# A Review on Scope of 3D Palm Print and Its Application in Modern ERA

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*Abstract – Biometrics is technology of identifying uniquely human subjects by means of measuring & analyzing one or more inherent behavioral or physical traits. These human body characteristics include fingerprints, voice patterns, eye retinas & irises, facial patterns & hand dimension. Biometric systems are used to authenticate identity by measuring physiological and/or behavioral characteristics. So, two main categories of biometrics are 'physiological' and/or 'behavioral'. The physiological category includes physical human traits such as palm print, hand shape, eyes, veins, etc. The behavioral category includes movement of human, such as hand gesture, speaking style, signature etc. The measurement of these traits helps within authentication using biometric systems. In this paper the study has been made about existing biometric system along with their working and application in modern era. This paper also represents various researches in field of 3D PALM PRINT.*

*Keywords: Biometric, Behavioral Traits, Physical Traits, Fingerprints, Palm Print, Facial Patterns.*

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## 1. INTRODUCTION

Biometric systems include applications making use of biometric technologies & which allow identification automatically, verification or authentication of a natural person. In principle, processing of personal data involving use of a biometric system is considered by privacy experts to be only justified within places requiring a high level of security & absolute identification procedures. The implementation of similar systems should take place within a transparent way & therefore appropriate information should always be provided to employees. Where introduction of biometric systems is necessary, employers should opt for that system which provides a high level of comfort within terms of privacy requirements. It is possible within view of technological progress achieved within this field.

## 2. PALM PRINT RECOGNITION

**Palm print recognition** is one of biometrics available at present. One of most successful biometric systems is palm print recognition system. This system recognizes on basis of palm print of a person. It is reliable due to fact that print patterns are always unique. Palm print is made up of principal lines, wrinkles, & ridges. Three kind of features are within palm print: geometry features (width, length, & area of palm), line features (principal lines, coarse wrinkles, & fine wrinkles), & point features (minutiae & delta points). Palm print verification uses these features to verify identity of a person. However, geometrical features, such as width of palm could be faked easily by making a model of a hand. Delta points & minutiae only could be extracted from fine resolution images. Principal lines & wrinkles are very important to discriminate between different palm prints & they could be extracted from low resolution images. Palm lines are very irregular & even within same palm they have quite different directions, shapes, & contrast, thus this is very difficult task to extract these lines.

Thus palm print recognition is a very interesting research area. Much work has already been done within this area, but there is still a lot of scope to make systems more efficient. Here, we have tried to analyze already existing systems & there by propose a new approach.

A biometric system might be used for personal recognition instead of token-based methods such as a passport, a physical key & an ID card or Knowledge base method such as a password. In token-based, "token" could be stolen or lost easily while knowledge could be forgotten.

## 3. EXISTING RESEARCHES

There have been several researches in field of biometrics. Some of them are research related to support vector machines in finger print, comparison of 3d Biometric modalities, Multi-Biometric

Personal Authentication with 3d Face and Iris Images ,Face Recognition by purposive control of observer motion. There have been several technical as well as review paper related to Biometric. This section discusses the objectives and results of existing research papers that are related to proposed research work.

### In 2001 wrote by C. Chang and C. Lin. LIBSVM: a library for support vector machines in finger print

A fingerprint in its narrow sense is an impression left by friction ridges of a human finger. Recovery of fingerprints from a crime scene is an important method of forensic science. Fingerprints are easily deposited on suitable surfaces (such as glass or metal or polished stone) by natural secretions of sweat from eccrine glands that are present in epidermal ridges. These are sometimes referred to as "Chanced Impressions". In a wider use of term, fingerprints are traces of an impression from friction ridges of any part of a human or other primate hand.

### In 2015 wrote by Damon L. Woodard, Timothy C. Faltemier, Ping Yan, Patrick J. Flynn, Kevin W. Bowyer in 2015 A Comparison of 3D Biometric Modalities

This paper presents structure of a 3D facial authentication system. Focus is on acquisition & processing of 3D facial data, different 3D facial representations i.e. models & various 3D facial features. Advantages & disadvantages of different representations & features are discussed.

### In 2014 wrote by Dr. T. Karthikeyan Multi-Biometric Personal Authentication with 3d Face and Iris Images Using Sum Rule Based Fusion of Matching Score

Image pre-processing techniques for eigenface based face recognition. "They have presented a range of image processing techniques as potential pre-processing steps,which attempt to improve performance of eigen face method of face recognition.

### In (1994) wrote by Dyar. C.R "Face Recognition by purposive control of observer motion", Computer Vision and Pattern Recognition

A face recognition system is a group of programs for automatically recognize a person from a digital image or a video frame from a source.Ways to do this is by comparing selected characteristics from image and face database.

### In 2003 wrote by Gerhard X. Ritter; Joseph N. Wilson, " Handbook of Computer Vision Algorithms in Image Algebra

Since the field of image algebra is a recent development it will be instructive to provide some background information .In the broad sense, image algebra is a mathematical theory concerned with the transformation and analysis of images. Although much emphasis is focused on the analysis and transformation of digital images, the main goal is the establishment of a comprehensive and unifying theory of image transformations, image analysis, and image understanding in the discrete as well as the continuous domain.

### In 2003 wrote by L. Ma, and T. Tisse, "Personal Recognition Based on Iris Texture Analysis

With an increasing emphasis on security, automated personal identification based on biometrics has been receiving extensive attention over the past decade.Iris recognition, as an emerging biometric recognition approach, is becoming a very active topic in both research and practical applications.In general,a typical iris recognition system includes iris imaging, iris liveness detection, and recognition.This paper focuses on the last issue and describes a new scheme for iris recognition from an image sequence.

## 4. MOTIVATION FOR CURRENT RESEARCH

During last year's there has been growing use of automatic personal recognition systems. Palmprint based biometric approaches have been intensively developed over last 12 years because they possess several advantages over other systems. Palmprint images could be acquired with low resolution cameras & scanners & still have enough information to achieve good recognition rates. In this case, discriminate information relies within palm lines & texture. However, if high resolution pictures are captured, ridges & wrinkles could be detected, resulting within an image similar to fingerprints[5].

Palmprint are one of four biometric modalities possessing all of following properties:

- **Universality,** which means trait should be present within all individuals.

- **Uniqueness,** as characteristic has to be unique to each individual.

- **Permanence,** its opposition to aging.

- **Measurability,** how easy is to obtain picture or signal from individual.

- **Performance,** how good this is at recognizing & identifying any person.

- **Acceptability,** population must be willing to provide characteristics.

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## 5. WORKING PRINCIPLE

During enrollment phase, data is immediately converted into a template containing a unique binary code which represents characteristics or measurements of biometric feature. This binary code is normally encrypted & kept within a separate storage space, for instance, within memory of biometric device. In this way biometric data is segregated from other personal information conventionally contained within a back-end database & kept for administrative purposes. For instance, every time person makes use of biometric device to enter or exit work premises, system will convert fingerprint [5] data to a binary code & match code with one previously contained during enrolment phase to authenticate individual.

The method of identification based on biometric characteristics is preferred over traditional passwords & PIN based methods for various reasons such as: The person to be identified is required to be physically present at time-of-identification. Identification based on biometric techniques obviates need to remember a password or carry a token. A biometric system is essentially a pattern recognition system which makes a personal identification by determining authenticity of a specific physiological or behavioral characteristic possessed by user. Biometric technologies are thus defined as "automated methods of identifying or authenticating individuality of a living person based on a physiological or behavioral characteristic".

**Identification -** One to Many: Biometrics could be used to determine a person's individuality even without his knowledge or consent. For example, scanning a crowd with a camera & using face recognition technology, one could determine matches against a known database.

**Verification -** One to One: Biometrics could also be used to verify a person's individuality. For example, one could grant physical access to a secure area within a building by using finger scans or could grant access to a bank account at an ATM by using retinal scan.

Biometric authentication requires to compare a registered or enrolled biometric sample (biometric template or identifier) against a newly captured biometric sample.

## 6. AREA OF APPLICATION

**Biometric systems are basically used for security and accountability purposes.**

1. **For Security:** Protect Sensitive Data, High degree of individuality certainty within transactions & Create databases with singular identities.

2. **For Accountability:** Improve auditing/reporting/record keeping & time keeping & for efficiency. Reduce password-related problems. It is also used within following areas: enterprise-wide network security infrastructures, secure electronic banking, investing & other financial transactions, retail sales, law enforcement, health & social services.

## 7. SCOPE OF RESEARCH

In future Palm Print process is found to be most secure as compared to other biometric techniques. It could be useful to enhance secure transaction within banks & other financial organization. However there are many challenges within frequent use of this technology but within future due to advent of new technology it would be possible to use this technology easily.

Enterprise & government both acknowledge convergence of physical & information security environments,but there are new security challenges on horizon just-in-time inventory control, sophisticated supply chain management,& even a phenomenon called "coopetition" in that companies that compete within some areas, cooperate within others. Managing this convergence of physical & information security requirements now drives security system architecture design & implementation & is an increasingly key factor within biometric technology selection. Managing convergence would only become a more complex task because as IT & communications becomes increasingly wireless, there is a need for robust individuality management would become more acute. Palm Print 3D sees this technology as a natural "fit" for within physical & wireless arenas. This growing need, as well as Palm Print 3D competence within this technology, coupled with core interests within IT & wireless, provide impetus for design efforts for future & makes Palm Print 3D one to watch for new developments within individuality management tomorrow & beyond.

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