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Employee Attendance Management System Using Fingerprint Recognition

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ABSTRACT : In any organization to identification of any employee is necessary. To identifying or confirming the identity of an individual employee their name and signature is not enough, because any one can misuse other's identity so these type of problem occur in today. To overcome this problem we can use fingerprint recognition by which we can easily recognize any person, because human fingerprints are unique to each person and can be regarded as some sort of signature, certifying the person's identity. In this paper we propose a method for fingerprint matching based on minutiae matching. In addition, this paper describes all the records of employee and introduces verification of fingerprints without any biometric device.

Keywords: Fingerprint matching; fingerprint verification; attendance; without biometrics; record.

I. INTRODUCTION

Employee management is an aspect widely practiced in all workplaces. Day by day security breaches and transaction fraud increases, the need for secure identification and personal verification technologies is becoming a great concern to the organization.. Therefore, we present here efficient management of attendance using fingerprint identification for those area, where the biometric device are not available and attendance of employee is calculated at the last of month. First enroll the employee. Store all the necessary information including id, image and fingerprint into the database. When attendance is calculated, the daily fingerprints are matched with the stored fingerprint by using the scanner. If fingerprint is matched then attendance is accepted otherwise it is rejected.

II. LITRETURE WORK

Human fingerprints have been discovered on a large number of archaeological artifacts and historical items.

In 1684, the English plant morphologist, Nehemiah Grew, published the first scientific paper reporting his systematic study on the ridge, furrow, and pore structure. In 1788, a detailed description of the anatomical formations of fingerprints was made by Mayer. In 1823, Purkinji proposed the first fingerprint classification, which classified into nine categories [6] Biometrics is an automated method that recognizes people based on their physical and action characteristics, and is a field that used to authenticate a certain individual's characteristics, recognize a person's character, or study a person's measurable characteristics [8, 9]. People have unique fingerprints that do not change, and fingerprints consist of ridge and furrow parts of a finger's surface. Fingerprints can be categorized according to many key patterns that include loops, whirl pools and arches [10, 11].

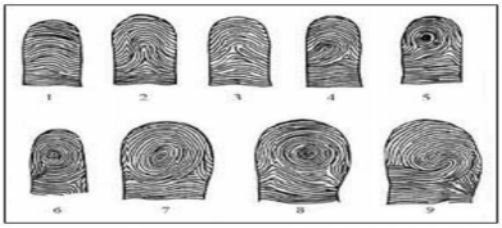

Fig. 1. Fingerprint classification [5].

III. UNIQUE FEATURE OF FINGERPRINT

A fingerprint is an impression of the friction ridges of all or any part of the finger. A friction ridge is a raised portion of the epidermis on the palmar (palm and fingers) or plantar (sole and toes) skin, consisting of one or more connected ridge units friction ridge skin. These ridges are sometimes known as "dermal ridges" or "dermal papillae".

A. Fingerprint Pattern

There are a number of different strategies through which fingerprint identification can be done, among which verification through minutia points is the most simple and easy [1][4].

According to the current most widely used Galton -Henry system, the fingerprint is divided into five classifications [1][4]:

- Arch: Fingerprint lines start from side of the finger and end at the other side, do not return and on the core points and delta point.
- Tented Arch: Like an arch fingerprint, but graphic Center upward rise in the vertical direction, equivalent to a core and a delta on the same vertical line.

- Left Loop: Circular pattern that is fingerprint lines access from one direction then back from the same direction after a rotation around. To the left is Left Loop. There is a core and a delta at the lower left.
- Right Loop: To the right is Right Loop. There is a Core and a delta at the lower right.
- Whorl: At least one fingerprint stripe rotate into a closed curve around the center, there are two core points in center, a triangular point on each side when the cores are not in the same vertical line, here will form a double helix.

Fig. 2. Example of fingerprint recognition.

B. Minutiae Features

The major Minutia features of fingerprint ridges are: ridge ending, bifurcation, and short ridge (or dot). The ridge ending is the point at which a ridge terminates. Bifurcations are points at which a single ridge splits into two ridges. Short ridges (or dots) are ridges which are significantly shorter than the average ridge length on the fingerprint. (See in Fig. 3, 4, 5). Minutiae and patterns are very important in the analysis of fingerprints since no two fingers have been shown to be identical.

Fig. 3. Example of ridge ending.

Fig. 4. Example of bifurcation.

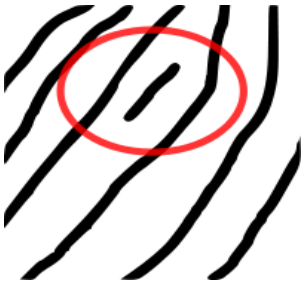

Fig. 5. Example of short ridge.

The minutia based algorithm is widely used for fingerprint authentication. It focuses on the endings of ridges and bifurcations. Consequently the central area in fingerprint image is very important and this algorithm keenly relies on the quality of the input images [12].

Global and local characteristics of fingerprints are used for identification of individuals. Global features are the ones that can be seen with naked eye like ridges, pattern area and delta while local characteristics are the minutia points [2].

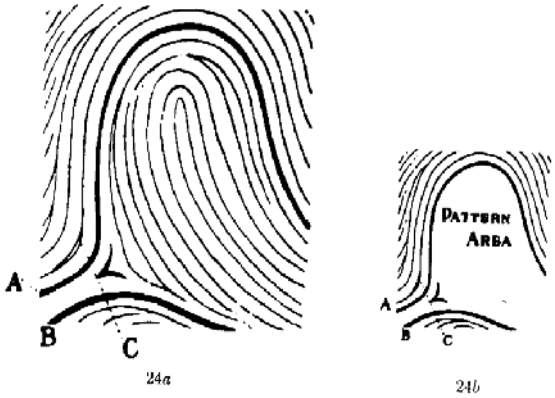

Fig. 6. Global Features [7].

Fingerprint ridges are not continuous as there are a number points at which ridges change and end and these points are called minutia points. The unique identifying features are provided by these minutia points. A raw image is taken from the sensor and algorithms are implemented on the image to enhance it and further extract the minutia points directly from this representation. This procedure provides a much more efficient and reliable result as compared to other methods of fingerprint verification [3].

IV. FINGERPRINT MATCHING

Fingerprint matching is the process used to determine whether two sets of fingerprint come from the same finger. One fingerprint is stored into the database and other is employee's current fingerprint.

Minutiae point refers to the topical characteristic at the end point of the ridge part. The best way to compare fingerprints is to compare all visual information on the fingerprints. However, this is realistically impossible. Comparing all visual information requires too much data, and this is inappropriate to making a commercialized system. Actual commercialized systems do not store the fingerprint itself, but characteristics of the fingerprints, and codes related to the position of these points of characteristics. Since only characteristics are stored, they cannot be revived as fingerprint visuals, and therefore cannot be used as evidence in legal facilities [8].

Fig. 7. Fingerprint matching.

In this, matching is performed by number of delta, triangles and squares.

V. DATABASE MANAGEMENT

Information of employee and finger print record is stored in the database. The database has secure access and can be updated as and when required by the administrator. The information stored into database is used when a fingerprint is matching.

Information stored into the database is:-

- Employee_id
- Employee_name
- Father_name
- Address
- Phone_number
- Date of birth
- Date of joining
- Finger print

The AF system should consist of two phases: the preparation

Phase and the recognition phase. First, we construct the database by filling it with the audio fingerprints and the associated metadata of many audio clips, and then the fingerprint of an unknown clip (or the distorted version of the clip brought by compression or standard audio processing) is extracted and compared to that of the clips in the database.

If the fingerprint of the unknown clip is in the database, it will be correctly identified by the matching procedures.

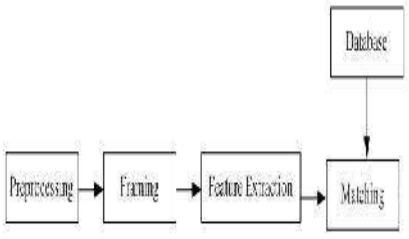

Fig. 8. General structure of system.

VI. FINGERPRINT SCANNER

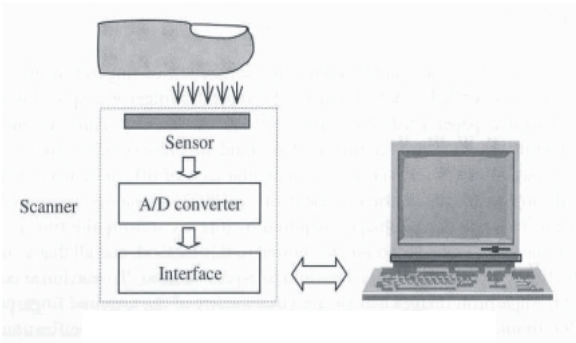

Fig. 9. General structure of scanner.

The main parameters characterizing a fingerprint image are

Resolution

Area, Number of pixels, Dynamic Range, Geometric Accuracy, Image Quality [6].

Technologies for scanning fingerprints have evolved over the past years. The traditional method which is used by law enforcement agencies for over a hundred years now is making a copy of the print that is found at a crime scene or any other location and manually examining it to find minutiae. These minutiae are compared with prints from a database or specific ink prints, which could be taken at a later time. This method is of course based on the fact that the person who left the fingerprints is not co-operating by placing his finger on a fingerprint scanner. For systems that are commercially available (and deployed) people are required to co-operate in order to gain access to whatever is protected by the verification system.

VII. CONCLUSIONS

Over the past decades, biometric technique and its applications have undergone tremendous development and growth. More than ever, fingerprint technique is one of the most popular applications in both identification, and verification. In the biometric technique there is a need of biometric device and this technique is not available every where. A more advanced solution already known patterns would not serve well due to its high sensitivity to errors. To overcome this problem, we describe a method based on minuate matching that is to extract features of so called minutiae points from the fingerprint image, and check matching between the sets of fingerprint features. After checking it verify the fingerprint and show identification of employee.

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