An Interactive Job And Interactive Platform

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Abstract

The Interactive Job and Internship Platform is a web-based system designed to connect job seekers, students, fresh graduates, and professionals with employers and companies offering job and internship opportunities. This platform provides a centralized, efficient, and user-friendly interface where users can create profiles, upload resumes, search for jobs, apply for positions, and track their application status. Employers, on the other hand, can post job openings, review applications, and communicate with potential candidates.

One of the key features of the platform is its automated job matching system, which suggests relevant job openings based on a user's profile, skills, and interests. Employers also receive recommendations for suitable candidates, making the recruitment process faster and more efficient. The system includes real-time notifications, application tracking, and a messaging system to enhance communication between job seekers and employers. Additionally, an admin panel is integrated for managing user activities, ensuring security, and maintaining the platform's functionality.

By leveraging modern technologies such as React.js, Node.js, and a secure database system, the platform ensures a smooth and scalable experience for users. It aims to simplify and streamline the job search and hiring process, making it more accessible, time-saving, and effective for all stakeholders. In conclusion, this platform bridges the gap between job seekers and employers, providing an innovative and interactive solution to job and internship recruitment.

Keywords: Job and Internship Portal, Job Seekers, Employers, Automated Job Matching, Profile Creation, Resume Upload, Job Search, Real-time Notifications, Job Recommendations, Employer Dashboard.

1. Introduction

In the current competitive employment landscape, a significant number of graduates face considerable difficulties during the transition from academic life to professional employment. Existing online platforms that aim to facilitate job searches often fail to provide an inclusive and integrated environment where users can access opportunities across diverse sectors, such as private industries, government jobs, and overseas employment.

Additionally, most platforms lack essential features such as personalized guidance, career counseling, and support services for internships and industrial training. The absence of these resources adversely impacts the preparedness and confidence of job seekers, particularly fresh graduates who often struggle with insufficient industry exposure and professional mentoring.

To address these challenges, a unified platform is proposed which adopts a holistic approach towards job search and career development. The platform will incorporate advanced Artificial Intelligence (AI) algorithms to perform intelligent matchmaking between job seekers and potential employers. It will also include tools for resume building, interview preparation, and career counseling. Furthermore, dedicated sections for internships, industrial training, and mentorship programs will be implemented to assist users in gaining practical experience and professional insight.

This platform is intended to act as a one-stop solution for students and graduates by broadening their employment reach and enhancing their career readiness. The inclusion of personalized services and continuously updated job listings ensures that users remain informed and connected in real-time with the job market.

2. Literature Survey

1. Graph Neural Networks (GNN) in Text Classification

- Key Research: GNNs have been increasingly applied in NLP tasks, especially for text classification. Yao et al. (2019) introduced the Text GCN model, which uses graph structures to model word-document relationships. Other works explore GNNs for hierarchical document structures and entity relations.
- Relevance to Project: GNN can help capture complex, non-sequential relationships in resumes, facilitating more accurate job role classification.

2. Pre-trained Embeddings in NLP Tasks

- Key Research: Pre-trained word embeddings like Glove (Pennington et al., 2014) and BERT (Devlin et al., 2019) have been widely used for representing words based on their context. These embeddings enhance performance in various NLP tasks by providing rich semantic representations.
- Relevance: Glove will be used for initializing the word representations, which will be fed into the GNN model to enhance the model's understanding of resume content.

3. Text Preprocessing and Feature Extraction

- Key Research: Preprocessing techniques like tokenization, stemming, and stop-word removal have long been foundational in NLP (Manning et al., 2008). More recent works focus on deeper, contextual text preprocessing using pre-trained models like BERT.
- Relevance: Effective preprocessing ensures that both resume and job description texts are properly structured and cleaned before being fed into the GNN for classification and matching.

4. Keyword and Skill Extraction in Job Recommendation

- Key Research: Keyword extraction techniques, such as TF-IDF (Salton et al., 1975) and RAKE (Rose et al., 2010), have been used to identify the most relevant terms in resumes and job descriptions. Skill extraction models often rely on domain-specific knowledge bases.
- Relevance: Extracting relevant keywords and skills will help in matching resumes to job descriptions and in recommending job roles and skill sets to candidates.

5. Named Entity Recognition (NER) in Resume and Job Matching

- Key Research: NER techniques have been used to extract specific information like job titles, skills,

and companies from resumes and job posts (Li et al., 2019). State-of-the-art NER models based on transformers like BERT (Devlin et al., 2019) have shown superior accuracy.

- Relevance: NER is critical for identifying entities within resumes and job descriptions, allowing for more precise keyword extraction and matching score computation.

6. Job Recommendation Systems

- Key Research: Job recommendation systems have evolved from rule-based matching to more sophisticated machine learning-based approaches (Paparizos et al., 2011). Recent research incorporates hybrid models, combining content-based and collaborative filtering techniques.
- Relevance: This project will implement a content-based recommendation system to suggest job roles and skills based on the GNN and NLP models' analysis of resumes.

7. Real-time Job Scraping and Enrichment

- Key Research: Web scraping techniques have been employed to extract job postings from various sources (Li et al., 2020). Combining scraping with NLP allows for real-time analysis of job descriptions.
- Relevance: Continuous web scraping is essential for ensuring the job recommendation system provides up-to-date job listings, enhancing the relevance of the recommendations.

3. Proposed System

The proposed system is an AI-powered, unified platform designed to address the challenges faced by graduates in securing employment, internships, and career guidance. It aims to connect job seekers with opportunities across private, government, and international sectors through intelligent matchmaking algorithms that analyze user profiles, skills, and job preferences. By computing compatibility scores, the platform delivers personalized job recommendations, continuously improving through machine learning based on user interactions and feedback.

In addition to job listings, the platform will offer essential support services including resume building, interview preparation, and professional counseling. A dedicated section for internships and industrial training will help students gain practical experience, while a structured mentorship program will connect users with industry experts for guidance and early career support

4. Existing System

Traditional job portals primarily rely on keyword-based matching to connect job seekers with potential opportunities. In this approach, candidates upload their resumes, and the system scans them for specific keywords related to job descriptions. Employers list job openings with predefined skill sets, and the portal matches resumes based on the occurrence of these keywords. While this method provides a basic level of job recommendations, it has several limitations. The system does not account for contextual meanings, related skills, or the candidate's career progression. Additionally, keyword-based filtering often leads to mismatches, as it fails to understand synonyms, variations in skill proficiency, or the overall relevance of a candidate's experience

5. Figures and Tables

Figure 1: Use case Diagram
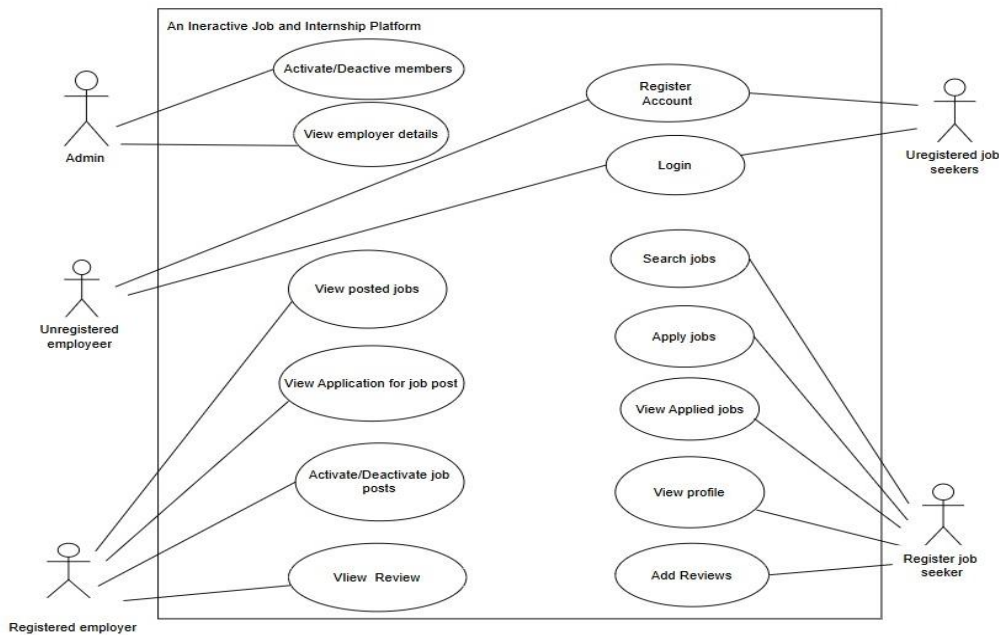
The Use Case Diagram for the Online Job Search Portal illustrates the interactions between different users and the system. The key actors include Admin, Employers, and Job Seekers. Admins manage users, activate or deactivate members, and oversee employer details. Employers can register, post jobs, view applications, and manage job listings. Job seekers can register, log in, search and apply for jobs, track their applications, view their profiles, and add reviews. This diagram effectively represents the system's core functionalities and user interactions in a structured manner.

Figure 2: Sequence Diagram
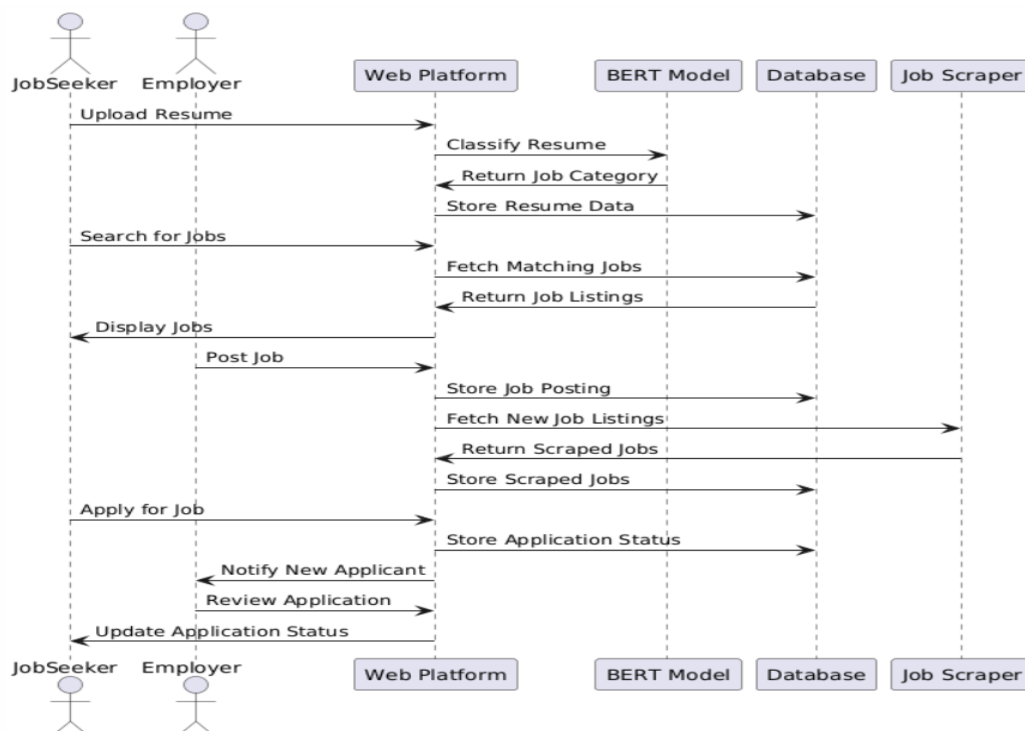
The sequence diagram illustrates the interaction between different components of the Resume Screening and Job Recommendation System. The process begins with a Job Seeker uploading their resume, which is classified using a BERT model to determine the job category. The system then stores the data in the database and allows the user to search for jobs. The employer can post job openings, which are stored in the database and periodically updated using a web scraper.

Figure 3: Activity Diagram
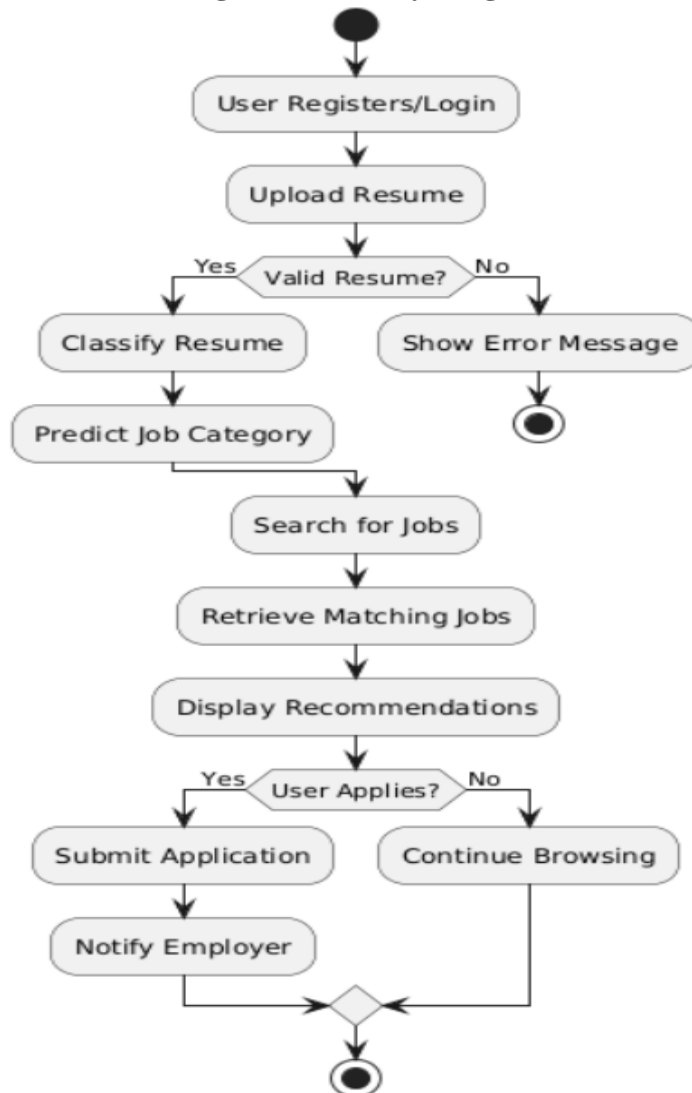
The activity diagram outlines the workflow of the Resume Screening and Job Recommendation System from a user's perspective. The process starts with a user registering or logging in, followed by uploading their resume. If the resume is valid, it is classified using an AI model to predict the job category. The user can then search for jobs, and the system retrieves relevant job listings from the database.

Table 1: Modules

Module	Description
User Management Model	Handle User Authentication, Resistration and Pro-file Management.

Resume Screening & Analysis Module	Extracts Key Details From Resume Using Natural language Processing.
Job Posting & Management Module	Uses Graph Neural Networks (GNN) & AI Matching Algorithms to recommend jobs.
Real-Time Job Web Scraping Module	Fetches latest job postings from external sources to increase job opportunities.
Automated Interview Scheduling Module	Provides insights into job trends, hiring efficiency, and candidate success rates.

6. Frontend (User Interface Development)

The platform's frontend is built using React.js or Angular.js, ensuring a dynamic and responsive user experience. The UI is developed with HTML5, CSS3, and JavaScript, enhanced with styling frameworks like Material-UI, Tailwind CSS, or Bootstrap to provide a sleek and intuitive interface. Redux or Context API is integrated for efficient state management, while Axios is used to handle API requests and fetch data from the backend seamlessly.

7. Backend (Application Logic and API Development)

The backend is powered by Java with Spring Boot, which offers a robust and scalable RESTful API architecture. The framework handles business logic, authentication, and database interactions while maintaining high performance. Spring Security with JWT (JSON Web Token) ensures secure authentication, while OAuth 2.0 allows users to log in using third-party services such as Google and LinkedIn. The Hibernate ORM framework is used for database interaction, ensuring seamless communication between the application and the database. Swagger is integrated for API documentation, simplifying API testing and development.

8. Database Management

For structured data storage, PostgreSQL serves as the primary relational database, handling job listings, user profiles, and applications efficiently. MongoDB is used as a secondary database for flexible storage of unstructured data, such as AI-driven job recommendations and resume parsing results. Redis caching is implemented to optimize data retrieval and improve response time. Additionally, Firebase Firestore is integrated for real-time updates, particularly for chat functionality and notifications.

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