



REVIEW OF BIOMETRIC 3D PALM PRINT RECOGNITION SYSTEM

¹Ritu, Research scholar, Department of CE, IIET, Kinana jind, Mittalritu047@gmail.com

²Mr. Amit Garg Assistant Professor CE, IIET, Kinana Jind. amit.indus86@gmail.com

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 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.

[1] INTRODUCTION

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 Knowledgebase method such as a password. In token-based, “token” could be stolen or lost easily while knowledge could be forgotten or guessed within a knowledge-base [9].

In this research we will use three dimensional technologies to compare biometric features of person to enhance security.

During last years 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.

present their smart card to biometric reader at any location where card is valid. The biometric template contained on card (which is usually encrypted) is compared to live biometric. If two match, system grants user access.

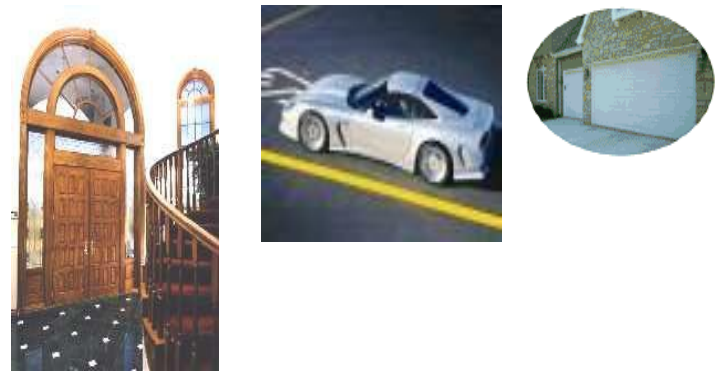


Fig.1: Applications- Doors, Cars, Garage Access

Biometrics With Smart Cards

Smart cards, when combined with biometrics, offer a number of benefits.

smart cards provide a portable storage mechanism for biometric template. This means template management is eliminated across biometric reader network. Enrolled users



Fig. 2: ATMs & Smart Card Utility



[2] LITERATURE REVIEW

Francis Galton is one of founders of Bio-metrics. In 1892, Galton invented first system of fingerprinting. He has observed that No two persons have same finger print. Each & every person has got a unique finger print pattern. In 1968, Bio-metrics technique was put into operation successfully when well-known bank of New York has arranged finger print scanning to access currency walt , first time within world.

But after 1990, when IT (Information Technology) comes into picture, through its advancement & simplicity Bio-metrics technique becomes very popular. This new technology is very easy to understand compare to its heavy label. Because of user-friendly environment this technique is very well welcomed by various fields.

Mariusz Leszczyński (2010)has worked on image preprocessing for illumination invariant face verification. “Performance of face verification system depends on many conditions. One of most problematic conditions is varying illumination condition. They have compared 14 normalization algorithms based on histogram normalization, illumination properties & human perception theory using 3 verification methods.

[3] PROBLEM FORMULATION

Pattern of iris- An iris has a mesh-like texture to it, with numerous overlays & patterns. The iris is located behind cornea of eye, but within front of lens.

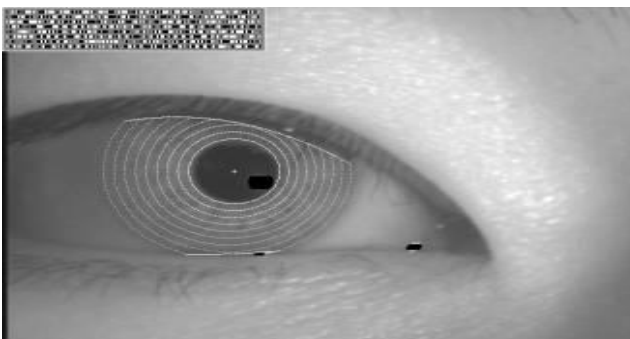


Fig-3 Iris Scanning

Its only physiological purpose is to control amount of light that enters eye through pupil, but its construction from elastic connective tissue gives it a complex pattern.

Face Print- To make this pattern camera will use approx 50 features of face like distance between two eyes, breath of nose, cheeks, area of forehead, jaws etc. These features are converted into digital form. The computer converts face pattern into 0 & 1.After taking input that input is also converted into 0 & 1.If both code matches person is authorized.

The palmprint based systems for verification make use of ink marking to capture the palmprint patterns. These systems are not widely accepted because of high attention and co-operation of users to provide data. Recently digital camera is used to capture images and users hand placing is constrained using pegs.

The problem with this system is that the users may not be able to provide the sample for enrollment or verification if hand is injured or physically challenged. Hence there is a need to build a system which has following characteristics.

- The main problem with LBP is, when we calculate LBP's of direct palm image, then extracted features are not very directive. Also, the communication cost and efficiency of system degraded to a higher level.
- The method should be intelligent and supervised, so that, there's no need of calculating and matching features in a traditional way.
- If we learn the system for various experiment cases, then it is capable for handling real time images and palm sections with various orientation.
- Constraint free image acquisition: the device used for acquiring hand image from user should be constraint free. So that physically challenged or injured people



can provide biometric sample. Figure 1 shows an example of constrained image acquisition.

- Robust to translation and rotation: The system should be able to extract palmprint independent of translation and /or rotation of hand on scanner surface.
- Robust to occlusion: If user exposes partial palmprint to scanner due to injuries or physical challenge, system should be able to verify the user.
- Low cost scanner: The device should be economic.

[4] PROPOSED WORK

In proposed work we have to acquire biometric data & analyze & validate it after transmission, signal processing, decision making & storing. We will use Matlab as simulation environment & will use edge detection techniques such as canny algorithm to find edge of samples & get matrix representation of stored images of faces or Finger prints. Then we will use various graphical techniques to compare them & comparison will be represented within form of Histograms.

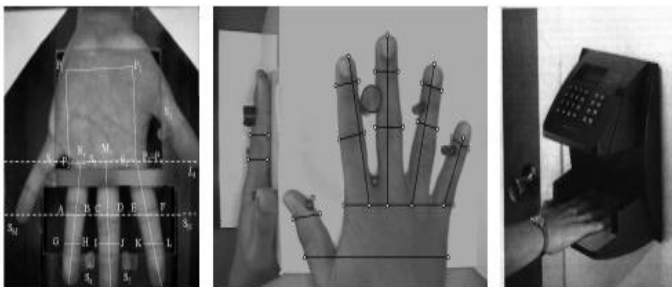


Fig. 4: Constrained Image Acquisition

Data Acquisition

Data collection involves use of sensors to detect & measure an individual's physiological or behavioral characteristics. The biometric feature must have following characteristics:-

Universality, which means that every person should have characteristic, Uniqueness, two persons should not have same term or measurement of characteristic Permanence, characteristic should be invariant with time, Measurability.

Transmission

Not all biometric systems process & store data on measuring device. Often measurement is made using relatively simple device to a computer or server for processing and/or storage. Depending on system, data might be relatively large & thus would need to be compressed for quick transfer.

OBJECTIVE OF THE RESEARCH

The main objective of research is to using 3d approach to compare palmprint & increase chances of accuracy. Palm print is widely used within personal identification & authentication for a precise & robust recognition. Palm print recognition has been reconnoitered over numerous years. During this instance of time, several different glitches related to palm print recognition have been addressed. Furthermost of studies has been done within palm print recognition due to its stability, reliability & exclusivity.

Image Processing course

Our plan is to use MATLAB programming software [6] as a tool for developing this Face Recognition system using Edge detection techniques such as Canny algorithm. Such techniques (image enhancement, filtering, segmentation & morphological operation) within Biomedical Image Processing that have been taught within class (or within syllabus) will be included within Biomedical Image Processing software package. The software package should capable to display input image, output image & a variety of click button for a variety of image processing techniques as well as description of techniques so students will learn effectively application on how biomedical image is analyzed instead of learning mathematical algorithm for such techniques.

[6] CONCLUSION

During this instance of time, several different glitches related to palm print recognition have been addressed. Furthermost of studies has been done in palm print recognition due to its stability, reliability & exclusivity. Furthermore, this has been



employed for law enforcement, civil applications & access control applications. Verification rate could be computed by employing False Acceptance Rate (FAR), False Rejection Rate (FRR), as well as Equal Error Rate (EER). FAR is percentage of accepted not genuine claims over total number of not genuine accesses. FRR is percentage of rejected genuine claims over total number of genuine accesses. For 3 D recognition multidimensional data has been taken & complexity of algorithm increases as array of matrix are compared in such cases. It will increase accuracy but takes lot of time on rendered images. So we have extract only useful part of biometric object such as pattern of palm in multidimensional form. 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, provides 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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