Smart Hire: AI- Based Campus Recruitment System

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Abstract*—This paper presents a comprehensive, web-based College Placement System designed to streamline and modernize the entire student placement lifecycle. The traditional placement process in educational institutions often suffers from manual inefficiencies, a lack of transparency, and inadequate tools for student preparation. To address these challenges, this project introduces an integrated digital platform serving three key stakeholders: students, the placement department (admin), and college management. The system provides role-based dashboards for managing profiles, job postings, and applications. A key innovation is the AI-powered Interview Preparation Hub, which leverages the Google Gemini API to offer personalized services. This hub analyses student resumes against job descriptions to provide an Applicant Tracking System (ATS) score with actionable feedback and generates tailored interview questions based on the student's profile and applied roles. By creating a transparent, efficient, and intelligent ecosystem, the College Placement System enhances student engagement, improves administrative productivity, and provides critical data insights for institutional growth, thereby strengthening the bridge between academia and industry.

***Index Terms*—College Placement System, Web-Based Application, Student Placement Management, Role-Based Dashboard, AI-Powered Interview Preparation, Google Gemini API, Resume Analysis, ATS Score, Industry Academia Bridge.**

I. INTRODUCTION

Campus placement is a critical phase in a student's academic journey and a key performance indicator for higher education institutions in India. As institutions strive for excellence and higher rankings in frameworks like the National Institutional Ranking Framework (NIRF), the efficiency and effectiveness of the placement process have come under sharp focus. Historically, these processes have been managed through manual methods involving extensive paperwork, spreadsheets, and fragmented communication channels like notice boards and emails. This approach is prone to errors, causes significant delays, and lacks the transparency expected by today's digitally native students.

In alignment with national strategies like the National Education Technology Plan (MoE, 2021), there is a significant push to create a robust digital infrastructure for higher education. The concept of a "Smart Campus" is evolving, where technology is integrated into every facet of university management to improve services and student experiences (Das & Reddy, 2022). This project, the College Placement System, is a direct response to this need. It aims to replace the outdated manual system with a centralized, web-based platform that automates workflows, fosters clear communication, and empowers stakeholders with real-time data and intelligent tools.

II. PROBLEM STATEMENT

The conventional approach to managing college placements presents several challenges for all stakeholders involved: For the Placement Department (Admin): The process is labour-intensive, involving the manual collection of student data, dissemination of company information, and tracking of countless applications. This administrative burden leaves little time for strategic tasks like industry engagement and student training.

For Students: There is a significant lack of transparency. Students often struggle to track application statuses, verify their eligibility for different roles, and receive timely updates. Consequently, they lack access to personalized, scalable tools for resume building and interview preparation, putting them at a disadvantage.

For College Management: Consolidating placement data for strategic analysis and accreditation reporting (e.g., NIRF, AISHE) is a cumbersome and error-prone task. The absence of a centralized data repository makes it difficult to track key metrics like branch-wise placement rates and company engagement.

Ineffective Preparation: Students receive generic placement training that does not cater to their specific profiles or the unique demands of the companies they apply to. This one-size-fits-all approach limits their potential for success.

III. PROPOSED SYSTEM OVERVIEW (SOFTWARE-ONLY)

The proposed College Placement System is a multi-role web application designed to address the aforementioned problems through a centralized, intuitive platform. It provides distinct modules tailored to the needs of its three primary users.

Student Module: This is the core of the student experience. Students can create and manage their detailed academic and personal profiles, upload resumes, browse ongoing and past recruitment drives, and apply for eligible positions with a single click. They have a dedicated dashboard to track the real-time status of their on-campus and off campus applications. The module also includes the AI-powered Interview Preparation Hub for personalized career coaching.

Placement Department (Admin) Module: This module acts as the administrative control center. The placement officer can add and manage company details, post new job openings with specific eligibility criteria, and oversee all student applications. They have the authority to update application statuses (e.g., from 'Applied' to 'Shortlisted'), which instantly notifies the concerned students. The admin can also manage off-campus application records and view comprehensive placement statistics.

College Management Module: This high-level module provides a strategic overview of the placement landscape. Management can view detailed student data, access holistic placement statistics through interactive charts and graphs, and monitor the overall success of recruitment drives. This data is crucial for internal reviews, strategic planning, and generating accurate reports for external bodies. Fig. 1 –System Architecture: Web-only platform with Admin, User, AI Engine, DB, Recycle Module

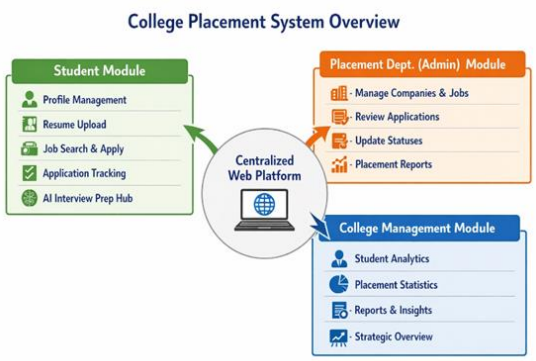

Fig 1: Architecture of SmartHire (Placement Management System.

IV. AI-BASED AUTOMATION (TEXT GENERATION)

AI-Powered Resume Analysis (ATS Simulation): The system analyzes student resumes (PDF/image) against applied job descriptions by simulating an Applicant Tracking System (ATS). It evaluates keywords, skills, and formatting, and returns structured feedback including:

- ATS Score (out of 100)
- Strengths
- Areas for Improvement
- Detailed, actionable suggestions (keywords, action verbs, quantified achievements)

Personalized Interview Question Generation: Based on the student's profile (branch, skills, CGPA) and job requirements, the system generates tailored interview questions, including:

- Technical Questions
- Behavioral Questions
- Scenario-Based Questions

V. TECHNOLOGY STACK

The application is built using a modern, robust technology stack chosen for its performance, scalability, and rich ecosystem.

Frontend Framework: React with TypeScript for building a type-safe, component-based, and interactive user interface.

Styling: Tailwind CSS for rapid UI development with a utility first approach, ensuring a clean and responsive design.

Client-Side Routing: React Router DOM for managing navigation and creating a seamless single-page application (SPA) experience.
Data Visualization: Recharts for rendering interactive and informative charts and graphs in the statistics dashboards.
Artificial Intelligence: Google Gemini API (via the @google/genai SDK) for powering the resume analysis and question generation features.

VI. REAL WORLD IMPACT & RELEVANCE

This College Placement System has a significant real-world impact by directly addressing the needs of the Indian higher education ecosystem.
Enhancing Student Employability: By providing sophisticated AI-powered preparation tools, the system directly contributes to improving students' confidence and performance in interviews, ultimately boosting placement rates.
Promoting Data-Driven Governance: The platform aligns with the goals of the Unified Data Portal for Institutional Excellence ([88]) and the Open Government Data (OGD) Platform ([105]) by creating a structured, reliable source of placement data. This enables college management to make informed decisions and simplifies reporting to bodies like AISHE and NIRF.
Improving Institutional Efficiency and Reputation: Automating the placement process reduces the administrative workload, freeing up the placement department to focus on building stronger industry relationships. A successful and transparent placement system enhances the institution's reputation, attracting better students and more companies.
Alignment with National Policy: The project is a practical implementation of the vision outlined in the National Education Technology Plan ([87]) and embodies the principles of a "Smart Campus" where technology is used to deliver superior student services (Das & Reddy, 2022).

VII. KEY FEATURES SUMMARY

- Centralized Web-Based Placement Platform for managing the complete placement lifecycle
- Role-Based Dashboards for Students, Placement Department (Admin), and College Management
- Student Profile & Application Management with real-time application tracking
- AI-Powered Interview Preparation Hub using Google Gemini API
- ATS-Based Resume Analysis with score, strengths, and improvement suggestions
- Personalized Interview Question Generation based on student profile and job role
- Admin Control Module for job postings, eligibility management, and application status updates
- Management Analytics Dashboard with interactive placement statistics and reports

VIII. EXPECTED OUTCOMES

Improved Placement Process Efficiency
- Significant reduction in manual effort and processing time
- Faster application handling and status updates
- Enhanced Transparency and Student Engagement
- Real-time visibility into application progress
- Increased student trust and participation in placement activities

Higher Student Employability
- Personalized AI-driven resume analysis and interview preparation
- Better alignment of student profiles with industry requirements
- Data-Driven Institutional Decision Making
- Accurate and centralized placement data repository
- Informed strategic planning for college management
- Improved Accreditation and Reporting Accuracy
- Simplified generation of reports for NIRF, AISHE, and other agencies
- Reduced data inconsistency and reporting errors

IX. CONCLUSION

The College Placement System successfully demonstrates the value of integrating modern web technologies and artificial intelligence to solve persistent challenges in higher education. It effectively replaces an inefficient, manual process with a transparent, streamlined, and intelligent platform that

benefits students, administrators, and college management. The project's key achievement is the AI Interview Preparation Hub, which provides unprecedented personalized support to students, significantly enhancing their preparedness for the competitive job market.

Future enhancements could include direct integration with company HR portals via APIs, an alumni mentorship module to connect current students with placed graduates, and predictive analytics to identify at-risk students and forecast placement trends. Ultimately, this system serves as a robust and scalable model for how technology can be leveraged to bridge the gap between education and employment.

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