IMPLEMENT FINGERPRINT AUTHENTICATION FOR EMPLOYEE AUTOMATION SYSTEM

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Abstract- The project work is concerned with the implementation of biometric fingerprint authentication system which is an automated method of verifying a match between two human fingerprints for validating identity. The modern computer security is a battle between high security and low friction. Developers want users to use unique, complicated passwords for their apps to increase security. Employee Automation System is designed to ensure that the organization is equipped with the right level of human resource tracking for each separate department of the organization. The main feature of Employee Automation System is time tracking for employees. The system is implemented based on biometric fingerprint features that identifies certain or specific employee. The system can be accessible from remote network. The developed system also includes the employee fingerprint verification, employee attendance, employee tracking, employee leave, and salary payment and promotion modules. The operational activities of the system are accessed or controlled by three users, like Admin, Operator and Employee. The admin can access all the features, whereas the operator panel is designed to run the software in office time and takes fingerprint attendance. The employee panel is accessible by employee that shows profile information, last fingerprint attendance access, leaving/absent status of that month. The system is designed with client-server model and software methodology.

Keywords: Automation System, Authentication, Biometric Features, Fingerprint Enrollment and Verification.
I. INTRODUCTION

Modern security is a battle between high security and low friction [1]. Developers want users to use unique, complicated passwords for their apps to increase security. One way to combine both performance and security is to take advantage of fingerprint sensors that are now prevalent on high-end smart phones and other mobile devices. Fingerprinting have a number of benefits over passwords [2], such as, (i) modern capacitive touch fingerprint sensors recognize the fingerprint and unlock in less than a second, quicker than inputting an extensive password; (ii) fingerprints are unique, impossible to guess, and difficult to fake without significant effort; (iii) Complex passwords are hard to remember, leading to the majority of people reusing passwords on multiple sites. As a physical feature, fingerprints are unforgettable. An automation system is a desktop application [3], which gives facility available for every organization. The information about an employee from enter into to leave from the organization are recorded. When an employee enters the company he/she is verified by fingerprint verification [4, 5]. Then the employees go to their work place to carry out their duties and the working time is started. Employees leave the office also by using the fingerprint verification. Monthly salary and other benefits are calculated by the system using their information. All the works are properly documented as weekly or monthly reports. Attendance report shows employees record like holidays, present days, absent days etc. This report is generated by SAP Crystal Report [6]. We have collected the devices, the fingerprint scanner that is required to develop security system. According to the requirements, we first design the structure of the system. The system can overcome all the limitations of the existing system. The system provides proper security and reduces the complexity of the manual work.

II. BIOMETRIC FINGERPRINT AUTHENTICATION APPROACH

Biometric Fingerprint Authentication [7] is an automated method of verifying a match between two human fingerprints for validating identity. That is, the authentication systems provide a means of verifying identity by collecting information about unique human characteristics and comparing that information to previously-submitted data. BioID [8] incorporates a biometric sensor that collects information about users' unique fingerprints and a matcher that facilitates decisions on whether access should be granted to the user based on data collected from the sensor. The user places a finger on the external surface of the sensor, or platen, and relevant information is quickly extracted and transformed into a digital representation of the user's fingerprint, or template. A template is not an image of a fingerprint, and fingerprint images cannot be restored from the encoded templates. The user’s template is compared to the reference template the authorized user provided during an initial enrollment process. If the two templates match, the user is granted access. The entire process, from finger placement to match result, takes place in approximately two seconds with the BioID fingerprint identification system.

III. EMPLOYEE AUTOMATION SYSTEM

The system is very simple in design and to implement. The system requires very low system resources and the system worked in almost all configurations. The proposed employee automation system (see Figure-1) includes the following major modules integrated with each others:

![Figure 1: Modules of Proposed Employee Automation System.](image-url)
a) **Employee Management System:** The employee management system helps to keep a detailed record including the fingerprints of all the employees working in the institution. It is important for the institution to verify the employee before hiring and the employee management system asks the employee to enter all relevant data and stores all required documents in the database.

b) **Employee Attendance Management System:** The employee attendance management system is a module which is primarily used to record the daily attendance of the employee. The employee attendance management system can be integrated with any smart card or fingerprint module which instantly records the presence of the employee and updates it in the attendance system.

c) **Employee Leave Management System:** The employee leave management module is designed to keep a track of the leaves an employee takes with a term or financial year. Every institute has a fixed earned leaves and sick leaves policy and the leave management system helps in keeping a track of these leaves as when they are exercised by the employee.

d) **Employee Performance Management Software:** Keeping track of the performance of an employee is of utmost importance to any organization. The employee performance management system helps the institution record employee performance details and analyzes their performance over a period of time.

e) **Employee Payroll System:** The employee payroll system has been designed to record payment and salary details of the employee. The salary slip, provident fund details and other tax related information is recorded on this employee payroll system for ease of access.

f) **Employee Monitoring Software:** Starting from attendance to leaves, all day to day information of the employee is recorded on the employee monitoring software.

### IV. SYSTEM ANALYSIS AND DESIGN

The analysis and design phase provides the developing process of employee automation system including Software Requirement Specification (SRS) [9,10].

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![ER Diagram](image.png)

**Figure 2: ER Diagram of the Proposed System**

The SRS part to provide complete description and overview of system requirement before the developing process is carried out. Besides that, the data flow diagram (DFD) [11] provides a view of how the system flows that able to increase the efficiency and effectiveness to achieve system objectives. The system is designed to satisfy the user requirements based on analysis of the system. In system design the logical model is moved to the physical aspects. The requirements identified in the requirements analysis phase are transformed into a system design document that accurately describes the design of the system. The database design is an important part of the software development. The data are manipulated and stored in database and then generated output data such as listing absent employee and count currently working employees, giving status of department, payment, promotion, monthly attendance Report etc. The entity-relationship (ER) diagram [12] and the database schema design [12] are shown in Figure-2 and Figure-3, respectively.
V. FINGERPRINT ENROLLMENT AND VERIFICATION

At the time of employee registration, the New Employee is asked to give their fingerprint. The fingerprint is taken with fingerprint index [13], employee id, it takes three times to ensure the finger. The fingerprint scanner device scan and generate a fingerprint template [14], the process is known as fingerprint enrollment (see Figure 4). The template is stored in the database and is used for employee verification (see Figure 5). After the completing of enrollment, employee is verified when he/she tries to enter in office. When the employee is verified, a record is stored in database.

VI. PROPOSED SYSTEM DESIGN

In this project work, the system is designed with three parts or panels; such Admin Panel, Operator Panel and Employee Panel (see Figure-6). The admin has the super power of all access. The admin can edit, delete, add all data for full system. He can check currently working employees and also who are absent till now. He can also check the list of all employees who takes leave. The admin can manage the Designation, Department and Scales of Salary Payment of the company. He can also give leave to a limit of date for an employee, can give promotion, can pay employee, can generate attendance data. The admin can generate crystal report as Monthly Attendance Sheet.
The Operator has less access to the system than admin. He can't edit, delete, add any data for full system. The Operator can check currently working employees and also who are absent till now. He can also check the list of all employees who takes leave. This panel is designed for general running of the software at office so that the software can take the fingerprint enrollments. The Operator can't manage the Designation, Department and Scales of the company. He can generate attendance data. The Operator can generate crystal report as Monthly Attendance Sheet. The Employee can access the system also. He has a separate login system that has limited access to his information. The access of the system by admin, operator and employee is shown below with Figure-7, Figure-8 and Figure-9 respectively.
VII. EXPERIMENTAL RESULTS

An Employee Automation System accurately captured all time worked. It calculated employee started time and ending time. It also calculated how much time he/she works. The proposed system created central database that can be accessed throughout the company and share multiple computer via LAN. The system calculated salary for every employee based on their working days. Employee automation system used fingerprint verification for every person in the office that secures the organization/company. The system generated reports that show working days, absent days, working hours, holydays and working percentage. The software system included three parts, Admin login, Operator login, Employee login, discussed earlier. Only admin can access like as operator and employee but operator and employee can’t access as admin.
The system can register new employee, update/delete employee status. Every employee can show his/her personal details. Without this system it’s tedious job for the human resource department to keep track of each and every employee and even harder for a project manager to assign tasks to the project team. The front-end of the software system is shown in Figure-10. It is the home window or main window which has a lot of features. It gives the status of currently working people, headlines of the messages, shows departmentwise information. It also shows the last employee detected and his time of attendance record, as shown in Figure-11.

Figure 12 : Register New Employee

(a) Finger Selection  (b) Selected Finger Print Enroll

Figure 13: Register Finger Print for New Employee

Figure 14: Update Employee Information
At any time, the home or main window connects the fingerprint device, track the input fingerprint and match it to the stored database for verification. The registration of an employee includes two forms, as shown in Figure-12 and Figure-13. The register form takes name, father name, NID [15] etc. and store the information (see Figure-12). After that a new fingerprint enrollment form comes and take the fingerprint of the new employee. The fingerprint register form takes three times of any one of ten fingers of an employee at a time (see Figure-14). After getting the fingerprint templates it stores them to Database. The system can easily update the employee's information and fingerprint (see Figure-14).

VIII. CONCLUSION

Modern security is a battle between high security and low friction. Developers want users to use unique, complicated passwords for their apps to increase security. One way to combine both performance and security is to take advantage of fingerprint features that are now prevalent on high-end smart phones and other mobile devices. Because, fingerprint features have a number of benefits over passwords, such as, performance, security, permanence, etc. This is really authentic news that last couple of year many sensors device like fingerprint, eye/image detection, punch card system are available in Bangladesh using this many organization secure their system. More organizations are going to establish their business using this secure system for that they easily maintain their employee securely. This project work is aimed to develop an Employee automation system using fingerprint authentication. In future the system will combine with a secondary authentication scheme such as a secure PIN, so that; it will enhance security for the application and ensure the authenticity of the user. This system will be further developed with some additional features of original fingerprint images processing in employee automation system.

REFERENCES

8. BioID fingerprint identification system: The next generation technology,© 2010 CareFusion Corporation or one of its subsidiaries, carefusion.com, San Diego, CA.

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