



IJRASET

International Journal For Research in
Applied Science and Engineering Technology



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 14 **Issue:** X **Month of publication:** October 2026

DOI: <https://doi.org/10.22214/ijraset.2026.85321>

www.ijraset.com

Call: ☎ 08813907089

E-mail ID: ijraset@gmail.com

CareerBridge AI: An AI-Assisted Smart Placement Management and Career Guidance Platform

N. Nazmunisha¹, S. Sanjana², S. Siva Susila³

¹Assistant Professor II, ^{2,3}UG Student, Computer Science and Engineering, K.L.N. College of Engineering, Pottapalayam, Sivagangai, Tamilnadu, India

Abstract: Campus placement management involves maintaining student information, managing company recruitment drives, checking eligibility, communicating opportunities, and supporting students in their preparation. Traditional approaches that depend on spreadsheets, manual records, and separate communication channels can increase the effort required for candidate verification and placement tracking. CareerBridge AI – Placement App is a centralized web-based platform developed to combine placement management with AI-assisted career guidance. The system uses Python and Django for backend processing, PostgreSQL for structured data management, and HTML, CSS, JavaScript, and Bootstrap for the user interface. It supports student registration with email OTP verification, profile and resume management, placement drive administration, automated eligibility verification, skill matching, skill-gap analysis, course recommendations, dynamic technical assessments, and an AI Career Assistant. A locally hosted Qwen 2.5 (1.5B) model through Ollama provides AI-assisted recommendations, while a rule-based fallback supports selected recommendation functions when the local model is unavailable. Mentor dashboards provide graphical analytics for placement monitoring. System testing documented successful workflows for OTP verification, multi-constraint eligibility checking, recommendation caching, AI-assisted skill updates, and mentor dashboard polling. The implemented system demonstrates how AI and web technologies can be integrated into a practical campus placement workflow while retaining clear scope for future enhancement.

Keywords : Artificial Intelligence, Campus Placement, Eligibility Verification, Skill Gap Analysis, Career Recommendation, Django, PostgreSQL, Qwen 2.5, Ollama, Placement Analytics

I. INTRODUCTION

Campus placement is an important activity in higher education because it connects students with employment opportunities and requires coordinated management of academic information, recruitment requirements, applications, and preparation activities. In many institutions, placement information is maintained through spreadsheets, separate documents, email or messaging platforms, and manually prepared reports. Although such approaches can support basic record keeping, they make it harder to maintain a centralized view of students and opportunities as the number of candidates and companies increases.

CareerBridge AI – Placement App was developed to address this operational gap through a centralized web application. The project combines student profile management, placement drive management, automated eligibility verification, skill matching, AI-assisted recommendations, technical assessments, and mentor analytics. The application is designed not only to help mentors organize recruitment information but also to help students understand their preparation needs and identify suitable learning directions.

The project uses Python, Django, PostgreSQL, HTML, CSS, JavaScript, and Bootstrap. Email OTP verification is supported through Gmail SMTP, graphical analytics are presented using Chart.js, and AI-assisted functionality is provided through a locally hosted Qwen 2.5 (1.5B) model running through Ollama. The report identifies the system as an assistance platform: eligibility results and AI-generated recommendations support decision making but do not guarantee recruitment outcomes.

II. RELATED WORK

A. Placement Prediction and Analysis

The literature reviewed in the project includes machine-learning approaches for predicting campus placement opportunities from academic performance, technical skills, training experience, and other student attributes. Such studies demonstrate the usefulness of student data for placement-related analysis, but prediction alone does not provide the complete operational workflow required for registration, drive administration, eligibility verification, and preparation.

B. Skill-Based Job and Career Recommendation

Research on skill graphs, employment matching, and career recommendation emphasizes relationships between candidate skills and job requirements. These approaches support more relevant recommendations than simple isolated matching. CareerBridge AI adopts skill matching as part of its placement workflow and extends it with skill-gap analysis, course suggestions, and an interactive career assistant.

C. AI-Assisted Career Guidance

Recent career recommendation work also considers personalized pathways and the interpretation of AI-generated suggestions. CareerBridge AI follows this direction by integrating a locally hosted language model for career guidance while retaining a rule-based fallback for supported recommendation operations. The combination is intended to make the application useful even when the AI service is unavailable. The main gap identified from the reviewed work is the absence of a unified workflow that brings together placement administration, eligibility checking, student preparation, AI-assisted guidance, and mentor-oriented analytics. CareerBridge AI focuses on this integration rather than presenting a standalone prediction model.

III. PROBLEM DEFINITION AND OBJECTIVES

Placement mentors may need to maintain academic records, manage company information, verify eligibility criteria, communicate recruitment updates, and monitor placement progress. When these activities are distributed across separate tools, repetitive comparisons and manual updates can consume time and may introduce errors. Students also face difficulty in identifying missing technical skills and selecting relevant learning resources for different placement opportunities.

The project therefore aims to develop an intelligent campus placement management application that centralizes student information and placement activities while providing AI-assisted career preparation. The principal objectives are:

- to provide centralized student and placement information management;
- to implement email-based OTP verification for student registration;
- to allow placement mentors to create and manage company recruitment drives;
- to automate eligibility checking using department, CGPA, active backlogs, and graduation batch;
- to compare student skills with placement requirements and identify skill gaps;
- to provide AI-assisted career recommendations, course suggestions, and interactive guidance;
- to provide dynamic technical assessments using multiple-choice questions;
- to provide mentor dashboards with graphical placement analytics; and
- to provide a rule-based fallback when the local AI service is unavailable.

IV. PROPOSED SYSTEM

CareerBridge AI is a centralized web-based platform developed to support campus placement activities and student career preparation. The proposed system brings student profile management, company placement drives, eligibility verification, skill matching, career recommendations, technical assessments, and mentor analytics into a single application. By combining these functions, the system reduces the need for maintaining placement information across separate tools and provides students and mentors with a more organized workflow. CareerBridge_AI_Journal_Paper_A...

The system provides separate functionalities for **students and placement mentors**. Students can register and verify their accounts, maintain their academic and professional profiles, upload resumes, view placement opportunities, check eligibility, identify skill gaps, receive course and career recommendations, and practise technical assessments. Mentors can create and manage company placement drives, specify eligibility requirements, review eligible candidates, and monitor placement activities through the analytics dashboard. CareerBridge_AI_Journal_Paper_A...

The proposed architecture follows a layered workflow in which the frontend communicates with the Django backend for processing user requests and application logic. PostgreSQL stores student, company, placement, and related application records. The eligibility engine compares student information with the requirements configured for each placement drive, while the skill-matching component provides additional information about relevant opportunities. CareerBridge_AI_Journal_Paper_A...

AI-assisted functionalities are provided through the locally hosted **Qwen 2.5 (1.5B)** model using **Ollama**. The AI component supports career recommendations, skill-gap analysis, course suggestions, technical assessments, and the AI Career Assistant. The system also includes a rule-based fallback for selected recommendation functions, allowing supported operations to continue when the local AI service is unavailable.

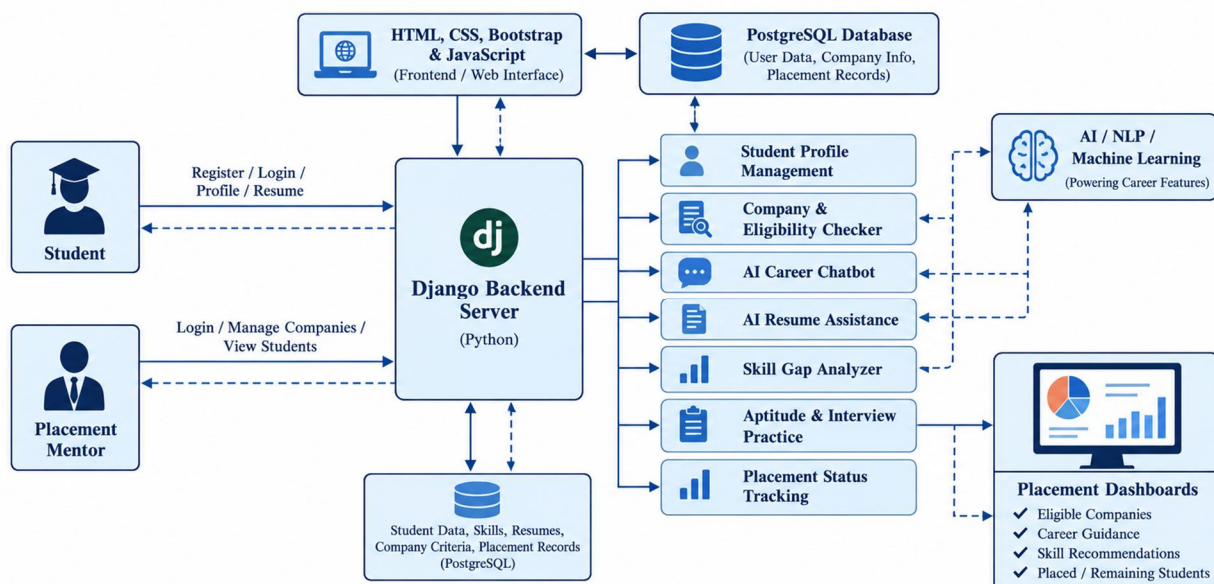


Fig. 1. CareerBridge AI system architecture

A. Student Registration and Profile Management

The registration module collects student information and uses email-based OTP verification. The profile module supports personal, academic, skill, project, certification, professional-link, and resume information. These records are used by the eligibility, skill-gap, and recommendation functions.

B. Company Drive and Eligibility Verification

Mentors can create placement drives containing company details, job role, package information, eligibility conditions, required skills, and deadlines. The eligibility engine evaluates department, minimum CGPA, active backlogs, and graduation batch. This reduces the need for mentors to manually compare every student profile with every company requirement.

C. Skill Matching and Skill-Gap Analysis

The skill-matching component compares the skills available in a student profile with those associated with a placement opportunity. Skill-gap analysis identifies missing or weak areas and supports course recommendations. The goal is to connect placement requirements with a structured preparation path.

D. AI Career Guidance and Assessment

The system integrates Qwen 2.5 (1.5B) through Ollama for career recommendations, skill-gap analysis, course suggestions, dynamic technical assessments, and an AI Career Assistant. Assessments use multiple-choice questions to help students practise technical concepts. The career assistant can also support supported profile-related actions through natural-language commands.

E. Mentor Dashboard and Analytics

The mentor dashboard presents placement information through graphical analytics. It supports candidate review and placement monitoring and uses AJAX-based polling to refresh supported student information periodically. Chart.js is used for graphical presentation.

V. SYSTEM ARCHITECTURE AND FUNCTIONAL WORKFLOW

The system architecture connects the student and mentor interfaces with the Django application layer, PostgreSQL data store, eligibility and skill-matching logic, AI services, email service, and analytics layer. The data flow begins when students or mentors submit information through the web interface. Django validates and processes the request, stores or retrieves records from PostgreSQL, invokes eligibility or AI-related logic when required, and returns the processed information to the relevant dashboard.

The design separates placement management from AI assistance. This separation allows core functions such as registration, eligibility checking, and database operations to remain available without depending entirely on the local language model. The architecture therefore combines deterministic application logic with optional AI-supported guidance.

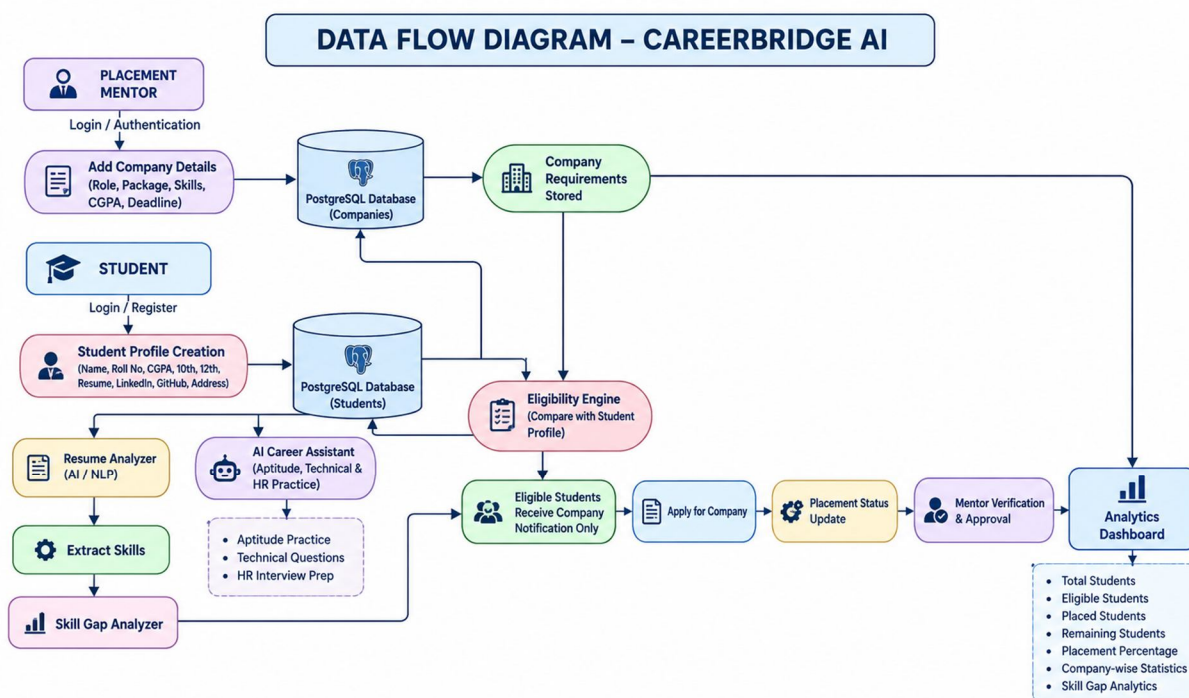


Fig. 2. Data flow of CareerBridge AI between students, mentors, Django services, PostgreSQL, AI services, and dashboards.

A. Technology Stack

Technology	Role	Implementation Use
Python / Django	Backend	Routing, application logic, database interaction and module integration
PostgreSQL	Database	Student, placement and application records
HTML / CSS / JavaScript	Frontend	Pages, forms, interaction and client-side behaviour
Bootstrap	UI framework	Responsive layouts and reusable interface components
Ollama / Qwen 2.5 (1.5B)	AI service	Career guidance, recommendations, skill-gap support and assessments
Chart.js	Visualization	Mentor dashboard analytics
Gmail SMTP	Email service	OTP verification and password-reset related email operations

VI. SYSTEM IMPLEMENTATION

The CareerBridge AI system is implemented as a web-based placement management and career guidance platform that integrates student services, placement management, eligibility verification, AI-assisted guidance, and analytics. The implementation uses Python with Django for backend processing, PostgreSQL for data storage, HTML, CSS, JavaScript, and Bootstrap for the user interface, and Ollama with the Qwen 2.5 (1.5B) model for AI-supported functionalities. The major interfaces developed for the system are described below.

A. Home Page Module

The Home Page Module provides the initial interface of the CareerBridge AI application. It introduces the purpose of the platform and provides navigation options for users to learn about the system, log in, or register. The interface is designed to give students and placement mentors a clear starting point for accessing the placement management and career guidance features.

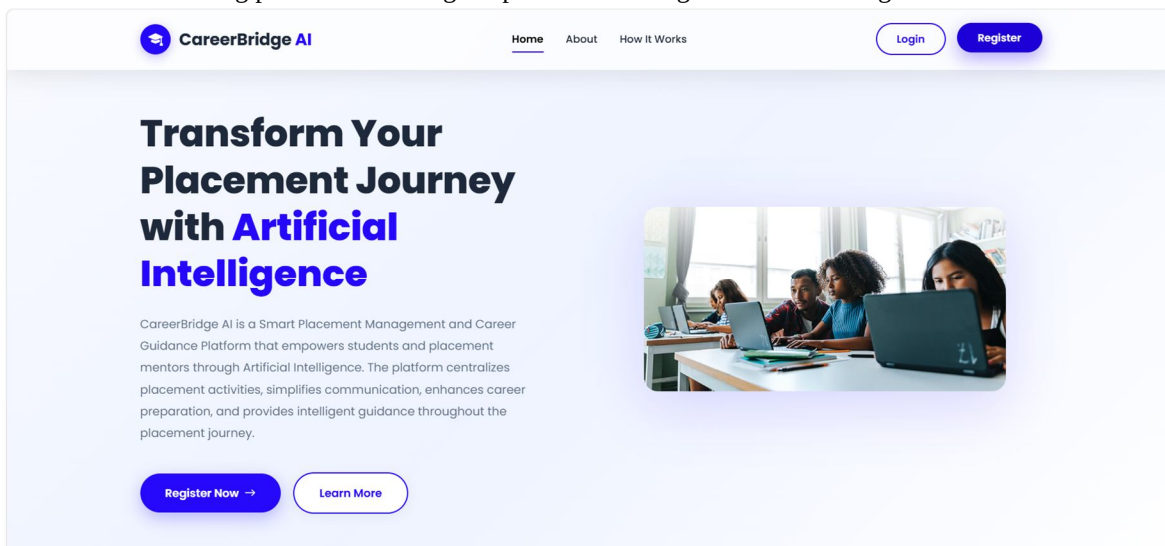


Fig. 3 CareerBridge AI Home Page Interface

B. Eligibility Module

The Eligibility Module evaluates students based on multiple placement requirements rather than a single criterion. It considers factors such as department, CGPA, active backlogs, graduation year, and required skills according to the conditions specified for each placement drive. Based on these criteria, the system automatically determines whether a student is eligible for a particular opportunity, helping reduce manual verification and providing a clear eligibility status.

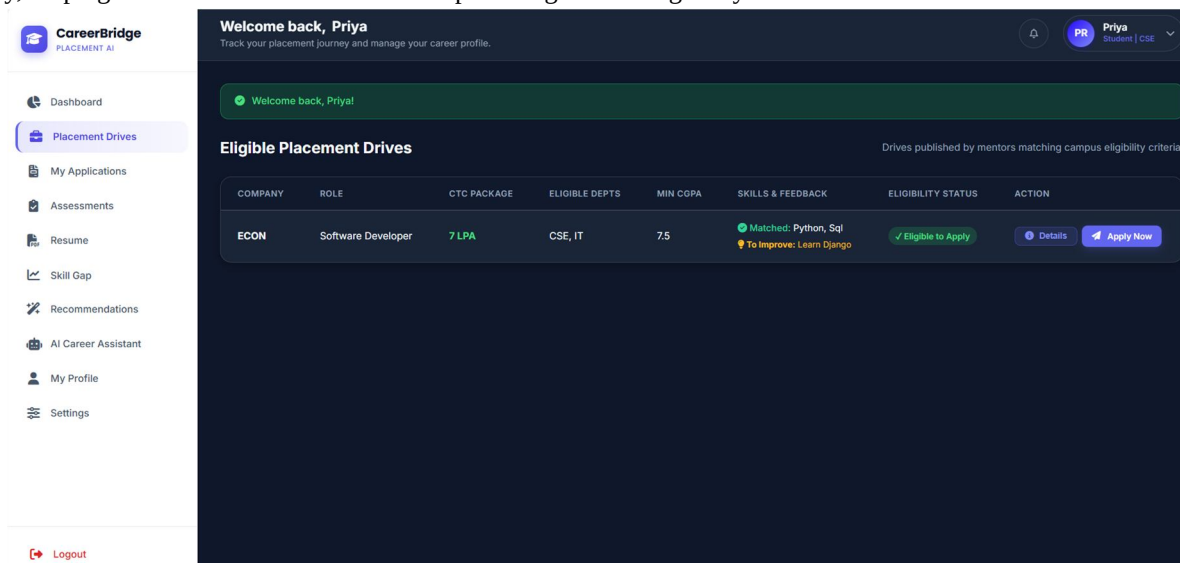


Fig. 4 Placement Eligibility Verification Interface

C. AI Guidance and Assessment Module

The AI module provides career recommendations, skill-gap analysis, course suggestions, technical assessments, and an interactive career assistant. It uses the locally hosted Qwen 2.5 (1.5B) model through Ollama. The module helps students understand their current skills and identify areas that require further preparation.

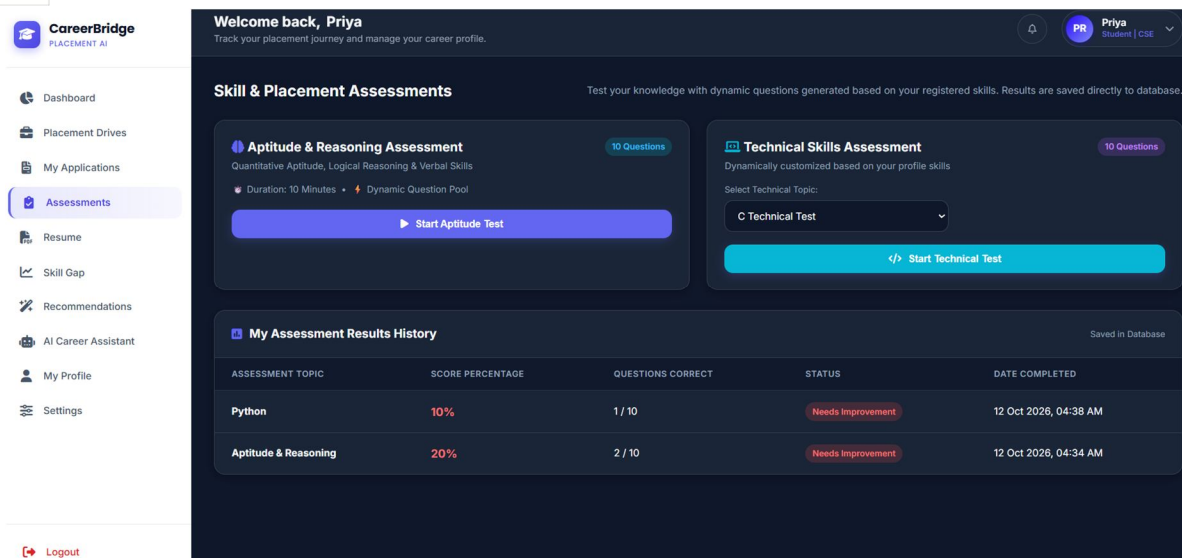


Fig. 5 Assessment Interface

D. AI Recommendation Module

The AI Recommendation Module analyzes the student's profile, skills, and identified skill gaps to provide relevant career and course recommendations. It helps students understand which skills they need to improve and suggests suitable learning resources based on their career interests and current profile.

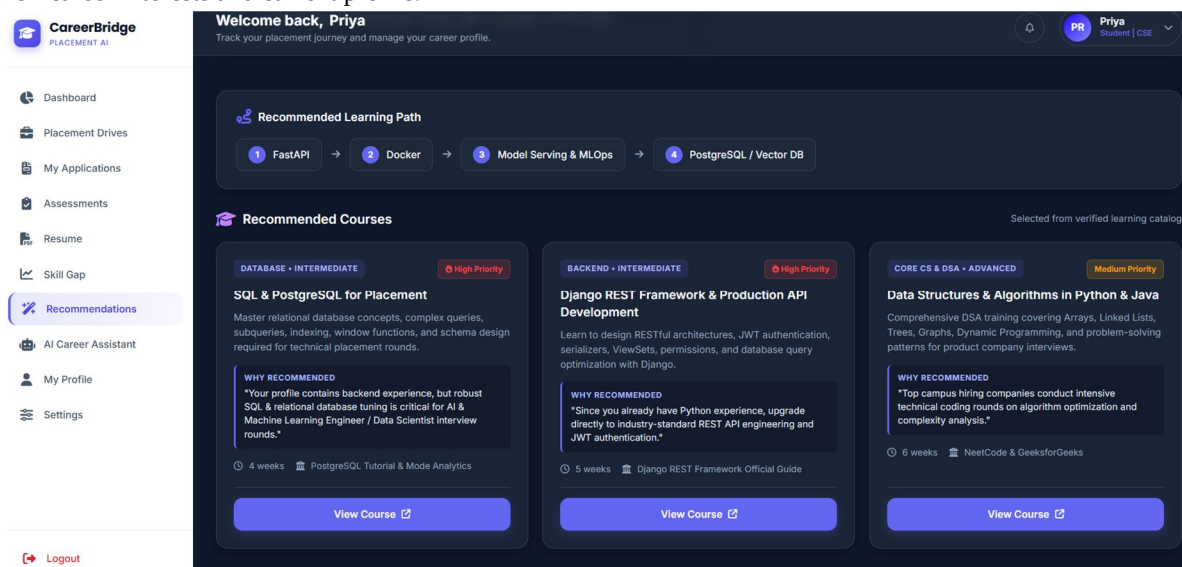


Fig. 6. AI-Based Career Recommendation Interface

VII. RESULTS AND DISCUSSION

The implemented CareerBridge AI application demonstrates an integrated workflow for student management, placement drive administration, eligibility verification, skill matching, AI-assisted recommendations, and mentor analytics. The technical audit reported six passed test cases covering email OTP dispatch, OTP validity, multi-constraint eligibility verification, AI recommendation caching, AI-assisted skill updates, and real-time mentor dashboard polling.

The OTP tests verified email delivery and rejection of expired or previously used tokens. Eligibility testing verified that candidates who did not satisfy configured CGPA or backlog requirements were prevented from proceeding as ineligible candidates. Recommendation caching was checked to confirm that existing recommendations could be reused when the student profile hash remained unchanged. The AI assistant test verified that supported skill updates were reflected in the student profile and eligibility calculations.

The mentor dashboard provides a consolidated view of placement activities and student progress. It presents placement statistics and relevant student information, allowing mentors to monitor recruitment progress and review placement-related activities through a centralized interface.

The implemented mentor dashboard provides a consolidated view of placement activities, eligible students, placement drives, and student progress, demonstrating the practical use of the system for placement monitoring.

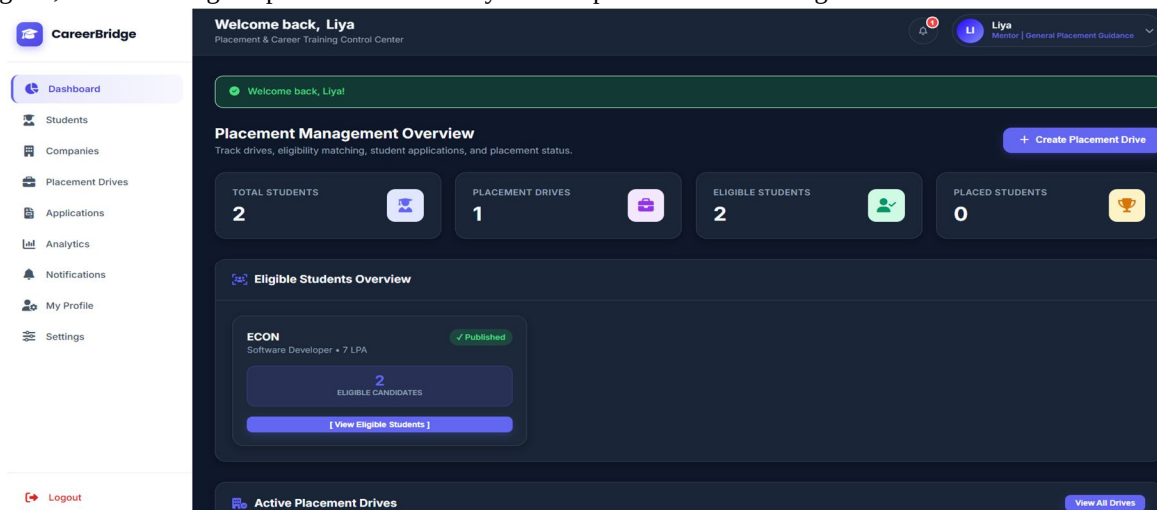


Fig. 7. Mentor Dashboard and Placement Monitoring Interface

The system also demonstrated integration between the frontend, Django backend, PostgreSQL database, and the locally hosted AI service. The performance review reported an approximate two-to-six-second response time for local language-model requests depending on hardware and request complexity. The mentor dashboard uses AJAX polling at six-second intervals for the supported student-table refresh.

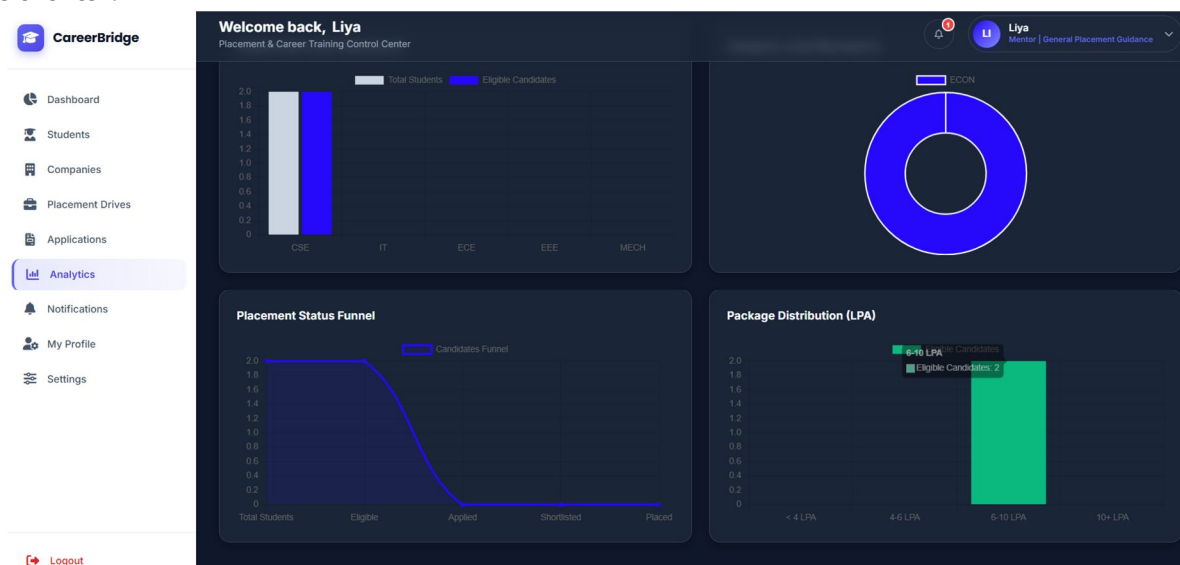


Fig. 8. Mentor Placement Analytics

The analytics interface further presents placement trends and package-related information through graphical visualizations, enabling mentors to interpret placement progress more efficiently.

The results should be interpreted within the scope of the implemented prototype. Local AI latency remains a practical limitation, application progress requires manual mentor updates, the current implementation supports one active resume file without version comparison, and large-scale concurrent-user testing was not performed. These limitations provide clear directions for subsequent development rather than invalidating the integrated workflow demonstrated by the prototype.

VIII. SYSTEM TESTING

A. Unit Testing

Unit testing focused on authentication, OTP validation, eligibility checking, recommendation handling, and student skill updates. Individual components were tested independently before evaluating their interaction within the complete application.

B. Functional Testing

Functional testing examined registration, login, profile management, placement-drive access, eligibility verification, career recommendations, skill-gap features, notifications, and mentor analytics. The objective was to verify that the major application operations behaved according to the defined requirements.

C. Integration Testing

Integration testing verified communication between the frontend, Django backend, PostgreSQL database, and AI services. It included registration and authentication, eligibility calculations, communication with Ollama, fallback recommendation behaviour, and mentor dashboard polling.

D. Performance Testing

Performance testing considered database access, eligibility calculations, AI response generation, recommendation retrieval, and dashboard updates. The locally hosted language model produced responses in approximately two to six seconds under the documented test conditions. Recommendation caching reduces repeated AI work when the student profile remains unchanged.

Test Area	Observed Result	Purpose
Email OTP	Passed	Verify dispatch and token validity
Eligibility	Passed	Verify multi-constraint candidate checking
Recommendation cache	Passed	Reuse results for unchanged profiles
AI skill update	Passed	Update skills and eligibility through assistant
Mentor polling	Passed	Refresh supported student information

IX. LIMITATIONS

The current system is a functional project implementation rather than a production-scale placement platform. The local language model introduces response latency that depends on hardware and request complexity. Placement application progress is still dependent on mentor updates, and the current resume handling does not provide full version comparison. The project also does not include large-scale concurrent-user testing. In addition, the AI output is intended as guidance and should not be treated as a guaranteed placement decision.

These limitations indicate that future evaluation should include larger datasets, concurrent-user testing, stronger resume-processing workflows, richer analytics, and controlled assessment of recommendation quality. The present results demonstrate the implemented integration and workflow rather than claiming a measured placement-prediction accuracy.

X. FUTURE ENHANCEMENT

The project report identifies several directions for extending CareerBridge AI. Automated resume analysis could extract information from PDF resumes and compare qualifications, technical skills, and experience with company requirements. More advanced AI recommendation methods could suggest job roles and learning paths using a student's skills and placement goals.

Skill-gap analysis can be extended into personalized learning plans and progress tracking. Placement application tracking can be automated to include application status, interview schedules, selection results, and final placement status. A mobile-friendly application could provide students and mentors with access to placement information, notifications, assessments, and career guidance through smartphones.

The assessment module can be expanded with aptitude tests, coding challenges, technical interviews, and mock interviews, while performance analytics can identify weak preparation areas. Mentor analytics can also be extended to department-wise placement statistics, company-wise selection details, skill-demand trends, and placement progress reports. Integration with learning platforms could connect course progress with identified skill gaps.

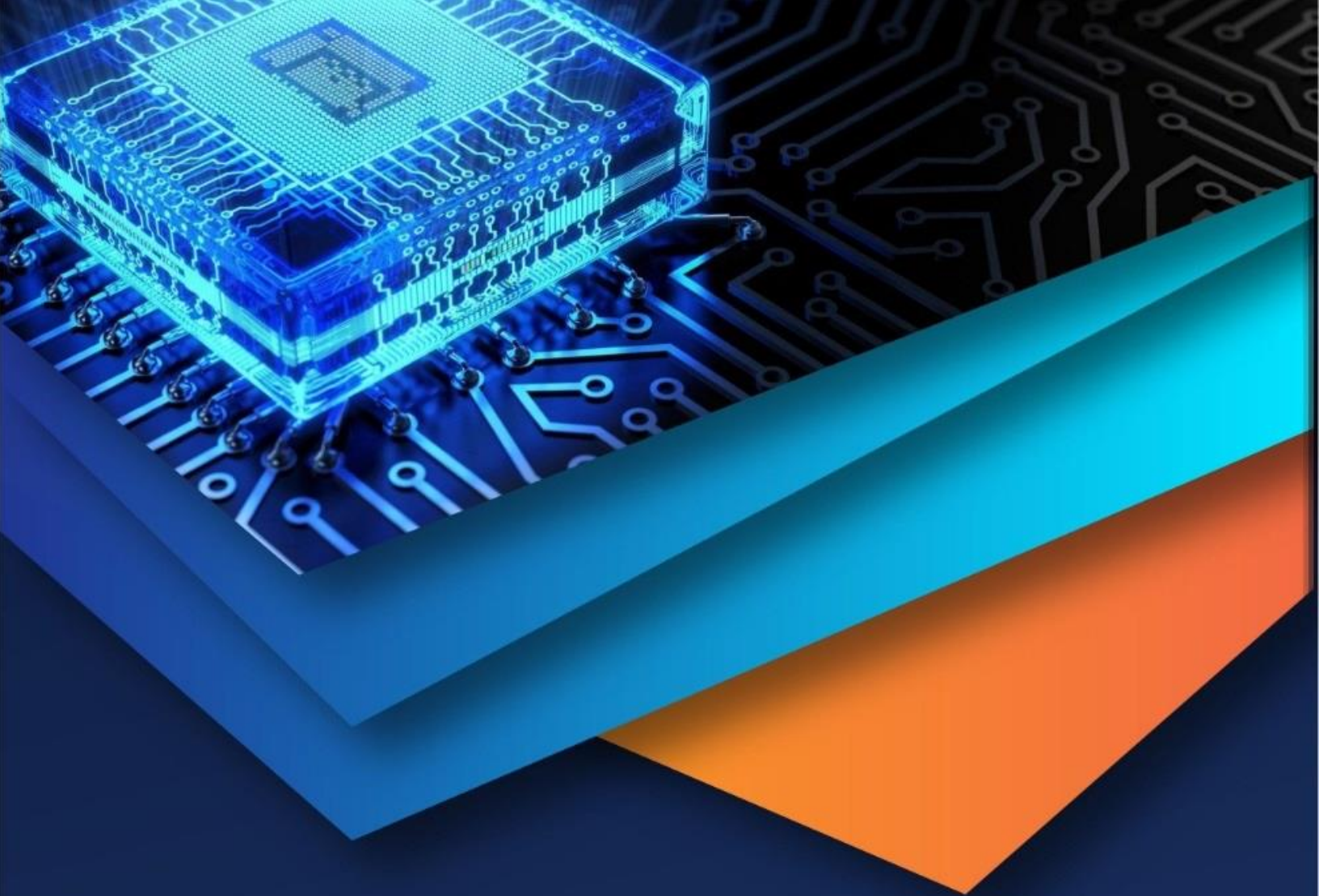
XI. CONCLUSION

CareerBridge AI – Placement App provides a centralized platform for managing campus placement activities and supporting student career preparation. By combining student profile management, placement drive management, automated eligibility verification, skill matching, AI-assisted guidance, technical assessment, and mentor analytics, the system addresses several limitations of fragmented and manually maintained placement workflows.

The implementation demonstrates the practical integration of Django and PostgreSQL with a locally hosted Qwen 2.5 language model through Ollama. The documented tests confirm important workflows including authentication, OTP verification, eligibility checking, AI recommendations, assessments, and dashboard operations. The system therefore presents a structured foundation for AI-assisted campus placement management while keeping the limitations and future development requirements explicit.

REFERENCES

- [1] "A Survey on Artificial Intelligence (AI) Based Job Recommendation Systems," 2023 International Conference on Sustainable Computing and Data Communication Systems (ICSCDS), IEEE, 2023.
- [2] "Placement Prediction & Analysis Using Machine Learning," IEEE Conference Publication, 2025.
- [3] "Prediction of Campus Placement Using Hybrid Logistic Regression Model," IEEE Conference Publication, 2025. DOI: 10.1109/WCEST66994.2025.11389880.
- [4] "Research on Employment Matching Based on Artificial Intelligence and Recommendation Algorithm," 2024 International Conference on Electronics and Devices, Computational Science (ICEDCS), IEEE, 2024. DOI: 10.1109/ICEDCS64328.2024.00198.
- [5] "A Personalized Machine Learning-Based System to Evaluate Students' Skillset and Analyze the Gap Between Academia and Industry for Engineering Students," *Kybernetes*, vol. 54, no. 9, pp. 4850–4865, 2025. DOI: 10.1108/K-01-2024-0053.
- [6] "Career Recommendation System with Skill Gap Analysis," *International Research Journal on Advanced Engineering Hub (IRJAEH)*, vol. 4, no. 4, pp. 2401–2408, 2026. DOI: 10.47392/IRJAEH.2026.0322.
- [7] "CARIA: A Personalized Career Recommendation System Based on Students' Competencies and Required Career Skills," *International Journal of Information and Communication Technology Education*, vol. 20, no. 1, 2024. DOI: 10.4018/IJICTE.356499.
- [8] "AI-Assisted Web Platform for Personalized Job Recommendation Using Machine Learning Techniques," IEEE Conference Publication, 2025.
- [9] "A Survey on Artificial Intelligence Based Career Recommendation Systems: Techniques, Architectures, and Research Gaps," *Journal of Advance and Future Research*, 2026.
- [10] "AI-Powered Skill Gap Identification and Career Guidance Platform Using Machine Learning and Natural Language Processing," *International Journal of Management Research and Review*, 2026.
- [11] "Smart Career Guidance System Using Machine Learning Algorithms," *International Journal of Creative Research Thoughts (IJCRT)*, vol. 14, no. 3, 2026.
- [12] "GenAI Skill Gap Analyser and Personalized Learning Path Recommendation," *International Journal of Creative Research Thoughts (IJCRT)*, vol. 14, no. 4, 2026.
- [13] "Machine Learning-Based Career Recommendation System Using Academic and Behavioral Analytics," 2026 International Conference on Emerging Systems and Intelligent Computing (ESIC), IEEE, 2026. DOI: 10.1109/ESIC68176.2026.11495729.
- [14] "AI-Powered Skill Gap Analysis and Career Path Recommendation System Using Hybrid Semantic and Ontology-Based Matching," IEEE Conference Publication, 2026.
- [15] "Dynamic and Personalized Career Path Prediction Using Machine Learning and Job Market Insights," 2026 International Conference on Intelligent and Sustainable AI Systems (ICOSAAS), IEEE, 2026. DOI: 10.1109/ICOSAAS68663.2026.11634695.



10.22214/IJRASET



45.98



IMPACT FACTOR:
7.129



IMPACT FACTOR:
7.429



INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089  (24*7 Support on Whatsapp)