Independent Component Analysis:** ICA is very closely related to the method called blind source separation (BSS) or blind signal separation. A "source" means here an original signal, i.e. independent component, like the speaker in a cocktail party problem. "Blind" means that we know very little, if anything, on the mixing matrix, and make little assumptions on the source signals. ICA is one method, perhaps the most widely used, for performing blind source separation. In many applications, it would be more realistic to assume that there is some noise in the measurements which would mean adding a noise term in the model. For simplicity, we omit any noise terms, since the estimation of the noise-free model is difficult enough in itself, and seems to be sufficient for many applications.

**Discrete Cosine Transform:** A discrete cosine transform (DCT) expresses a finite sequence of data points in terms of a sum of cosine functions oscillating at different frequencies. DCTs are important to numerous applications in science and engineering, from lossy compression of audio and images to spectral methods for the numerical solution of partial differential equations. The use of cosine rather than sine functions is critical for compression, since it turns out that fewer cosine functions are needed to approximate a typical signal, whereas for differential equations the cosines express a particular choice of boundary conditions.

**Fisherpalms:** A  $N \times N$  palmprint image can be considered as a  $N^2$  vector and each pixel corresponds to a component.

That is,  $N \times N$  palmprint images can be regarded as points in a high-dimensional space ( $N^2$ -dimensional space), called the original palmprint space (OPS). Generally, the dimension of the OPS is too high to be used directly. For example, the dimension of the original 128, 128 palmprint image space is 16,384. We should, therefore, reduce the dimension of the palmprint image and, at the same time, improve or keep the discriminability between palmprint classes. A linear projection based on FLD, thus, is selected for this purpose.

### 4. Conclusion

Palm print recognition is a 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 our work we will use BFO Algorithm to optimize features for reduction of feature dimension and accuracy improvement. This will help to reduce the number of features extracted by optimizing them and then matching is on the basis of these extracted features. This approach helps to enhance the minutiae-based scheme and will improve the accuracy of the palm-print matching systems.

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