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# College Management System Using Fingerprint Authentication

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## Abstract

This solution not only provides transparency, it frees up administrative processes through automation. This product eliminates impersonation, improves timeliness, and provides a computerized attendance record. Due to its modularity, this solution is also easy to connect to a cloud platform and mobile apps. By replacing old fashion logins, it also provides a safe and easy user experience. This is the major milestone we have taken toward digitization of education.

**Keywords:** Fingerprint, ESP32, Attendance, Authentication, Biometric, PHP

## 1. Introduction

Be it digitization or those idle police tools appear famil- iar. Nowadays, institutions require smart systems that are secure for data and operationally efficient. Manual atten- dance often causes inaccuracies, proxy challenges and report time delays. Fingerprint biometrics technology leverages our unique biology to solve both offline and online chal- lenges. The proposed system provides hardware and soft- ware for real-time authentication and access. Students and Faculty will have a secure and agile interaction with the institutional platform.

## 2. System Components

### 2.1 Hardware

- **ESP32:** Wi-Fi enabled microcontroller for communi- cation and control.
- **R307 Fingerprint Module:** Captures and processes fingerprint data securely.
- **Connections:** UART-based serial communication between ESP32 and sensor.

### 2.2 Software

- **PHP:** Server-side login and dashboard redirection.
- **MySQL:** Database for storing roles and attendance.
- **HTML/CSS:** UI for user interaction and dashboard display.

## 3. Literature Survey

Several works have contributed to the development of biometric systems.

Table 1: Summary of Related Works

| Sr. No | Title | Authors | Year |
|---|---|---|---|
| 1 | Dormitory Management System | Liu et al. | 2023 |
| 2 | Cloud-Enabled Fingerprint Attendance | Vini et al. | 2024 |
| 3 | Fingerprint At- tendance with SMS Alerts | Adepoju et al. | 2020 |
| 4 | Biometric and RFID Atten- dance System | Reddy and Hussain | 2015 |
| 5 | Fingerprint- Based Student Progression | Adhyapak D.P. | 2023 |

## 4. Methodology and Workflow

### 4.1 Workflow Steps

1. Fingerprint scanned and compared with database.
2. ESP32 sends credentials to the server.
3. PHP validates and redirects user based on role.
4. Attendance is marked upon successful login.

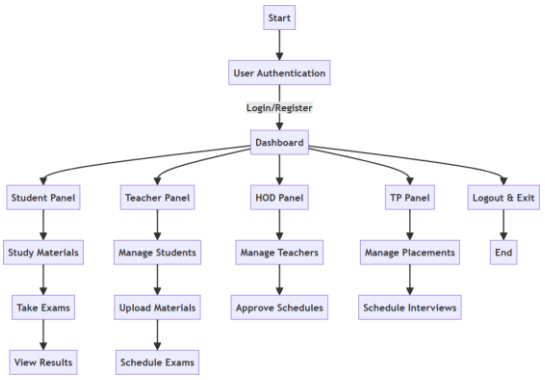


Figure 1: Flowchart Of Project

## 5. Algorithm

1. Launch the fingerprint scanner and connect to the server.
2. Prompt user to place finger on scanner.
3. Capture and extract fingerprint template.
4. Match locally or transmit to server.
5. If match found:
   - Grant dashboard access.
   - Record attendance.
6. If no match:
   - Deny access, log attempt.
7. Log all attempts with timestamps.

## 6. Results and Discussion

- **Speed:** Authentication typically under 1 second.
- **Accuracy:** High reliability across user types.
- **Usability:** Dashboards tailored to user roles.
- **Scalability:** Extendable to mobile/cloud platforms.

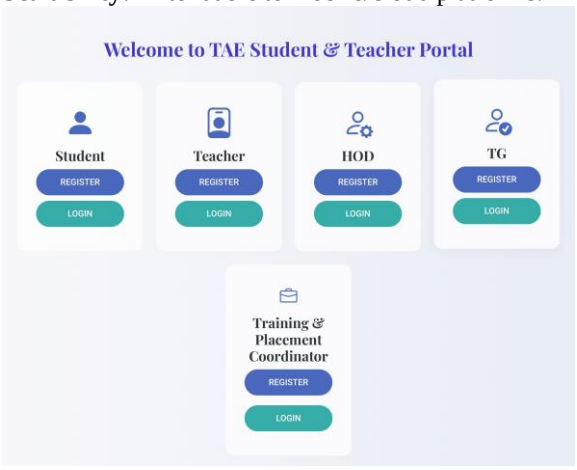


Figure 2: Login Page

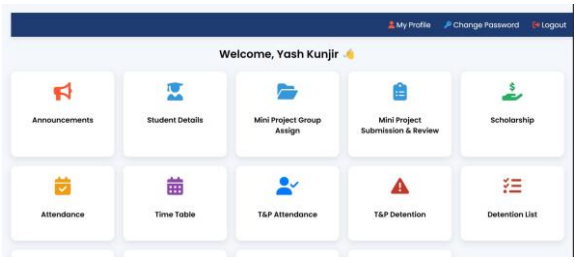


Figure 3: Dashboard with Role-Based Functionalities

## 7. Conclusion

Facilitating the intersection between security and efficiency, the college management system that uses fingerprint-based authentication identifies a high-stakes trade-off to achieve the optimal outcome. Use of ESP32 and R307 enables fast and accurate personal verification; the reliance on a web-based system supports access controls and attendance through simple touchpoints. This work presents a definitive method for institutions looking to securely integrate digitization into their operations.

## References

0. Liu J. et al., ”Dormitory Management System Based on Fingerprint Recognition,” 2023.

0. Vini N. et al., ”Cloud-Enabled Fingerprint Attendance Using CNN,” 2024.

0. Adepoju T. et al., ”Fingerprint Attendance with SMS Alerts,” 2020.

0. Reddy V.K.C., Hussain S.J., ”Biometric and RFID Attendance System,” 2015.

0. Adhyapak D.P., ”Fingerprint-Based Student Progression System,” 2023.