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SmartHire : AI Powered Recruitment & Placement Management System

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Peer Review Information	Abstract
<p><i>Submission: 16 March 2026</i></p> <p><i>Revision: 03 April 2026</i></p> <p><i>Acceptance: 26 April 2026</i></p> <p>Keywords</p> <p><i>Artificial Intelligence, Recruitment Automation, Resume Screening, Natural Language Processing, ATS Score, Skill Gap Analysis, Job-Candidate Matching</i></p>	<p>Many colleges use manual profile verification and student shortlisting as a part of their campus placement drives. In such cases several days are taken by the Training and Placement Office (TPO) to complete the process before actual drive. These manual processes usually result in delays in verification of eligibility, problems in identifying candidate-job fitment, and not providing feedback to students about what improvements they need to make. With the above-mentioned constraints, the researchers propose SmartHire, a recruitment and placement management system using AI to aid campus hiring exercises. The developed system uses AI algorithms to analyze the resume of candidate and match it with the job description provided by recruiters. The AI system automatically performs the verification of whether the candidates are eligible according to their CGPA, branch, and backlogs. NLP methods are applied to extract necessary information from resumes, generate an ATS score-based suitability score that indicates how well a candidate matches the job requirements. The system performs skill gap analysis and suggests students to improve their profiles before applying for placement drives. There are dedicated modules for TPO administrator and coordinator's coordination, and students in the portal, which allow managing all applications, placements, and jobs centrally. Experimentally, it has been observed that the automation of resume evaluation and eligibility filtering increases efficiency and creates greater visibility into the process. This example of the SmartHire tool shows how AI can help educational organizations to assist students know about their strength and weaknesses.</p>

Introduction

1. Background and Motivation

In Institutes and Universities, recruitment systems play an important role in connecting candidates with suitable job opportunities. The Training and Placement Officer / Administrator (TPO) is responsible for managing placement activities and the placement cell acts like a bridge between students and companies as it organizes campus drives, verifying eligibility

and maintaining placement data. When the number of students and companies participating in campus recruitment increases, it becomes time consuming to manage all the placement activities. It is seen that many placement related tasks still depend on spreadsheets and repeated manual checking which usually leads to delays and confusion. This is why there is a growing need to introduce automation in the hiring

process so that placement activities can be managed more efficiently and in an organized manner.

2. Problem Statement

Manual eligibility checking during campus placements requires placement staff to verify academic details such as CGPA, branch, and backlog status for each company's criteria. When multiple companies visit the campus, preparing eligible student lists becomes time consuming and increases chances of errors. A major challenge is determining whether student skills match the job requirements. There is a possibility that students may not always understand the exact skills expected by companies, and placement officers may not get enough time to review each resume individually. It is also seen that placement information is stored in different files or systems which makes tracking applications difficult. So, it can be witnessed that these issues need a centralized placement management system that can reduce manual work and improve clarity in the recruitment process.

3. Objectives of the Proposed System

The purpose of SmartHire system is to automate the recruitment workflow by decreasing the manual effort which is involved in eligibility verification and resume screening. It also aims to improve candidate job matching by analyzing the resume content and comparing it with job requirements using AI techniques. Another objective is to provide a centralized dashboard for the TPO administrator and coordinator, where placement activities such as job postings, student applications, and eligibility results can be managed in an organized way. The system helps students understand their skill gaps so they can work on the skills that are required for job opportunities.

4. Scope of the System

The SmartHire system is a web-based recruitment platform which supports various users associated with university placements. This is a module-based system which has different modules for student, TPO administrator and coordinators where user would be able to perform tasks all at the same place. In the site, students can set up profiles, upload resumes and apply for job opportunities. The TPO administrator can handle the job postings and placement statistics monitoring, and the TPO coordinator can help in verifying details of students and shortlisting student candidates. The system focuses on simplifying placement management and providing a structured approach to campus recruitment activities.

Literature Overview

1. Existing Recruitment Systems

Recruitment systems are an important resource that many organizations use to assist in managing their hiring processes; however, they also provide a platform where candidates can find potential employment. Most traditional recruitment platforms (placement portals) serve as repositories for storing information about candidates who wish to apply for jobs. Placement portals allow employers to post job openings, and candidates to submit applications for open positions. While these platforms do maintain applicant records, all or at least most of the applicant evaluation processes are completed through manual procedures. For example, in the case of campus placements, companies typically require placement personnel to manually confirm student eligibility based on various factors (i.e., GPA), and then evaluate resumes for those students prior to conducting interviews. Due to the high volume of students applying to multiple companies for a limited amount of job openings, this manual process is extremely time-consuming and labor intensive. The traditional system also provides limited support for analyzing whether student skills match the top requirements. The Resume screening is performed manually and it may lead to inconsistencies in the evaluation. It becomes difficult to maintain placement statistics and tracking application status because the data is sometimes stored in multiple files or system. From these limitations it is shown that traditional recruitment system is not always efficient when the placement activities increase.

2. AI in Recruitment

In recruitment systems, artificial intelligence is used to improve the efficiency of candidates screening and job matching. AI based resume screening techniques use Natural Language Processing(NLP) to extract information like skills, education, and experience from resumes. It helps in converting unstructured resume content into structure data that can be analyzed easily. Some of the Machine Learning approaches are also used to compare resume content with job descriptions and find how well a candidate profile matches with the job requirements. The job matching approaches focus on calculating the similarity between the skills of candidates and the skills that are required for job. That's how these methods help recruiters to identify suitable candidates immediately from a large number of applications. The AI based recruitment tools can reduce the manual effort and provides consistent results in the evaluation of the

candidate. This system also helps in finding the missing skills and suggest improvements as it can support candidate in preparing better for job opportunities.

3. Research Gap

Today many recruitment systems and AI based screening methods are available but most of them focuses only on resume matching or job recommendation separately. The availability of systems is limited to integrate eligibility filtering, resume analysis and placement management on a single platform specially designed for campus recruitment. In existing solutions, skill gap identification and personalized suggestions for improvements are not clearly provided. Another gap discovered is the absence of a structure module that supports the coordination between TPO administrator and coordinators for managing the placement activities. Most of the research focuses mainly on the recruiter and candidate interaction but campus placement process requires additional coordination rules. Due to these limitations, there is a need for an integrated AI based placement system which can manage eligibility checking, resume analysis and placement coordination together. SmartHire aims to address all these gaps by building a centralized platform that can support both automation and structured placement management.

Proposed System

1. System Overview

SmartHire is proposed as a web-based platform that simplifies the campus placement process by bringing the students, TPO administrators and TPO coordinators on a single platform. The main idea behind this system is to reduce manual work which is involved in checking the eligibility and managing the placement data. So instead of maintaining multiple files, the platform provides structured way to manage the students profile job posting and application in one place. This helps in improving the coordination between all the users that are involved in placement activities.

This system follows a role-based access approach where each user is given access according to their roles and responsibilities. The TPO administrator can manage job posting and monitor the placement activities, the TPO coordinator can assist in verifying details and shortlisting the candidates and the students can create their own profile and apply for job opportunities. This separation of roles helps in maintaining clarity and ensures that each user interacts only with the features that are required for the task.

2. User Modules

The SmartHire system includes three main user modules that can represent the primary users involved in the placement process. The use case diagram shows how its user interacts with the system and perform specific actions.

a) TPO (Admin) Module: The TPO module allows the administrator to create and manage job posting by defining the eligibility criteria's like CGPA, branch and backlog conditions. The TPO can view the student applications, monitor placement progress and manage placement related data through a centralized dashboard. This module helps reduce the effort that are required for a manual verification and improve the organization of placement activities.

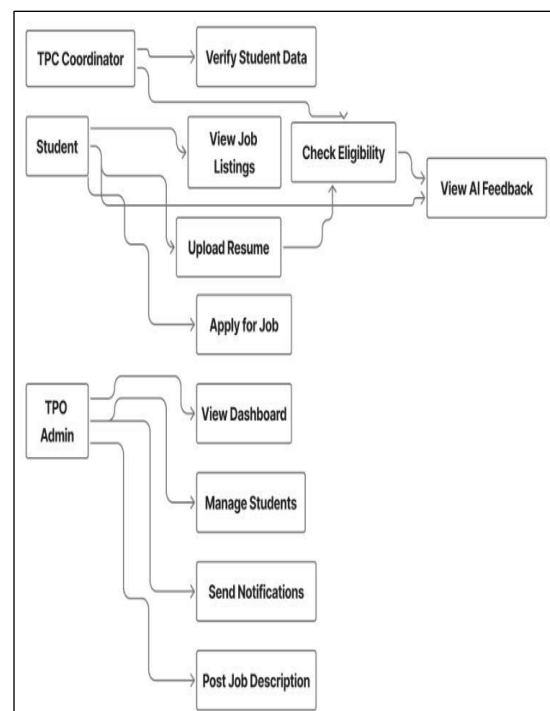


Fig. 1. Use Case Diagram of SmartHire System

b) TPO Coordinator Module: The TPO coordinator module supports the placement process by verifying the student profiles and assist in shortlisting the candidates. The coordinator ensures that the student information is properly maintained and also ensures that there is a communication between students and the placement office. This module improves the coordination and helps in maintaining the accuracy in the shortlisting process.

c) Student Module: The student module allows students to create their profile, upload resume and apply for present job opportunities. Students can check whether they meet the eligibility criteria and track the status of their applications. This system also helps students

understand the skills that are required so that they can work on it.

3. Key Functionalities

The SmartHire system provides automated eligibility checking which compares the academic details of the students with the requirement of companies and also identifies eligible candidates quickly. This reduces the need for repeated manual checking of the data.

This system also supports AI based resume screening where the resume content is analysed to identify the important skills and keywords. Based on this analysis, the system generates and ATS based score that indicates how well the candidate’s profile matches the job description. The skill gap analysis is another important feature of this system. It helps in identifying the missing skills and provides suggestions that can guide students in improving the profiles before applying for jobs. The dashboard feature allows TPO administrators and coordinators to view the placement information like job postings, applications and basic statistics in a structured way. These functionalities together help in simplifying the placement process and improving transparency for all the users.

System Architecture and Design

1. Architecture Diagram

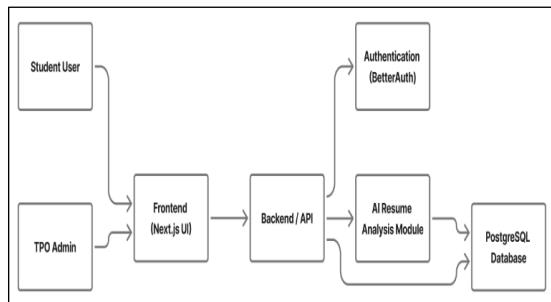


Fig. 2. System Architecture of SmartHire Platform

The SmartHire system follows a structured architecture where frontend, backend, database, and AI modules work together to manage placement activities. The frontend built using Next.js provides an interface for students, TPO administrator and coordinators to perform tasks such as profile creation, job posting, and application tracking. The backend and API layer process user requests and communicate with the Neon PostgreSQL database. It stores student, job, and application data securely. The AI module analyses resume content using NLP techniques generates a relevance score for the resume based on job requirements provided by particular company.

2. Workflow of the System

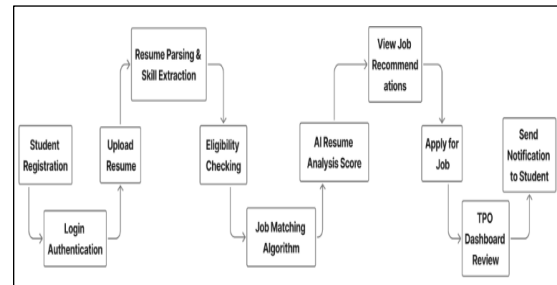


Fig. 3. Workflow of SmartHire Recruitment Process

The workflow begins when the TPO administrator posts job details along with eligibility criteria. Students create profiles and upload resumes, after which the system automatically checks eligibility conditions. The AI module compares resume skills with job requirements and generates suitability score. Eligible students can apply for jobs, and the TPO administrator and coordinators can monitor applications through the dashboard. This step-by-step process helps in managing placement activities in an organized way.

3. UML Design

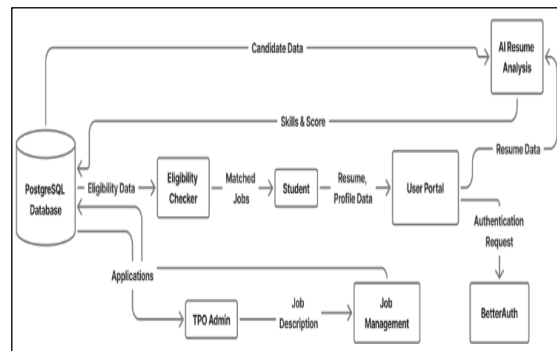


Fig. 4. Data Flow Diagram (DFD) of SmartHire System

The Data Flow Diagram shows how information moves between students, TPO administrator and coordinators, database, and AI module. Student and job data are processed through eligibility checking and resume analysis. The processed information is then displayed to users through the dashboard which helps them to track placement progress easily.

Methodology and Algorithms

The SmartHire system follows a structured approach to automate eligibility checking and resume analysis for campus placements. This methodology is designed to focus on reducing manual efforts by converting resume content into structured information and comparing it with job description provided by corresponding company. Natural Language Processing (NLP)

techniques are used to extract and process resume text, identify important skills, evaluate and compare candidate suitability. The system combines rule-based filtering and similarity-based matching to ensure accurate and transparent shortlisting of candidates. The overall workflow improves efficiency in placement activities and helps students understand their readiness for job opportunities.

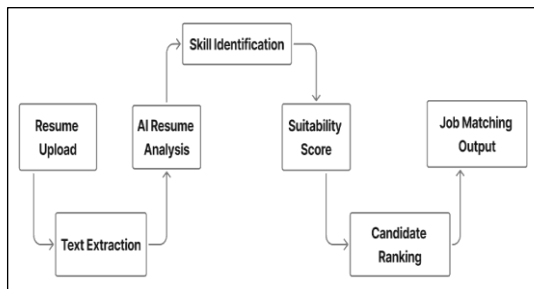


Fig. 5. Resume Processing and Matching Algorithm Flow

1. Resume Processing

Resume processing converts uploaded resume documents into a structured format suitable for analysis. The system performs text preprocessing by removing unnecessary symbols, transformation of text into lowercase, and separating words into tokens so that normalized data from resume can be used for comparing it with job description. This step helps in cleaning the data and improving accuracy of further processing.

After preprocessing, the system extracts important skills, tools, and technical keywords from the resume. These extracted skills are stored in structured form. Then these extracted skills are compared with job description requirements ensuring that relevant candidate information is captured correctly for matching.

2. Candidate Matching Process

The candidate matching process compares extracted resume skills with job description requirements. The system identifies common keywords between resume and job description and calculates a similarity score. This score indicates how closely a candidate profile matches the required skills.

Based on similarity score, candidates are ranked according to relevance score. A higher score indicates better alignment with job requirements and lower score highlights need for skill improvement. This helps placement staff in identifying relevant candidates efficiently.

3. Eligibility Filtering

Eligibility filtering is performed using rule-based conditions defined by the company.

Criteria such as CGPA, branch, backlog count, and graduation year are compared with student academic records. The system classifies candidates as 'eligible' or 'not eligible' automatically.

This reduces efforts for manual verification and ensures consistent decision making for all applicants.

4. Algorithms

The gap analysis algorithm identifies missing skills by comparing resume content with job requirements. Based on this comparison, the system suggests areas where students can improve their skills.

The notification dispatch algorithm sends alerts to eligible students regarding job openings and deadlines. This helps students stay updated with placement activities and ensures better communication between placement cell and students.

IMPLEMENTATION

The SmartHire system is implemented using modern web technologies to create responsive and efficient platform for managing campus placement drives. The system provides facilities like resume analysis, improvement recommendations, eligibility filtering, and secure data management. It can be easily accessed by students, TPO administrator and coordinators using a web browser with no requirement of any additional installations which makes it easily accessible.

1. Technology Stack

The frontend of the SmartHire system is developed using Next.js with TypeScript. It helps in creating a responsive dynamic and structured user interface. Next.js supports both client side and server-side functionality, allowing smooth navigation between pages such as login, profile, job listings, and dashboard. TypeScript helps to reduce common errors during development resulting in improved code reliability. Neon PostgreSQL is used as the cloud-based database to store student profiles, job postings, eligibility results, and application records. It provides structured data storage and ensures secure handling of information. BetterAuth is used to implement authentication features such as login, registration, and role-based access control for students, TPO administrator and coordinators. This maintains secure and controlled access to the system.

AI and Natural Language Processing libraries are used to process resume text extraction and matching relevant skills and keywords. This enables the system to generate suitability scores like ATS score and perform skill gap analysis in

order to recommend relevant resources for improvement.

2. System Development Tools

Visual Studio Code is used as the main development environment for writing and managing the code of the SmartHire system. GitHub is used for version control. It helps in tracking code changes and managing project files efficiently. Postman is used for testing API endpoints in order to ensure proper communication between frontend, backend, and database. These development tools support efficient implementation and maintenance of code quality throughout the project development process.

Results and Discussion

The SmartHire system helps reduce the manual effort involved in campus placements by automating eligibility checking and basic resume analysis. Preparing the list of eligible students for particular company or job role has become faster compared to checking records manually in spreadsheets. The dashboard and reports help TPO administrator and coordinators to manage job postings, student information, job description in one place. Students can also view their application status, understand whether their profile matches the job requirements and improve their skills in order to be better match for job description provided by company.

When compared with the traditional placement process, SmartHire provides a more organized way to store and manage data. Manual checking usually takes more time and there is always a chance of small errors during filtering. In this system, eligibility conditions are applied automatically, which helps in maintaining consistency. The resume analysis feature also gives students an idea about missing skills so they can improve before applying for jobs.

Resume matching mainly depends on keywords mentioned in the resume, so results may vary based on how clearly skills are written. The system has not yet been tested with very large datasets. Integration with external job portals is not included in the current version but it can be provided with future version of application. Still, the system shows that using a centralized platform can make the placement process simpler, convenient, and easier to manage for both students and placement staff.

Conclusion and Future Scope

1. Conclusion

The SmartHire system is developed to make the campus placement process simpler and more organized by using AI based techniques for

resume analysis and eligibility checking. The system facilitates centralized platform where students, TPO administrator and coordinators can manage placement activities regardless of multiple files or manual checking. It helps in identifying eligible candidates more quickly and reduces the chances of mistakes that may occur during manual verification. The resume analysis feature gives students an idea about how well their profile matches job requirements and what skills they may need to improve before applying. Using Artificial Intelligence in recruitment related tasks helps in reducing time required for shortlisting and makes the process more consistent. Instead of checking each record manually, the system processes data in a structured way and supports better decision making for placement staff. SmartHire shows how AI based tools can help educational institutions manage placement activities more efficiently and guide students in preparing for job opportunities.

2. Future Scope

The current system focuses on resume analysis and eligibility filtering, but more features can be added in future to improve its usefulness. The system also has strong potential for further automation. In future, students can apply for placement drives with a single click, without going through repeated registration steps for each company. The platform can automatically notify only relevant job opportunities based on student profile and eligibility, making the application process faster and more convenient. An AI based interview chatbot can be included to help students practice interview questions and improve their preparation. More advanced machine learning models can also be used to improve accuracy of resume matching by understanding skills in better way. The system can also be connected with external job portals so that students can view more job opportunities from a single platform. Additional analytics features can help placement staff understand skill trends and placement performance.

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