

# Employee Attendance Management System using Fingerprint

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**Abstract**— In this paper effective employee attendance management system using fingerprint is introduced. To identify an individual employee by their employee\_id, employee name and their signature is not enough because any one can misuse it. Attendance is marked after employee identification. For Employee identification, a fingerprint recognition based identification system is used. Fingerprint matching technique is used because it is secure, unique for every person and does not change in one's lifetime. In this project, a crossing number method algorithm is used in which minutiae extraction is done. The unique features called minutiae points of each employee will extract using Crossing Number (CN) method which extracts all the detail of finger including ridge end, neighboring point of each ridge end. This gives the Security, productivity and skills for improving the progress of an organization. It was implemented with Microsoft C# on .NET framework and Microsoft Structured Query Language (SQL) Server as a backend.

**Key words:** Fingerprint Matching, Fingerprint Verification, Attendance, Biometric Device, Records

## I. INTRODUCTION

Fingerprints are a form of biometric identification and it does not change in entire's lifetime, because it is unique for every person. This project establishes the attendance management system using fingerprint in office environment.

A finger print is a pattern of ridge and valleys on the surface of fingertips. Minutiae means ending point and cross point of ridges. Each minutiae detail is different so that it gives the unique feature for each employee and gives lifetime secure password.

Management of employee record is very tedious work and also it consumes time and paper both. So to make all the record automatically and online, we have design the attendance management of employee so that it automatically reduce the work load like it automatically generate salary slip, gives time updates etc.

## II. ATTENDANCE MANAGEMENT FRAMEWORK

In existing system, manual register entries and physical supervision are not able to take an attendance clearly. Time waste over the responses of employees, waste of paper etc is the disadvantages of manual attendance system.

Employee Attendance framework system is divided into parts:

### A. Hardware/Software Design:

- Fingerprint Scanner
- LCD/Display module
- Computer

### B. Attendance Management Policies:

- 1) Office timing for every employee is from 10am to 6pm.If any one comes late after 10 am regularly for three days then their attendance will be marked an absent.

- 2) Leave policy is applicable for whole staff from joining date of each employee. Leave can be categorized in following ways:

- Sundays- four Sundays in a month
- Saturdays- two alternative Saturdays in month i.e., 1st and 3rd Saturday of each month.
- Casual leaves are 7 in a year.
- Earn leave are 15 in a year.
- Festival holidays can be considered.
- Based on leave salary is deducted.
- Overtime can be considered as per employee schedule.

## III. FINGERPRINT IDENTIFICATION SYSTEM

Employee information is stored into the database system also stored minutiae details of finger. Scanner extracts the features like minutiae and other details for matching. If the minutiae details are matched with database information where we already stored minutiae details of each employee, then the attendance is marked successfully.

System takes input from fingerprint scanner, enhance the fingerprint details in image format, extract features like minutiae, mean ridge density, key etc. and perform matching.

## IV. FINGERPRINT ENHANCEMENT

The image acquires for scanner sometimes not in perfect quality. It gets interrupted because of irregularities, non-uniformity in the impression taken and due to variations in the skin and the presence of scars, humidity, dirt etc. Therefore, we are using segmentation, orientation estimation, normalization, ridge frequency estimation, thinning, and gobar filter and binarisation techniques to reduce this problem.

## V. FEATURE EXTRACTION

After improving the quality of fingerprint image we extract the features from binarised and thinned image. We extract features like minutiae points.

Reference point is very important feature because it provides the location of origin for marking the minutiae points. Minutiae extraction can be done using Crossing Number (CN) method. It involves the skeleton image where the ridge points are eight connected. The minutiae points are extracted by scanning each neighbourhood ridge in skeleton image by using 3\*3 window. The CN value is then calculated which is defined as half the sum of the difference between pairs of adjacent pixel in eight neighbour ridge points. This is the properties of Crossing Number method:

CN value	Property
0	Isolated point
1	Ridge ending point
2	Continuing ridge point
3	Bifurcation point
4	Crossing point

Fig. 1: Property

#### VI. DATABASE MANAGEMENT

Employee information and fingerprint record are stored in database. It has secure access and updates as required by the administrator. Stored information is used when finger print is matched with scanned image.

#### VII. FINGERPRINT MATCHING

Fingerprint matching is the process used to find out whether two set of fingerprint comes from the same finger i.e. one finger print which is stored in database system and other is employee current fingerprint. If the fingerprint is matched attendance is marked otherwise rejected.

#### VIII. CONCLUSION

Fingerprint technique is one of the most popular techniques which are used for unique identification and verification. Also biometric device is not available everywhere so employee can mark at office environment only. A more advanced solution is that patterns would not serve well because of high sensitivity. To overcome this problem we have used a method called minutiae matching which extract the features called minutiae points from fingerprint image and match the fingerprint details with database. After checking it verifies the fingerprint and shows the identification of each employee.

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