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PlaceNext: A Centralized Hub for Institutional Talent Acquisition

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Abstract: Campus placement is one of the most important activities of a technical institution, yet in many colleges it is still managed through spreadsheets, messaging groups, paper forms, and e-mail. Student data is scattered across files, eligibility is checked by hand, drive announcements reach students unevenly, and the placement cell has no single, reliable record of who applied, who was shortlisted, and who was placed. This paper presents **PlaceNext**, a web-based placement management application that brings these activities into one centralized system. The application provides four role-based logins: Super Admin, Training and Placement Officer (TPO), Student, and Recruiter. The Super Admin manages TPO accounts and system settings; students maintain a verified profile and resume; recruiters register and post job openings directly in the system; the TPO reviews and approves each job and publishes it as a company drive with eligibility criteria; an eligibility engine matches students to drives using rules such as minimum CGPA, permitted backlogs, branch, and graduation year; and applications are tracked through each selection round until the final result. Notifications, interview scheduling, placement analytics, and downloadable reports support follow-up and decision-making. All records are stored in one central database so that the placement cell, students, and recruiters work from the same information. The prototype was evaluated at module level using 12 functional test cases, of which all 12 passed, and was demonstrated with 120 students and 6 company drives. These observations demonstrate the operation of the prototype; they do not represent validated accuracy or user-satisfaction measurements. The paper describes the system design, implementation, observed outputs, limitations, and directions for further evaluation.

Keywords: Placement management system, campus recruitment, training and placement cell, eligibility engine, role-based access control, web application, placement analytics.

1. INTRODUCTION

1.1 Campus Placement and Its Coordination Needs

Campus placement connects a college's final-year students with employers and is closely tied to an institution's reputation and to students' career outcomes. A placement season involves many coordinated steps: collecting and verifying student details, registering companies, announcing drives, checking who is eligible, collecting applications, scheduling aptitude tests and interviews, publishing results, and reporting outcomes to management and accreditation bodies. In many colleges these steps are carried out with separate spreadsheets, forms, and messaging groups maintained by a small group of staff and student coordinators.

1.2 Challenges in Current Placement Practice

This approach causes recurring problems. The same student data is entered several times and soon becomes inconsistent. Eligibility is verified manually, so ineligible students may apply or eligible students may be missed. Announcements and deadlines travel through informal channels and may not reach everyone. After a drive, it is difficult to answer simple questions such as how many students applied, how many cleared each round, or which branches have the lowest placement rate. When coordinators change from year to year, previous records are hard to find.

1.3 Proposed System and Contributions

This paper introduces **PlaceNext**, a software prototype that manages the placement lifecycle from student registration to final result in a single, centralized application. The system provides four role-based logins (Super Admin, TPO, Student, and Recruiter) over a common database, lets recruiters post jobs directly, applies eligibility rules automatically, tracks each application through every selection round, and produces analytics and reports for the placement cell.

The main contributions of this work are: (1) a centralized platform with four role-based logins (Super Admin, TPO, Student, Recruiter); (2) a recruiter job-posting and TPO approval workflow that replaces e-mail and phone coordination; (3) a rule-based eligibility engine that matches student profiles to drive criteria; (4) end-to-end application and round

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tracking with scheduling and notifications; (5) placement analytics and exportable reports for the placement cell and management; and (6) a role-based security design intended to protect student data.

2. RELATED WORK

2.1 Approaches to Placement Management

Placement activities in colleges have traditionally been handled in three ways. The first is manual or spreadsheet-based management, which is simple to start but does not enforce consistency, access control, or history. The second is the placement or student-record module of a general campus ERP, which stores data centrally but is often designed for administration rather than for the recruitment workflow. The third is a commercial or third-party campus-recruitment platform, which offers many recruiter-facing features but may not match a particular college's eligibility policies, reporting formats, or data-ownership requirements.

2.2 Published Web-Based Placement Systems

Several published works describe web-based training and placement systems for colleges. Nikam et al. [9] present an integrated dashboard in which students can view eligibility criteria and upcoming drives, and the TPO can view student information and collect resumes through a login. Adarsha et al. [10] describe a placement cell management system with four modules (Admin, TPO, HOD, and Student), in which the administrator creates the login credentials of the TPO and HOD. Mobile and analytics-oriented systems have also been reported, including Placemento, an Android-based application for automating the placement and training department [11], a student analysis system for training and placement [12], and an Android application for the training and placement cell [13]. In the descriptions reviewed, these systems concentrate on student records, eligibility display, and TPO administration. PlaceNext extends this by giving recruiters their own login to post jobs, with a TPO approval step before students are notified, and by adding automatic eligibility matching, round tracking, and analytics in one system.

2.3 Positioning of PlaceNext

PlaceNext does not claim to introduce a new recruitment algorithm. It combines established web-engineering practices, such as a REST-style API [1], token-based authentication [2], and protection against common web vulnerabilities [3], with workflow rules specific to a college placement cell. Table 1 compares the existing approaches with PlaceNext.

Table 1. Comparison of Placement Management Approaches

Approach	Strength	Limitation	Relevance to PlaceNext
Spreadsheets and messaging groups	No cost; familiar to staff and students.	Duplicate data, no access control, manual eligibility checks, no history.	Represents the current practice that PlaceNext replaces.
General campus ERP module	Central student records already exist.	Placement workflow is often limited or generic.	Motivates integration of student data with drive management.
Commercial recruitment portals	Wide recruiter reach and rich features.	May not fit college rules; recurring cost; data held by a third party.	Motivates a college-owned system with local eligibility rules.
Web-based TPO portals [9], [10]	Central student records, eligibility display, resume collection, and separate logins (e.g., Admin, TPO, HOD, Student).	In the descriptions reviewed, recruiters do not post jobs through their own login.	Basis for the student, TPO, and Super Admin modules of PlaceNext.
Android and analytics-oriented systems [11]–[13]	Mobile access to placement information and analysis of student data.	Recruiter job posting and approval workflow not described in the sources reviewed.	Motivates the future mobile application and analytics module.
PlaceNext (this work)	Single database, automatic eligibility, round tracking, analytics.	Prototype; limited evaluation so far.	Proposed system.

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3. PROBLEM STATEMENT AND OBJECTIVES

3.1 Problem Statement

The problem addressed in this work is the difficulty of managing campus placement activities reliably when student records, company information, and selection results are held in separate, unconnected files. As a result, the placement cell spends considerable effort on repetitive coordination, students may miss opportunities, and management lacks timely and accurate placement statistics.

3.2 Objectives

The objective of PlaceNext is to develop a web application that manages campus placement at a single, central point. The specific objectives are:

- Maintain a single verified profile and resume for every student.
- Allow recruiters to register and post job openings directly, and allow the TPO to review, edit, and approve them as drives with eligibility criteria.
- Allow the Super Admin to create and manage TPO accounts and system-wide settings.
- Automatically determine which students are eligible for a drive and notify them.
- Track every application through aptitude, technical, and HR rounds up to the final result.
- Provide role-based access so that the Super Admin, TPO, students, and recruiters see only the information they need.
- Provide dashboards, analytics, and downloadable reports on placement outcomes.

4. THE PLACENEXT SYSTEM

4.1 Workflow Overview

A user first signs in and is directed to the portal for his or her role. The Super Admin creates and manages the TPO accounts. Students complete and submit their profile and resume, and the TPO verifies the profile. A recruiter registers the company and posts a job opening with its role, package, location, required skills, and suggested criteria; the posting is sent to the TPO as a request. The TPO reviews the request, edits the eligibility criteria if required, and approves it, after which the job is published as a drive. The eligibility engine compares each verified profile with the drive criteria and lists the students who may apply. Applications are then tracked round by round, with test and interview schedules and notifications sent at each stage. All actions are stored in the central database, from which dashboards, analytics, and reports are produced. The end-to-end workflow is shown in Figure 1.

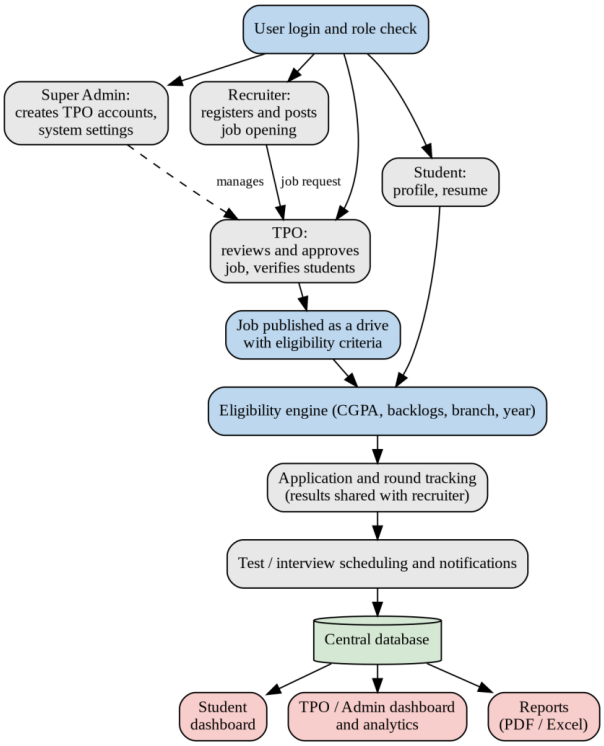


Figure 1. End-to-end workflow of PlaceNext.

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4.2 System Architecture

PlaceNext follows a three-layer architecture. The presentation layer is a web front end that serves the four portals. The application layer exposes a REST-style API [1] and contains the business modules: authentication and access control, administration, student and profile management, job posting and approval, drive management, eligibility and application processing, scheduling and notifications, and analytics and reports. The data layer contains the central database and a file store for resumes and offer letters. Separating these layers allows a module to be changed without affecting the others and keeps all business rules in one place on the server. The architecture is shown in Figure 2.

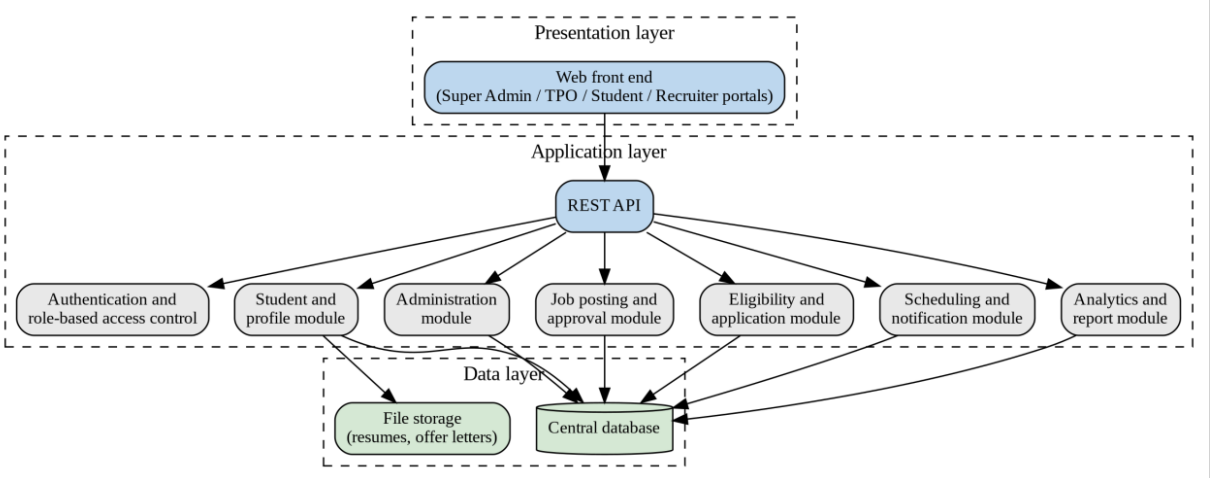


Figure 2. Layered architecture of PlaceNext.

4.3 User Roles and Responsibilities

Table 2 lists the four roles and the main functions available to each.

Table 2. User Roles and Their Main Functions

Role	Main functions
Super Admin	Create, edit, and deactivate TPO accounts; manage departments, academic years, and system-wide settings; view overall statistics and activity across the system; monitor access and audit records.
TPO	Verify student profiles; review, edit, approve, or reject job postings sent by recruiters; create drives directly if required; set eligibility criteria; shortlist and update round results; schedule tests and interviews; publish announcements; view analytics; generate reports.
Student	Register and sign in; complete profile (academic details, skills, projects); upload resume; view eligible drives; apply; track application status; receive notifications; view results.
Recruiter	Register the company and sign in; post job openings (role, package, location, skills, deadline); track the approval status of each posting; view applicants of the approved drive; download shortlisted profiles; share round-wise results or feedback.

4.4 Recruiter Job Posting and Approval

Recruiters can send job openings directly through their own login instead of contacting the placement cell by e-mail or phone. A job posting contains the company name, job role, description, package, location, required skills, suggested eligibility criteria, and the last date to apply. A new posting is saved with the status Pending and is sent to the TPO. The TPO may Approve it, Edit and approve it, or Reject it with a remark; the recruiter can see the current status and any remark in his or her dashboard. Only an approved job is published as a drive, and only then is it visible to students. This approval step lets the placement cell check each company and its criteria against college policy before students are notified. The possible statuses are listed in Table 3.

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Table 3. Status of a Recruiter Job Posting

Status	Meaning
Pending	Posted by the recruiter and waiting for TPO review.
Approved	Accepted by the TPO; published as a drive and visible to eligible students.
Rejected	Declined by the TPO with a remark; not visible to students.
Closed	Application deadline passed or drive completed.

4.5 Eligibility Engine

Each drive stores its criteria: minimum CGPA or percentage, maximum number of active backlogs, permitted branches, and eligible graduation year. A student is eligible for a drive only when every condition is satisfied. For a student s and a drive d, the eligibility function is:

$$E(s, d) = 1 \text{ if } CGPA(s) \geq c_{min}(d) \text{ AND } backlogs(s) \leq b_{max}(d) \text{ AND } branch(s) \in B(d) \text{ AND } year(s) = y(d);$$
$$\text{otherwise } E(s, d) = 0 \quad (1)$$

where c_{min} is the minimum CGPA, b_{max} the maximum permitted backlogs, B the set of permitted branches, and y the eligible graduation year. Only students whose profiles are verified by the TPO are evaluated, and the criteria are those approved by the TPO for the drive, which may differ from the criteria suggested by the recruiter. Because the rules are applied by the server rather than by staff, the same policy is used for every student and every drive.

4.6 Application Lifecycle and Round Tracking

Each application moves through defined states: Applied, Shortlisted, Aptitude Test, Technical Interview, HR Interview, Selected, or Rejected. The TPO or the recruiter updates the state after each round, and the student sees the change in his or her dashboard. The complete history of state changes is stored, so the placement cell can later see at which round students were eliminated.

4.7 Scheduling and Notifications

The scheduling module lets the TPO assign a date, time, and venue or meeting link to each round. When a recruiter posts a job, the TPO is notified; when the TPO approves or rejects it, the recruiter is notified; and when a drive is published, a schedule is set, or a result is updated, the notification module sends an in-app message and an e-mail to the affected students. This reduces dependence on informal messaging groups and helps ensure that every eligible student receives the same information at the same time.

4.8 Analytics and Placement Statistics

The analytics module, available to the TPO and the Super Admin, computes summary measures from the stored records. The placement percentage for a group of students (for example, a branch) is:

$$\text{Placement \%} = (\text{Number of students placed} / \text{Number of eligible students}) \times 100 \quad (2)$$

The module also reports the number of drives and applications, the number of offers per company, the highest, average, and median package, and the branch-wise and round-wise distribution of students. These measures are shown as charts on the TPO dashboard.

4.9 Report Generation

The report module produces placement reports for a selected academic year, branch, or company, including the list of participating companies, student-wise results, and summary statistics. Reports can be downloaded as PDF and Excel files, which can be used for management review and accreditation documentation.

5. IMPLEMENTATION

5.1 Technology Stack

PlaceNext is implemented as a web application that runs in a standard browser and can be deployed on a college server or a cloud host. The technologies used in the prototype are summarized in Table 4 [8].

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Table 4. Technologies Used in the Prototype

Area	Technology	Purpose in the prototype
Front end	React (HTML, CSS, JavaScript)	Super Admin, TPO, Student, and Recruiter portals
Back end	Node.js with Express	REST API and business logic
Database	MongoDB	Central storage of all placement records
Authentication	JSON Web Tokens (JWT), password hashing	Sign-in and role-based access control for four roles
File storage	Local server storage	Resumes and offer letters
Notifications	Nodemailer (SMTP) and in-app alerts	E-mail and in-app alerts
Charts and reports	Chart.js, PDFKit, ExcelJS	Dashboards and downloadable reports
Testing	Postman	API and module testing

5.2 Database Design

The central database stores the entities listed in Table 5. Relationships link each application to one student and one drive, and each drive to one company, so a single change is reflected consistently wherever the data is displayed.

Table 5. Main Data Entities

Entity	Description
User	Login identity, hashed password, and role (Super Admin, TPO, Student, Recruiter).
Student profile	Name, enrolment number, branch, year, CGPA, backlogs, skills, projects, resume file, verification status.
Company / recruiter	Company name, sector, recruiter contact details, website, approval status, and history of past visits.
Job posting	Posting recruiter, role, description, package, location, required skills, suggested criteria, deadline, status (Pending / Approved / Rejected / Closed), and TPO remark.
Drive	Approved job posting, TPO-approved eligibility criteria, deadline, and round structure.
Application	Student, drive, current status, and timestamps.
Round / schedule	Round type, date, time, venue or link, and result for each application.
Notification	Recipient, message, type, and read status.

5.3 Security Measures

Passwords are stored only as salted hashes, for example using bcrypt [7], and never in plain text. After sign-in, the server issues a signed token [2] that carries the user's role, and every API request is checked against that role so that, for example, a student cannot open TPO functions or another student's data, a recruiter can see only his or her own postings and applicants, and only the Super Admin can create TPO accounts. Input validation, parameterized queries, and file-type and size checks on resume uploads are used to reduce the risk of common web vulnerabilities [3].

5.4 Configuration

The key configuration parameters of the prototype and their default values are given in Table 6.

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Table 6. Key Configuration Parameters

Parameter	Prototype default	Purpose
MAX_RESUME_SIZE_MB	2	Maximum permitted resume upload size
TOKEN_EXPIRY	1 day	Validity of a sign-in token
DEFAULT_MIN_CGPA	6.0	Default eligibility threshold for new drives
MAX_ACTIVE_BACKLOGS	0	Default backlog limit for new drives
DATABASE_URL	localhost	Connection to the central database

6. System User Interface

PlaceNext provides a browser-based interface organized around the role of the signed-in user, with separate dashboards for the Super Admin, TPO, Student, and Recruiter. The following subsections describe the main screens.

6.1 Landing Page and Sign-in

The landing page introduces the application and offers sign-in and registration. After sign-in, the user is taken to the dashboard for his or her role.

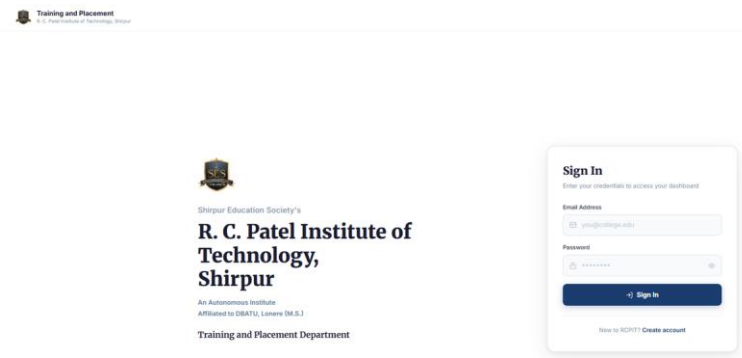


Figure 3. PlaceNext landing page showing the application overview and sign-in options.

6.2 Student Portal

The student portal shows the profile and its verification status, the resume, the drives for which the student is eligible, and the status of each application. Notifications about new drives, schedules, and results appear on the dashboard.

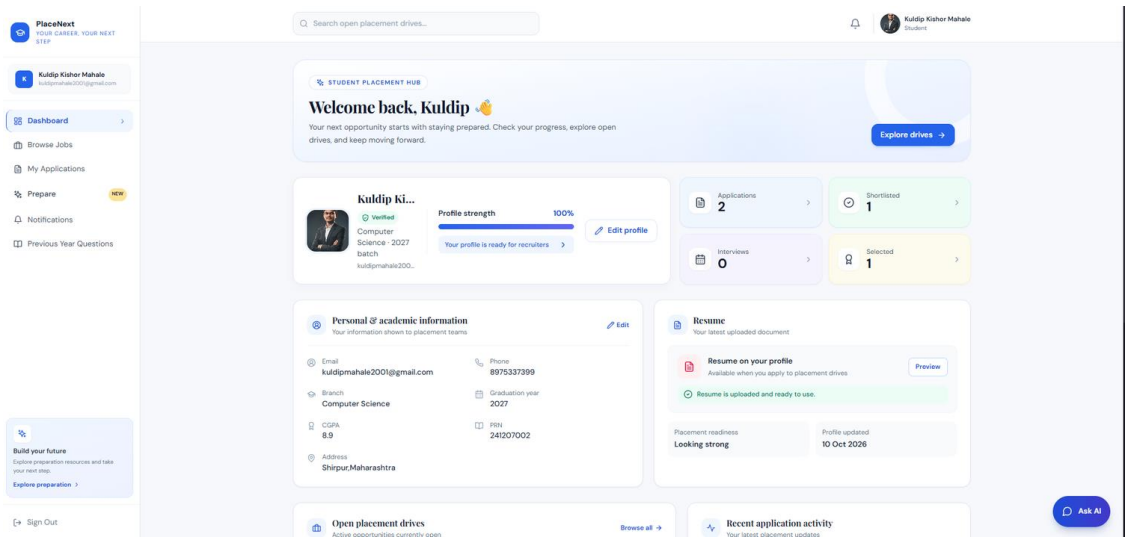


Figure 4. Student dashboard showing eligible drives and application tracking.

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6.3 Recruiter Portal

The recruiter portal lets a company representative post a new job opening, see whether it is Pending, Approved, or Rejected, read the TPO's remarks, and, after approval, view the applicants and share round-wise results.

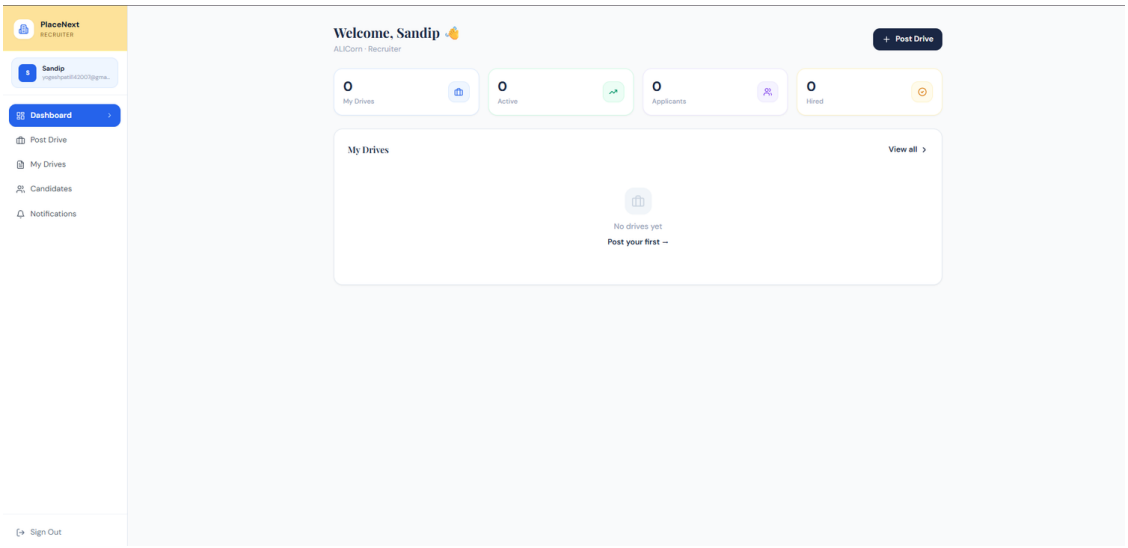


Figure 5. Recruiter portal showing job posting and approval status.

6.4 TPO Portal and Analytics

The TPO portal allows the placement officer to verify students, review and approve job postings, manage drives, update round results, and view analytics such as placement percentage, package distribution, and branch-wise outcomes.

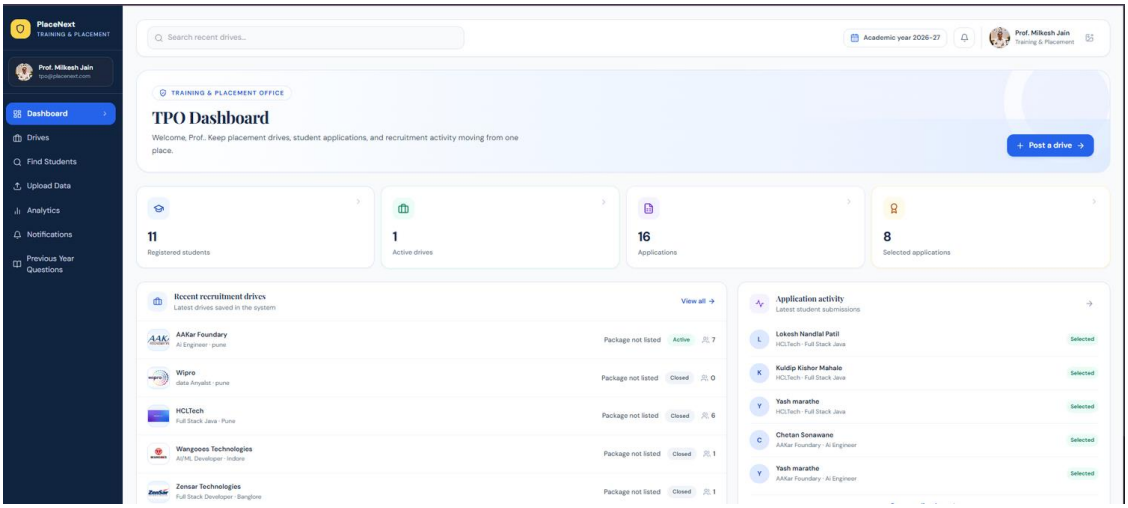


Figure 6. TPO dashboard showing job approval, drive management, and placement analytics.

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6.5 Super Admin Portal

The Super Admin portal is used to create and deactivate TPO accounts, manage departments and academic years, configure system settings, and view overall statistics.

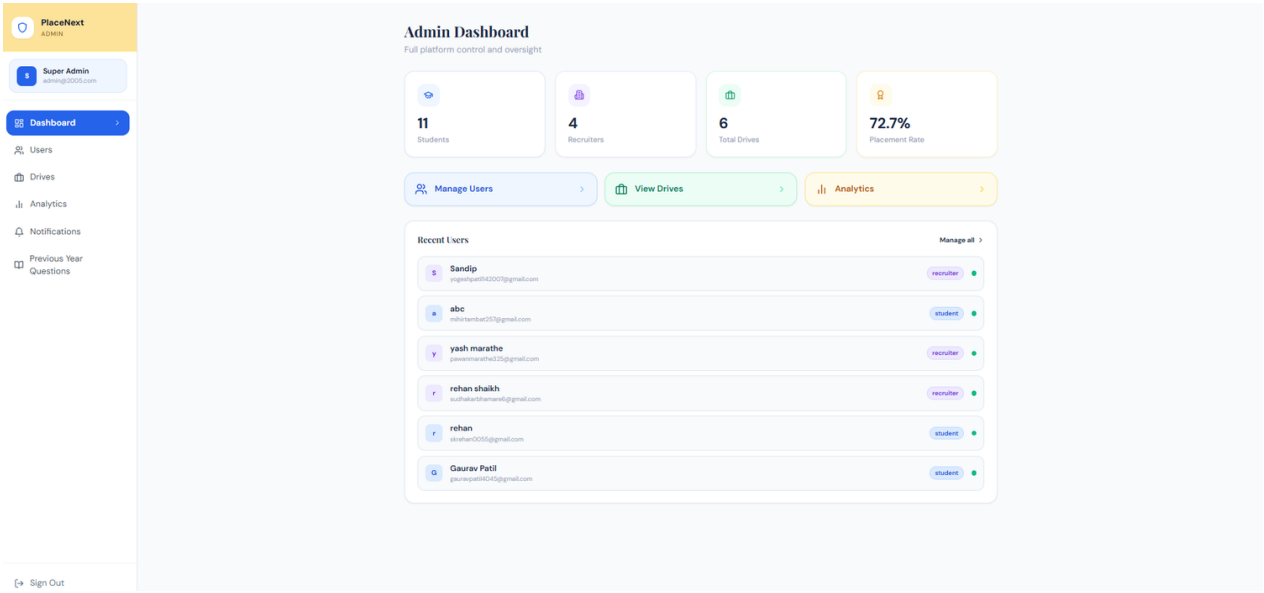


Figure 7. Super Admin dashboard showing TPO account management and system overview.

7. Dataset and Test Material

The prototype was tested with synthetic data. The test material consisted of 120 student profiles from 4 branches, 6 recruiter accounts, 8 job postings, and 6 drives with different eligibility criteria. Table 7 lists the main data stored for each placement record.

Table 7. Stored Fields for a Placement Record

Stored field	Description
Student details	Identity, branch, year, CGPA, backlogs, and resume
Company and drive	Company, role, package, criteria, and deadline
Eligibility result	Whether the student met the criteria for the drive
Application status	Current round and history of status changes
Schedule	Date, time, and venue or link for each round
Final outcome	Selected / not selected, offered package

8. RESULTS AND DISCUSSION

8.1 Functional Testing

The prototype was checked using 12 functional test cases. The tests examined whether each main function produced the expected output for the selected test inputs. All 12 test cases were recorded as passed (Table 8). These results indicate that the tested functions operated for the selected inputs; they do not establish performance under heavy load or in a real placement season.

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Table 8. Functional Test Cases

Test case	Expected behaviour	Observed status
User registration and login	Create an account and sign in with correct role	Passed
Role-based access	Student cannot open TPO, Recruiter, or Super Admin pages	Passed
TPO account creation	Only Super Admin can create and deactivate TPO accounts	Passed
Recruiter job posting	Recruiter can post a job; it is saved as Pending	Passed
Job approval / rejection	TPO can approve or reject; recruiter sees the status; only approved jobs are visible to students	Passed
Profile and resume upload	Save profile; accept valid resume; reject invalid file	Passed
Eligibility check	Only students meeting all criteria are listed	Passed
Application submission	Eligible student can apply once per drive	Passed
Round status update	Status change is visible to the student	Passed
Notification delivery	Affected students receive an alert	Passed
Analytics dashboard	Statistics match the stored records	Passed
Report download	Report is generated and can be downloaded	Passed

8.2 Observed Output

For the demonstration data, the system registered 120 students and 6 recruiter accounts, managed by 1 Super Admin and 2 TPO accounts. The TPO received 8 job postings from recruiters, approved 6 of them as drives, and recorded 214 applications. For a sample drive with eligibility criteria of CGPA ≥ 6.5, at most 0 backlogs, and branches CSE and IT, the eligibility engine listed 41 of 96 verified students as eligible. The analytics dashboard showed a placement percentage of 53.4% and an average package of 5.8 LPA for the test records (Table 9). These are observed application outputs, not ground-truth accuracy results.

Table 9. Observed Output for Demonstration Data

Measure	Sample drive	All demonstration data
Students considered	96	120
Students found eligible	41	88
Applications received	33	214
Students selected	12	47
Placement percentage	29.3%	53.4%

8.3 Development Across Project Phases

The project was developed in phases. The first phase built the authentication, Super Admin, student, and TPO modules with profile management. The second phase added the recruiter portal with job posting and approval, the eligibility engine, application tracking, and notifications. The final phase added analytics, reports, and role-based security.

8.4 Discussion

The observed results show that the prototype can connect student registration, drive management, eligibility checking, application tracking, and reporting within one application. Replacing separate files with a single database removes repeated data entry, and automatic eligibility checking applies the same rules to every student. The current evaluation is functional rather than quantitative. It does not by itself show how much time the placement cell saves or how satisfied users are. A more rigorous study should measure, for example, the time taken to prepare a drive and shortlist before and after using PlaceNext, the number of eligibility errors in manual versus automatic checking, and user satisfaction using a standard instrument such as the System Usability Scale [4], together with a pilot deployment in a real placement season.

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9. PRIVACY, ETHICAL CONSIDERATIONS, AND LIMITATIONS

9.1 Privacy and Data Protection

Placement data includes personal and academic information, such as contact details, marks, and resumes, and recruiters should see only the data of students who have applied to their own drives. In India, the processing of such data is governed by the Digital Personal Data Protection Act, 2023 [6], so a production deployment should collect only the necessary data, state its purpose, restrict access by role, and define a retention period. Access to the server and database must be controlled, backups must be protected, and only anonymized or synthetic data should be used for public demonstrations.

9.2 Ethical Considerations

Eligibility rules directly affect students' opportunities, so the criteria used for each drive should be visible to students and approved by the placement cell, and the TPO should be able to review exceptions. The system supports human decision-making and does not replace the judgment of the placement officer.

9.3 Limitations

The current prototype has the following limitations:

- **Synthetic data only:** The prototype has been tested only with synthetic data and has not been evaluated in a full placement season.
- **Fixed eligibility rules:** Eligibility is based on fixed rules and does not consider skills or interests.
- **Dependence on the TPO:** Verification of student data and approval of recruiter job postings depend on the TPO, and recruiter identity is not independently verified by the system.
- **Missing integrations:** There is no mobile application, e-mail notifications depend on correct SMTP configuration, and the system is not integrated with the college ERP.
- **Security audit:** The security design has not been independently audited and should be reviewed before use with real student data.

CONCLUSION AND FUTURE WORK

This paper presented PlaceNext, a centralized web-based placement management system for colleges. The system combines four role-based logins (Super Admin, TPO, Student, Recruiter), a recruiter job-posting and TPO approval workflow, a rule-based eligibility engine, application and round tracking, notifications, analytics, and report generation on a single database. The prototype passed all 12 of the 12 functional test cases described in this study. These observations demonstrate functional operation but should not be interpreted as proof of improved placement outcomes.

Future work will focus on a pilot deployment during a real placement season, with measurement of time saved, error reduction, and user satisfaction. Further development may include a resume-to-job matching and skill-gap module, automatic resume parsing, a mobile application, company verification for new recruiters, integration with the college ERP and with e-mail and calendar services, alumni and internship modules, predictive analytics for placement readiness, and stronger production-level security, audit logging, and backup.

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