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College Placement And Staff Timetable Management System

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Abstract

As educational institutions grow in scale and complexity, traditional methods for managing academic schedules and placement activities become inefficient and fragmented. Existing systems often address these functions separately, lacking integration and automation. The College Placement and Staff Timetable Management System is developed to overcome these limitations by providing a unified, role-based platform for managing both academic and placement operations. The system assigns tailored access to Admins, Heads of Departments (HODs), Staff, Students, and Placement Officers. HODs manage department data and assign staff timetables, with automated email reminders sent to staff five minutes before each class. Staff are required to log their "work done" per session for academic tracking. On the placement side, Placement Officers can designate departmental coordinators, who distribute drive and internship links based on eligibility. Students can register for these opportunities, and coordinators can monitor responses and validate internship certifications. By automating workflows and ensuring secure, real-time coordination, the system enhances

institutional efficiency, transparency, and communication.

Keywords

Placement Management, Timetable Automation, Role-Based Access, Academic Scheduling, Staff Monitoring, Student Registration, Internship Verification.

I. Introduction

In today's digital era, educational institutions are increasingly adopting technological solutions to streamline their academic, administrative, and placement-related processes. As the size and complexity of institutions grow, traditional manual methods prove to be inefficient, error-prone, and unsustainable. Manual class scheduling often leads to conflicts, delays, and mismanagement, which can disrupt the academic calendar and reduce staff efficiency. Likewise, placement activities managed without automation result in inconsistent communication, poor student tracking, and limited engagement [2][4].

The emergence of intelligent systems has enabled the automation of critical operations such as timetable management, staff workload monitoring, and placement coordination. Existing solutions

have attempted to address various aspects of these challenges. For example, Sharma and Verma [2] proposed an online training and placement management system that centralized placement data but lacked academic integration. Jewani et al. [4] introduced an Android-based solution focusing on training and placement, highlighting the significance of mobile accessibility and real-time updates for students. Kousik and Nagappan [5] emphasized the importance of human-computer interfaces in placement systems, proposing a model that automates company-student matching and recruitment logistics. However, these systems either focus narrowly on placement or lack modular coordination between departments.

The administrative and academic modules are equally critical. Kumar et al. [6] proposed a college activity management system that allowed staff to manage notifications and academic records, though it lacked automation features such as scheduling reminders. Meanwhile, Singh and Goyal [3] presented a notification system using email APIs to enhance communication efficiency, particularly in time-sensitive scenarios like timetable alerts.

Building upon these works, the proposed College Placement and Staff Timetable Management System addresses the limitations of fragmented platforms by offering a comprehensive, role-based solution. It ensures secure and role-specific access to data using Role-Based Access Control (RBAC) principles [1], enabling stakeholders—including Admins, Heads of Departments (HODs), Staff, Students, Placement Officers, and Placement Coordinators—to interact with the system according to their responsibilities.

The system introduces automated class scheduling with email-based reminders five minutes before class start time, reducing schedule confusion and improving staff punctuality. Staff members can log their "work done" per session, which can be reviewed by HODs. Placement Officers can appoint Placement Coordinators within departments, who are responsible for sharing placement and internship opportunities with eligible students based on academic records. These coordinators also oversee registration tracking and verify submitted internship certificates.

Additionally, automated dashboards and real-time student registration tracking ensure transparency and improved communication across stakeholders.

In summary, this system consolidates core features from previously proposed solutions while adding intelligent automation, centralized access control, and integration between academic and placement modules—ultimately enhancing the operational efficiency and digital maturity of institutional processes.

II. Existing System

Existing academic and placement management systems are often fragmented, with separate tools handling scheduling, student tracking, and placement coordination. Many institutions rely on manual or semi-automated processes, which can result in data redundancy, inefficiencies, and delayed communication between stakeholders. Traditional systems do not offer role-specific dashboards, and most fail to integrate staff timetable management with placement operations. Moreover, student engagement is limited due to poor visibility of eligible drives and no system to track offer letter submissions or certificate verifications.

Previous research highlights the importance of automation in educational environments. For instance, Singh et al. [1] propose a role-based access control framework for secure data processing in IoT environments, which supports the idea of compartmentalized access. Similarly, Sharma and Verma [2] present an online training and placement system, though it lacks integration with academic modules. Singh and Goyal [3] design a timetable notification system but do not address placement coordination.

These limitations demonstrate the need for an integrated, role-based solution like the proposed College Placement and Staff Timetable Management System.

III. System Architecture

The College Placement and Staff Timetable Management System is built using the MERN stack architecture, which includes MongoDB as the database, Express.js as the server-side web framework, React.js for the frontend interface, and Node.js as the runtime environment for backend logic. The system is hosted and integrated with

MongoDB Atlas, a cloud-based NoSQL database service, ensuring scalability and high availability of institutional data.

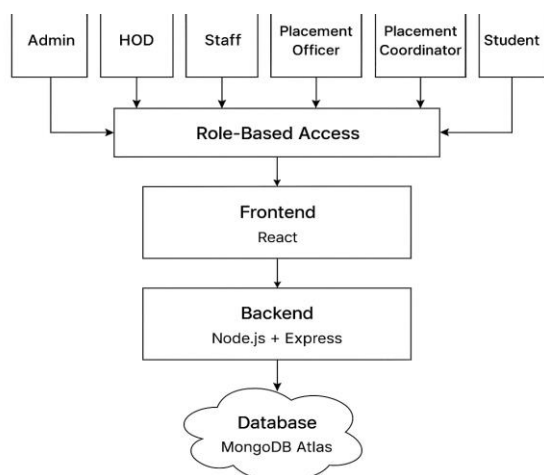


Fig.3.1 System Architecture

The frontend, developed using React.js, provides a responsive and dynamic user interface for all roles, with dashboard views personalized based on role-based access control (RBAC). React components manage user interactions, state transitions, and API communications efficiently. The backend server is powered by Express.js and Node.js, handling API routes, user authentication, role validations, and

business logic. The backend communicates securely with the MongoDB Atlas database to perform CRUD operations on user profiles, timetables, placement drives, and work reports.

Each user logs into the system through a shared login interface, after which they are redirected to role-specific dashboards depending on their authenticated role: Admin, HOD, Staff, Placement Officer, Placement Coordinator, or Student.

The flow ensures that each role only accesses the features permitted for their responsibility, maintaining data privacy and workflow clarity. This

layered, modular structure simplifies maintenance, improves scalability, and facilitates future feature extensions like notification systems or analytics modules.

IV. Modules Description

The system is composed of six functional modules, each corresponding to a user role, designed to support a wide range of academic and placement operations.

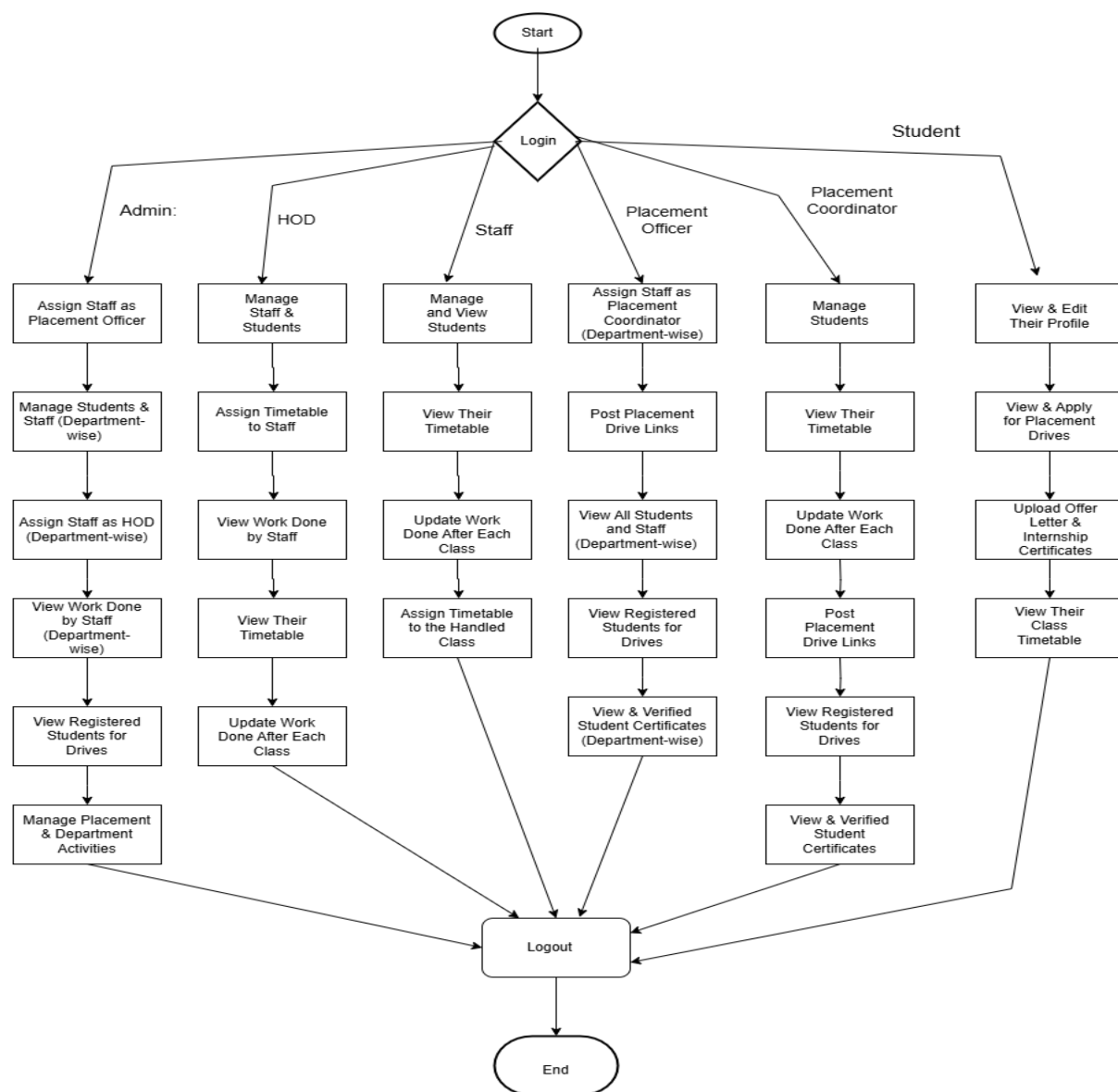


Fig.4.1 Modules Description

A. Admin Dashboard

The Admin Module is the central control unit responsible for the overall governance of the system. Admins have the authority to assign HODs and Placement Officers based on departments. They can manage all student and staff records across departments, and monitor placement activities. Admins also track the status of registered students for various placement drives, ensuring broad oversight of both academic and placement progress. Through their dashboard, Admins can access aggregated reports and initiate institutional-level changes.



Fig 4.1.1 Admin Dashboard

B. HOD Dashboard

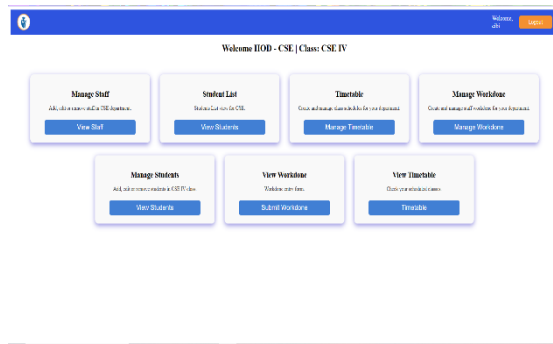


Fig 4.1.2 HOD Dashboard

The HOD Module is tailored for Department Heads, allowing them to manage department-specific student and faculty information. HODs are tasked with assigning timetables to faculty members and overseeing their class performance. They can monitor the "work done" reports submitted by staff after each class, thereby maintaining academic accountability. HODs also have visibility into class schedules and departmental placement participation, enabling them to ensure that both academic and placement activities are progressing as planned.

C. Staff Dashboard

The Staff Module allows faculty members to interact with their assigned classes. Faculty can view their daily and weekly timetables, and are required to submit a "work done" report after each session to maintain academic transparency. In addition to viewing student information, they can also manage and update student data when permitted. Staff can handle their specific subjects and classes efficiently and collaborate with the HOD on academic updates.

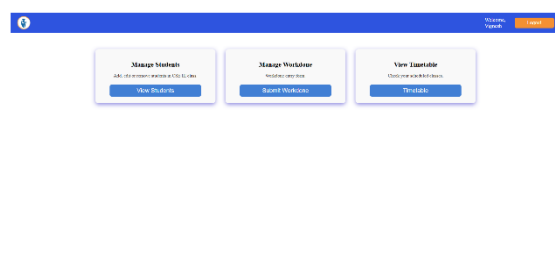


Fig 4.1.3 Staff Dashboard

D. Placement Officer Dashboard

The Placement Officer Module is focused on managing institutional placement efforts. Placement Officers can assign Placement Coordinators to departments, post placement drive links, and monitor registration activities. They are given access to view all students and staff across departments and can verify uploaded internship and offer letter certificates. This role ensures that the placement process is streamlined and coordinated efficiently across departments, with minimal delays or communication gaps.



Fig 4.1.4 Placement Officer Dashboard

E. Placement Coordinator Dashboard

The Placement Coordinator Module functions as a department-level extension of the Placement Officer. Coordinators manage placement-related tasks within their department. They can view department-specific students, update class work done reports, post drive links, and monitor student registrations. Coordinators also assist in verifying uploaded documents and act as the liaison between students and the Placement Officer. This modular delegation of responsibility ensures scalable and department-wise management of placement tasks.

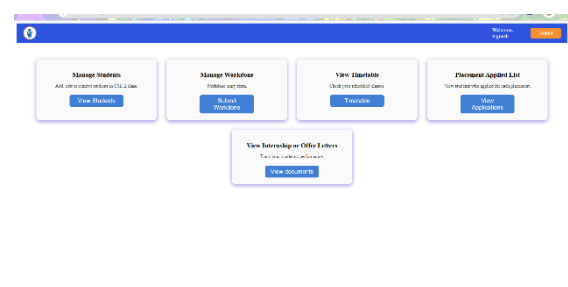


Fig 4.1.5 Placement Coordinator Dashboard

F. Staff Dashboard

The Student Module is designed for the end users—students—who can log in to view and edit their profiles, access their class timetable, and register for placement and internship drives. Students can also upload offer letters and internship completion certificates for verification. The intuitive dashboard provides students with relevant information and options without exposing administrative complexity, ensuring a smooth user experience.

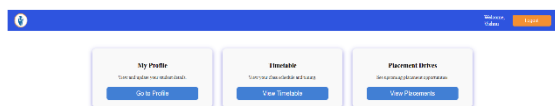


Fig 4.1.6 Staff Dashboard

V. Results and Discussion

The proposed system was tested across different roles in a simulated college environment. Key outcomes include:

Reduced Administrative Workload: Manual timetable assignments and placement link dissemination were significantly reduced due to automation.

Improved Timeliness: Email reminders sent to staff five minutes before classes ensured better punctuality.

Enhanced Student Participation: The ability to view and register for department-wise drives through personalized dashboards led to increased student engagement.

Certificate Verification: Placement Officers and Coordinators could easily verify uploaded internship and placement documents, ensuring accountability.

The system also ensures secure and role-specific data access through RBAC, minimizing unauthorized access and errors.

VI. Conclusion

The College Placement and Staff Timetable Management System successfully integrates placement coordination and academic scheduling into a centralized, role-based platform. By automating key processes such as class scheduling, work tracking, and placement management the system enhances communication and reduces the administrative burden. The inclusion of Placement Coordinators further decentralizes responsibilities, improving scalability and departmental coordination. Future enhancements could include AI-based drive recommendations and mobile application support for greater accessibility.

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