

AI-ENABLED JOB RECRUITMENT PLATFORM WITH ALUMNI COLLABORATION

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ABSTRACT

The rapid growth of digital hiring platforms has transformed the recruitment process, yet many students still face challenges in connecting with the right opportunities due to lack of guidance, limited industry exposure, and ineffective filtering of job roles. Traditional job portals often fail to provide personalized recommendations and meaningful networking opportunities, especially for fresh graduates.

This project proposes an AI-enabled job recruitment platform integrated with alumni collaboration to bridge the gap between students, alumni, and recruiters. The system leverages Artificial Intelligence (AI) and Machine Learning (ML) techniques to match candidates with suitable job opportunities based on their skills, academic background, and career preferences.

The platform uses Natural Language Processing (NLP) to analyze resumes and job descriptions, extracting relevant features such as skills, experience, and keywords. A recommendation engine built using Collaborative Filtering and Content-Based Filtering suggests jobs that best fit the candidate's profile. Additionally, recruiters can efficiently filter candidates using AI-based ranking systems.

Key words: AI Recruitment System, NLP, Resume Parsing, Job Recommendation, Alumni Collaboration, Chatbot, Smart Hiring

INTRODUCTION

In today's competitive job market, connecting the right candidates with suitable job opportunities remains a significant challenge. Many students and fresh graduates struggle to identify relevant job openings due to limited industry exposure, lack of proper guidance, and inefficient recruitment systems. Traditional job portals primarily focus on keyword-based searches, which often fail to provide personalized recommendations and meaningful professional connections.

With the advancement of **Artificial Intelligence (AI)** and **Machine Learning (ML)**, recruitment systems are evolving towards smarter and more efficient solutions. AI-driven platforms can analyze candidate profiles, resumes, and job descriptions to provide accurate job recommendations, reducing the gap between job seekers and recruiters. However, most existing systems lack a collaborative approach that integrates experienced professionals who can guide candidates effectively.

LITERATURE REVIEW

2.1 AI in Recruitment Systems

Artificial Intelligence (AI) has significantly transformed modern recruitment processes by automating candidate screening, resume analysis, and job matching. AI-based systems can analyze large volumes of applicant data efficiently, reducing human effort and bias. Techniques such as Machine Learning (ML) and Natural Language Processing (NLP) are widely used to evaluate candidate profiles and match them with job requirements. These systems improve hiring speed and

Reference: Upadhyay, A. K., & Khandelwal, K. (2018). Applying artificial intelligence: implications for recruitment. Strategic HR Review.

2.2 Resume Parsing and NLP Techniques

Resume parsing is a critical component of AI-based recruitment platforms. NLP techniques are used to extract key information such as skills, education, experience, and certifications from resumes. Methods like Named Entity Recognition (NER) and keyword extraction help in structuring unstructured resume data. This enables automated candidate requirements.

Reference: Sovren. (2019). Resume Parsing and Extraction with Natural Language Processing.

2.3 Job Recommendation Systems

Job recommendation systems use algorithms such as **Collaborative Filtering**, **Content-Based Filtering**, and hybrid approaches to suggest relevant job opportunities to users. These systems analyze user preferences, past applications, and skill sets to provide personalized recommendations. Research shows that AI-based recommendation engines improve user .

Reference: Paparrizos, I., Cambazoglu, B. B., & Gionis, A. (2011). Machine learned job recommendation. ACM RecSys.

2.4 Alumni Collaboration in Career Development

Alumni networks play a vital role in bridging the gap between academia and industry. Studies indicate that alumni mentorship and referrals significantly enhance students' career opportunities. Alumni can provide guidance, share industry insights, and refer candidates within their organizations. Integrating alumni collaboration into recruitment platforms.

Reference: Smith, J. (2020). The role of alumni networks in career success. Journal of Career Development.

2.5 Chatbots in Recruitment Systems

AI-powered chatbots are increasingly used in recruitment platforms to assist candidates with queries, application processes, and interview preparation. These chatbots use NLP and conversational AI to provide instant responses and improve user experience. They help reduce recruiter workload while ensuring continuous user support.

Reference: McTear, M. (2017). The rise of conversational AI: Chatbots in recruitment. Springer.

PROPOSED METHODOLOGY

The proposed system focuses on developing an AI-enabled job recruitment platform integrated with alumni collaboration to improve job matching, candidate guidance, and recruitment efficiency. The system is designed to automatically analyze candidate profiles, recommend suitable jobs, and facilitate interaction between students, alumni, and recruiters. The methodology is divided into three major stages: training, testing, and deployment.

• Training

During the training phase, datasets are collected from various sources such as:

- User resumes
- Job descriptions
- Candidate profiles
- Alumni and recruiter data

Data preprocessing techniques are applied to ensure better model performance, including:

- Text cleaning and normalization
- Tokenization and stop-word removal
- Feature extraction using NLP techniques

The system uses **Machine Learning and Natural Language Processing (NLP)** models to:

- Extract key information (skills, education, experience) from resumes
- Analyze job descriptions
- Build a **recommendation engine** using techniques such as:
 - Content-Based Filtering
 - Collaborative Filtering

Additionally, classification models are used to rank candidates based on job suitability. To improve performance and avoid overfitting:

- Regularization techniques are applied
- Hyperparameter tuning is performed

The system performance is evaluated using metrics such as:

- **Accuracy**
- **Precision**

- Recall
- F1-Score

• Testing

After training, the system is tested using unseen data, including new resumes and job postings. In this phase:

- The model analyzes candidate profiles and job descriptions
- It predicts the most relevant job matches for users
- Candidate ranking is verified for correctness and efficiency

The testing stage ensures that:

- The recommendation system works accurately on new users
- Resume parsing correctly extracts relevant information
- The platform provides meaningful and reliable job suggestions

• Future Deployment

The trained AI models can be integrated into a **web-based application** to provide real-time recruitment services. The deployment can be implemented using frameworks such as:

- **Flask or Django** (backend)
- **React / HTML / CSS / JavaScript** (frontend)

The system processes user data using trained AI models and provides:

- Personalized job recommendations
- Candidate-job matching scores
- Alumni-based referral opportunities

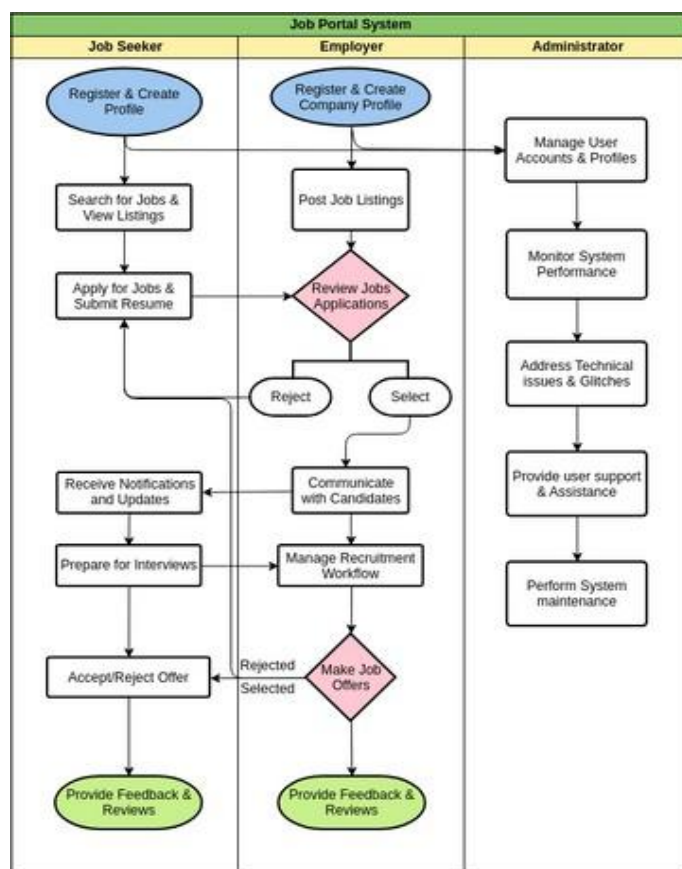


Fig 1: Process diagram for AI Enabled Job Recruitment with Alumni Chapters

3.1 Functional Requirements

Functional requirements describe what the system should do:

- User registration and login (students, alumni, recruiters)
- Resume upload and parsing
- Job posting by recruiters
- AI-based job recommendation system
- Candidate ranking based on skills
- Alumni interaction (mentorship, referrals)
- Job application tracking
- Chatbot support for user queries

3.2 Non-Functional Requirements

Non-functional requirements describe how the system performs:

- **Performance:** Fast response time for job recommendations
- **Scalability:** Ability to handle large numbers of users
- **Security:** Protection of user data and privacy
- **Usability:** Simple and user-friendly interface
- **Reliability:** Accurate and consistent system performance
- **Availability:** System should be accessible 24/7

3.3 System Requirements

Hardware Requirements

- Minimum 4GB RAM
- Processor: Intel i3 or above
- Storage: 50GB

Software Requirements

- Frontend: HTML, CSS, JavaScript
- Backend: Python (Flask/Django)
- Database: MySQL / MongoDB
- Libraries: TensorFlow / Scikit-learn / NLP libraries

3.4 Advantages of the Proposed System

- Provides personalized job recommendations
- Reduces recruitment time
- Improves candidate-job matching accuracy
- Enables alumni mentorship and referrals
- Enhances user engagement through chatbot support

3.5 Applications

- College placement systems
- Online job portals
- Career guidance platforms
- Corporate recruitment systems

SYSTEM ARCHITECTURE

The system architecture of the proposed **AI-enabled job recruitment platform with alumni collaboration** consists of multiple interconnected modules that work together to automate job matching, enhance candidate experience, and enable collaboration between students, alumni, and recruiters. The system processes user data using Artificial Intelligence and Machine Learning techniques to provide accurate job recommendations and career guidance. The architecture mainly includes **data collection, preprocessing, resume analysis, recommendation engine, alumni module, and user interaction modules**.

The first component is the **data collection module**, which gathers data from various sources such as user profiles, resumes,

job postings, and alumni information. This data forms the foundation for training and testing the AI models. It includes candidate skills, education, experience, and job requirements provided by recruiters.

The next component is the **data preprocessing module**, where the collected data is cleaned and prepared for analysis. This stage includes text cleaning, removal of irrelevant information, normalization, and structuring of unorganized resume data. Natural Language Processing (NLP) techniques are applied to convert textual data into meaningful formats suitable for machine learning models.

The **chatbot and user interaction module** allows users to communicate with the system. The AI-powered chatbot assists users with job-related queries, resume building, and interview preparation, improving overall user experience.

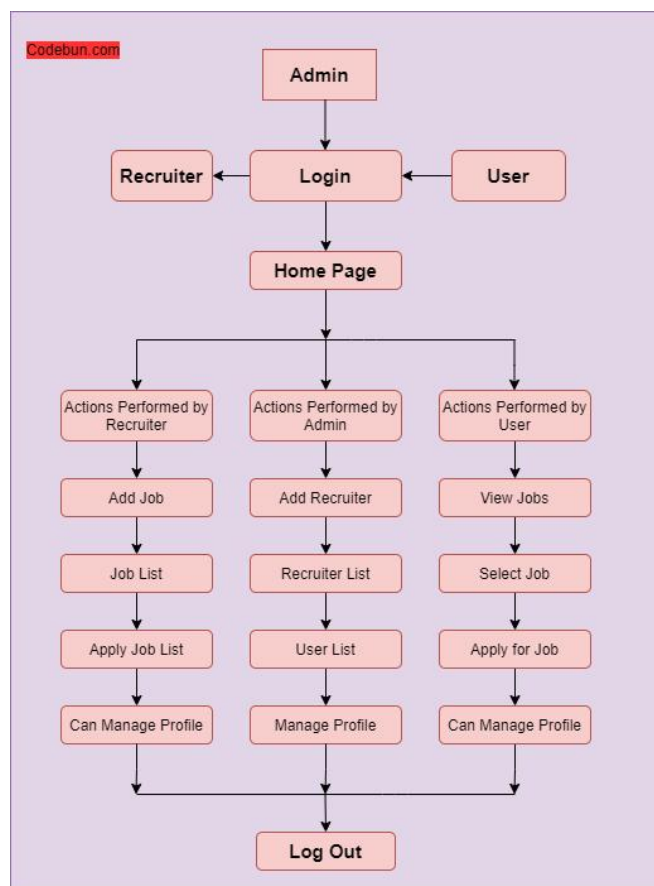
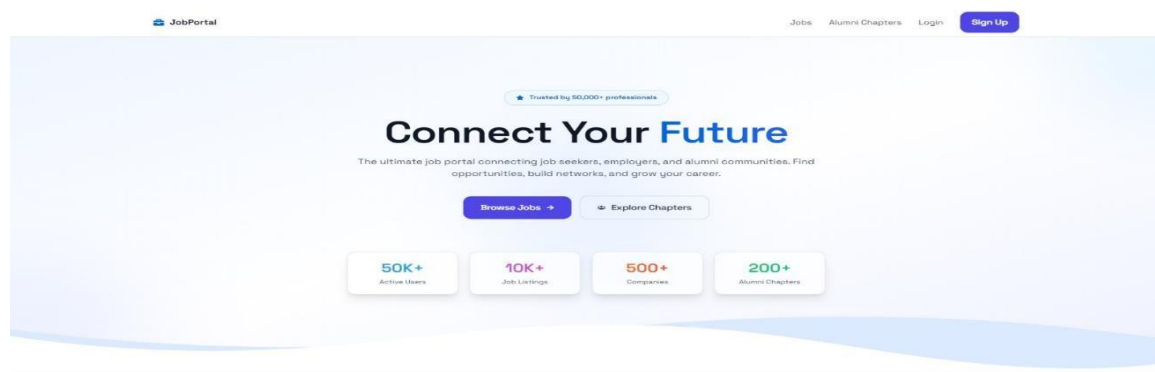
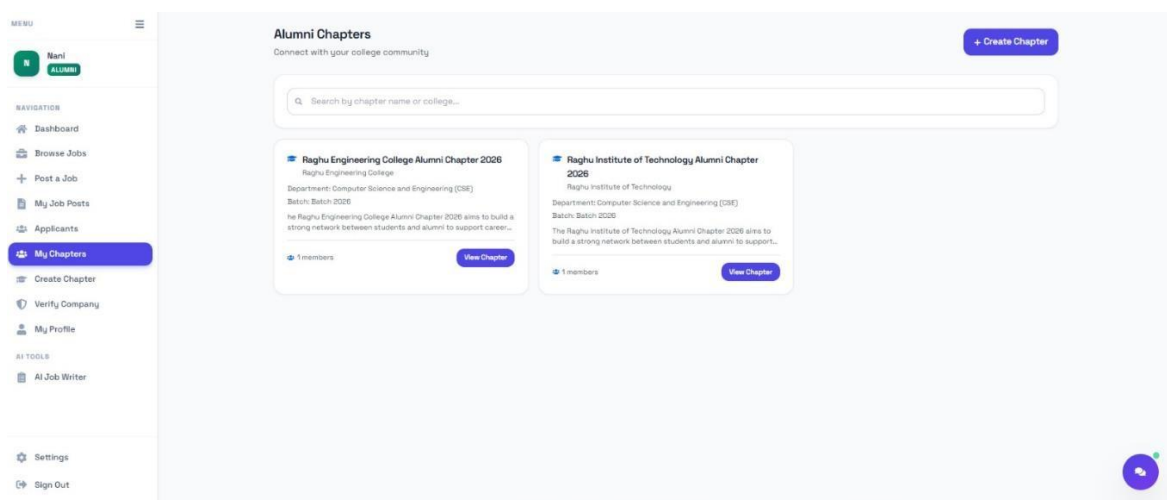
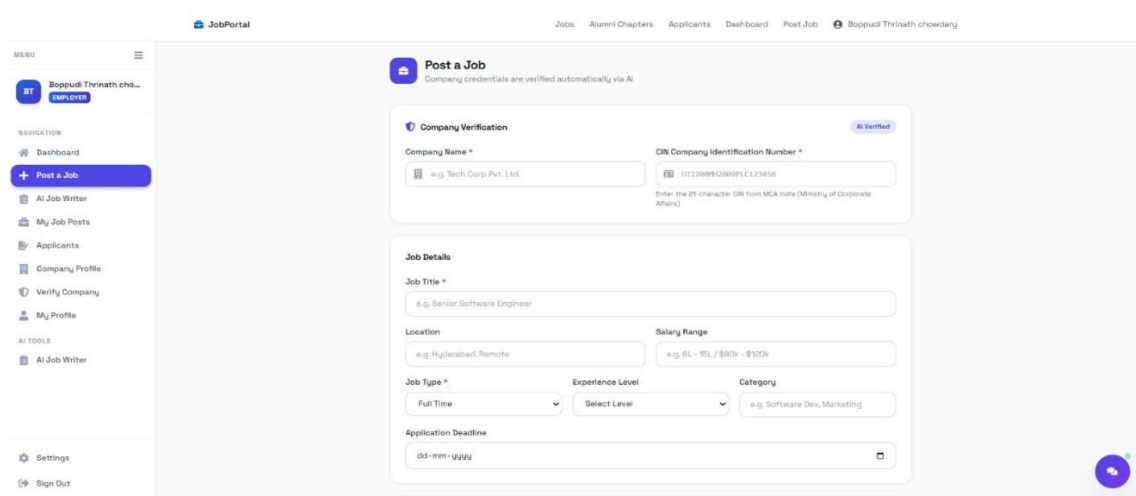
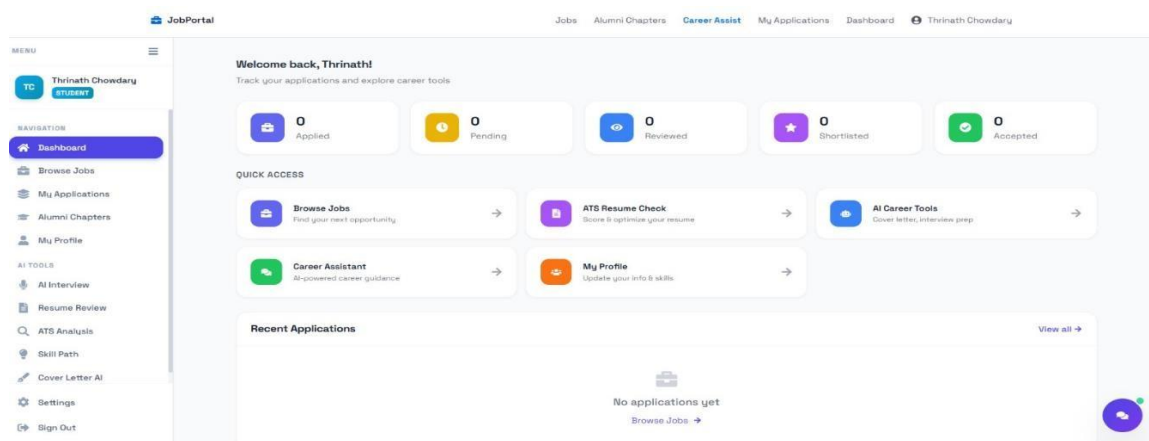
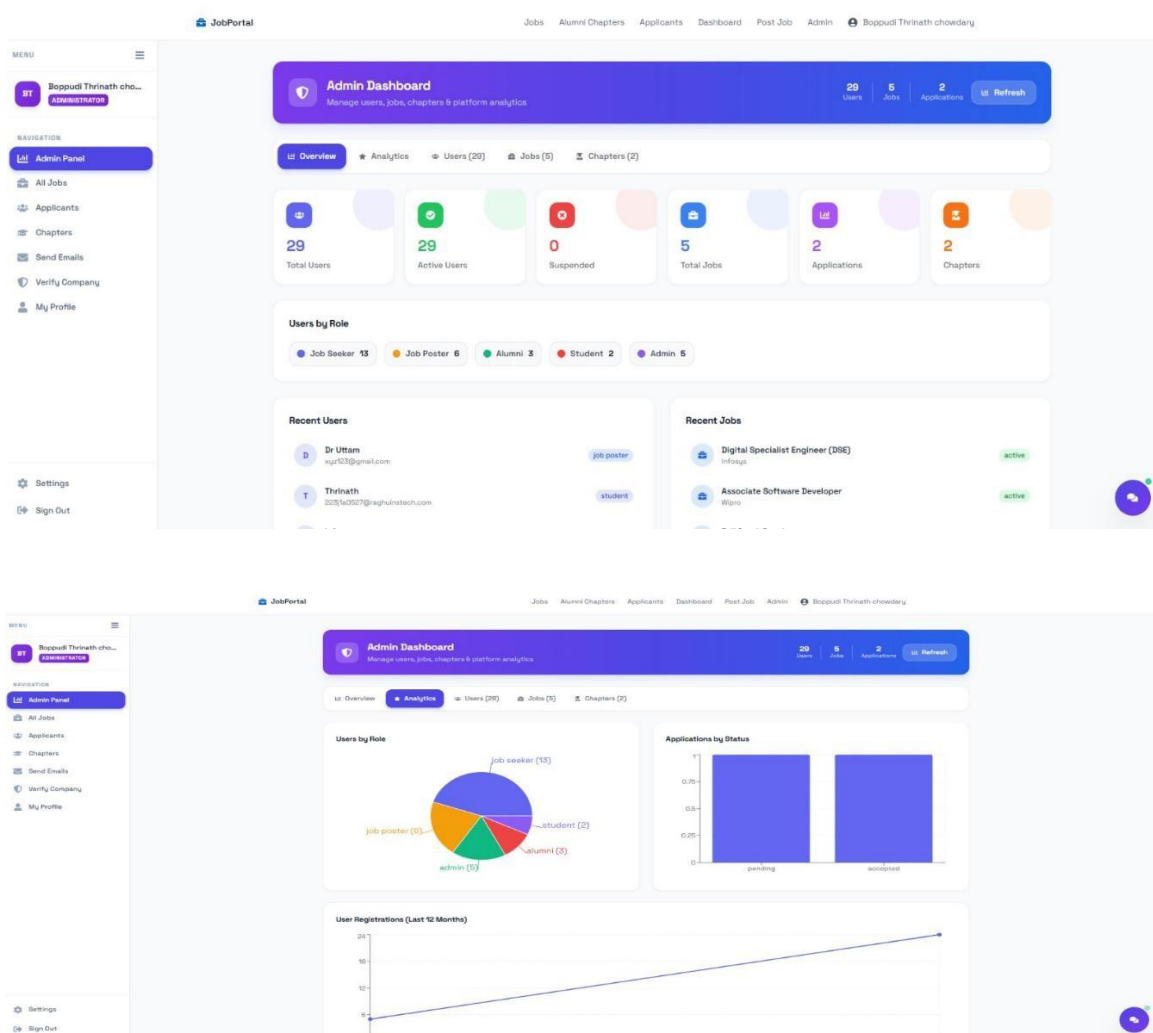


Fig: System Architecture for AI Enabled Job Recruitment with Alumni Collaboration

And here are few output images:







CONCLUSION

1. The study presented an efficient and user-friendly approach for developing an Online Job Portal System with Alumni Chapters, which integrates job recruitment functionalities with alumni networking features.
2. The proposed system combines job portal functionalities with alumni interaction, enabling students to not only search and apply for jobs but also connect with alumni for guidance, mentorship, and referrals. This integration enhances the overall effectiveness of the platform.
3. The system provides personalized job recommendations based on user skills, preferences, and profiles. This improves the relevance of job listings and increases the chances of successful placement compared to traditional job portals.
4. The inclusion of alumni chapters significantly improves user engagement. Students can interact with alumni, seek career advice, and gain insights into industry requirements, making the platform more interactive and beneficial.
5. The system demonstrated reliable performance with quick response times and accurate results. All modules such as user

registration, job posting, job application, and alumni communication functioned smoothly and efficiently.

6. By providing a centralized platform for job listings, applications, and alumni networking, the system simplifies the job search process for students and fresh graduates.

7. The system can be effectively used by educational institutions, universities, and organizations to improve placement activities. It serves as a bridge between students, alumni, and recruiters, enhancing employment opportunities.

8. The system was thoroughly tested using various testing methods including unit testing, integration testing, functional testing, system testing, and acceptance testing. All test cases passed successfully, confirming that the system meets user requirements and performs reliably in real-world scenarios

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