

Smart College Attendance System Using Fingerprint Recognition

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Abstract—Attendance Management is an important activity in educational institutions such as schools, colleges, and universities. Traditionally, attendance is recorded manually by teachers using registers or attendance sheets. Although this method is simple, it requires significant time and effort, especially in classrooms with large number of students. In addition, manual attendance systems often face problems such as proxy attendance, human errors, and difficulty in maintaining accurate records. To overcome these issues, a smart Attendance System using Fingerprint Recognition is Propose

Index Terms—Fingerprint Recognition Smart Attendance System, Biometric Authentication Attendance Monitoring Database Management

I. INTRODUCTION

Attendance management plays an important role in educational institutions. It helps teachers track student participation and ensures discipline and responsibility. In traditional attendance student attendance in register or spreadsheets. However, this process is inefficient and prone to several issues such as time consumption, human errors, and proxy attendance. With the rapid development of biometric technology, fingerprint recognition has become one of the most reliable methods for personal identification. Fingerprints are unique for every individual and cannot be easily duplicated. Therefore, fingerprint recognition systems are widely used in security systems, banking applications, and access control systems. The proposed Smart Attendance System using Fingerprint Recognition aims to automate the attendance process in educational institutions. The system uses a fingerprint scanner to capture the fingerprint of students and compare it with the stored fingerprint data in the database. Once the fingerprint is verified, the system automatically records the attendance.

II. LITERATURE SURVEY

Several researchers have worked on automated attendance systems using different technologies such as RFID, facial recognition, and fingerprint authentication. These the of systems aim to improve accuracy and efficiency attendance management in educational Institutions. Kumar (2021) proposed a biometric attendance system that uses fingerprint sensors to identify students and record their attendance automatically.

The system stores fingerprint templates in a database and verifies the fingerprint during attendance marking. This approach reduces proxy attendance. and improves accuracy. Chen (2019) developed a smart attendance system using biometric authentication and database management systems. The system provides a digital platform where teachers can manage attendance records and generate reports. The research highlighted that automated systems reduce manual effort and improve record management. Another research study by Patel (2022) introduced an automated attendance system that integrates fingerprint recognition with cloud storage technology. In this system, attendance data is stored on a cloud server, allowing administrators to from any location.

Although these systems provide effective solutions for attendance management, many of them lack features such as user- friendly dashboards and real-time monitoring. Therefore, the proposed Smart Attendance System aims to provide a more efficient and user-friendly platform for managing student attendance.

III. PROPOSED SYSTEM

The proposed Smart Attendance System uses fingerprint recognition technology to automatically record student attendance. The system consists of several components including a fingerprint scanner, backend Server, and web dashboard. Initially, students are required to register in the system by entering their personal information such as name, roll number, department, and semester. During the registration process, the student's fingerprint scanner and stored in the system database. When a student wants to mark attendance, they place their finger on the fingerprint scanner. The scanner captures the fingerprint image and sends it to the recognition module. The recognition module processes the fingerprint data and compares it with the fingerprint templates stored in the database. If the fingerprint matches the stored template, the system records the attendance automatically.

IV. METHODOLOGY

The working process the smart Attendance System can be explained through the following steps:

1. Student Registration Student register in the system by Entering personal details and scanning their fingerprint.
2. Fingerprint Storage The fingerprint data is stored securely in the database.
3. Fingerprint Scanning Student scan their fingerprint using the Fingerprint scanner to mark attendance
4. Fingerprint Verification The system compares the scanned Fingerprint with the stored fingerprint Templates.
5. Attendance Recording If the fingerprint matches successfully the system automatically records the attendance.
6. Database Storage Attendance data is stored in the database for future use
7. Report Generation Teachers can view attendance reports Through the dashboard interface.

V. ADVANTAGES

The proposed system offers several Advantages compared to traditional When a student scanned their fingerprint

- Saves time during lectures
- Improves accuracy of attendance record
- Reduces manual effort for teachers
- Provide digital attendance reports
- Ensures secure data storage

VI. ALGORITHM

- Step 1: start the system
- Step 2: register student details and fingerprint
- Step 3: store fingerprint data in database
- Step 4: student scans fingerprint
- Step 5: system captures fingerprint image
- Step 6: compare fingerprint with stored data
- Step 7: if fingerprint matches mark attendance with data and time
- Step 8: store attendance record in database
- Step 9: display attendance in dashboard
- Step 10: End process

VII. RESULT AND DISCUSSION

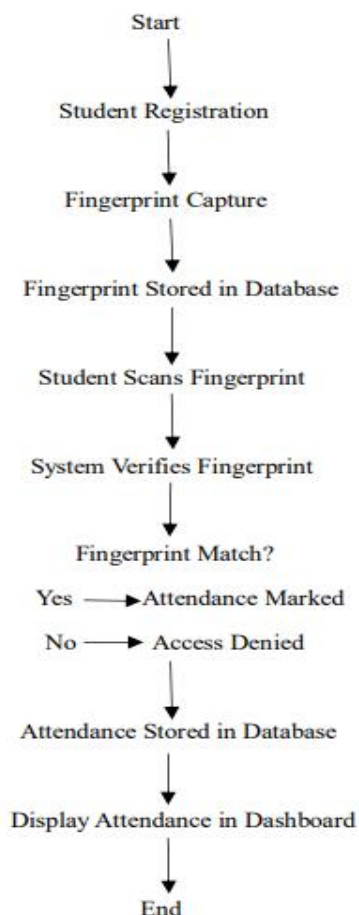
The smart attendance system using fingerprint recognition was developed to automate the process of recording student attendance. The system was tested with Multiple student records to evaluate its Performance and accuracy. During the testing phase, students were first registered in the system by storing their personal details and fingerprint data in the database. Capture student fingerprints and store them Using the fingerprint scanner, the system Successfully identified the student by Matching the scanned fingerprint with the fingerprint templates stored in the Database. After successful verification, the system automatically recorded the attendance along with the date and time. The attendance information was then displayed on the dashboard and stored in the database for future reference.

The experimental results show that the Proposed system is efficient and reliable in managing attendance records. The System significantly reduces the time Required to record attendance compared to traditional manual methods. It also Prevent proxy attendance because each Fingerprint is unique and cannot be Easily duplicated. In addition, the dashboard interface Provided a simple and user-friendly Platform for teachers and administrators to

monitor attendance. The system can Generate attendance reports, which help in analysing student attendance patterns Over time.

VIII. FLOWCHART

The flowchart explains the working process of the smart attendance system. Initially, students register in the system by 4. Teachers and administrators. in a database. The system verifies the providing their personal details and fingerprint data. When students scan their fingerprint, the system verifies it with the stored fingerprint templates in the database.



IX. FUTURE SCOPE

1. Integration with Face Recognition along with fingerprint for better security.
2. Use of Cloud Storage to store attendance Data and access it from anywhere.

3. Development of a Mobile Application for system also stores attendance data in a SMS and Email Notifications to inform
4. parent about student attendance. implementation of AI-based analytics to analyse attendance Systems.
5. Integration With College ERP or Management Systems.
6. Addition of multi-biometric authentication like fingerprint and iris recognition.
7. Implementation of real-time attendance monitoring through a web dashboard.
8. Generation of automatic attendance report such as daily, monthly, and yearly reports.
9. Improvement of Security features to prevent fake or duplicate fingerprints.

X. CONCLUSION

The Smart Attendance System using Fingerprint Recognition provides an efficient and reliable solution for managing student attendance in educational institutions. Traditional attendance systems are Time-consuming and prone to errors, whereas biometric systems provide accurate identity verification. By using fingerprint recognition technology, the proposed system eliminates proxy attendance and ensures that only registered students can mark their attendance. The database, allowing teachers to easily access and analyse attendance records through a dashboard interface.

Overall, the system improves efficiency, transparency, and accuracy in attendance management. In the future, the system can be enhanced by integrating additional technologies such as mobile applications, cloud storage, and advanced biometric authentication methods.

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