



AI-POWERED JOB MATCHING PLATFORM

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Abstract: The AI-Powered Job Matching Platform will automate the recruitment process using Artificial Intelligence and the MERN stack (MongoDB, Express.js, React.js, Node.js) for jobs seekers to skill matching with their preferred work options as well as available roles in front of hiring managers. For employers, the platform improves hiring rates as well streamlines the job search & apply process for applicants. It also delivers career development resources and resume generators to help job seekers achieve their professional aspirations.

Applicant matching based on predictive analytics and AI to help organizations reach more qualified hires. The technology continuously improves the quality with which candidates are connected to jobs, using machine learning and natural language processing. Strong analytics and customer support allow administrators to have full control over users as well as job posts, platform content. This technology uniquely positions itself at the forefront of the job-matching field by predicting what is needed in the future and framing an answer to tackling present hurdles for hire.

IndexTerms - Artificial Intelligence, Job Matching, Resume Parsing, MERN Stack, Recruitment Platform.

I. INTRODUCTION

The job market has become increasingly competitive and complex, creating a challenging environment for both job seekers and employers. Job seekers often face an overwhelming number of listings, many of which do not align with their skills or interests. Meanwhile, recruiters must sift through vast numbers of resumes to find suitable candidates. This traditional hiring model is inefficient, time-consuming, and often leads to poor matches.

The **AI-Powered Job Matching Platform** aims to solve these issues by leveraging **Artificial Intelligence (AI)** and the **MERN stack** (MongoDB, Express.js, React.js, and Node.js). This platform enables intelligent, automated matching of job roles to candidate profiles using **Natural Language Processing (NLP)** and **Machine Learning (ML)**. It not only automates resume screening and job recommendations but also enhances the user experience through intelligent design and real-time feedback mechanisms.

For **job seekers**, the platform provides:

- Personalized job recommendations based on their resume and profile.
- AI-assisted resume review and ranking.
- Career development resources, including resume builders and interview tips.

For **employers**, the platform offers:

- AI-based candidate shortlisting.
- Automated interview scheduling.
- Insights into candidate-job fit based on skill alignment and previous hiring data.

Unlike traditional keyword-based portals, this system uses semantic understanding to assess job descriptions and resumes, resulting in more accurate and context-aware matches. The backend integrates AI models capable of understanding job and skill relationships, while the frontend delivers a smooth and intuitive user experience.

Overall, the platform aims to:

- Minimize manual effort and hiring time.
- Improve the quality of job matches.
- Provide a robust, scalable, and secure environment for hiring processes.
- Establish a feedback loop to guide user improvement through skill gap analysis and training recommendations.

With its intelligent architecture and future-ready design, this platform represents a significant leap forward in the recruitment technology domain.

II. EASE OF USE

The AI-Powered Job Matching Platform is designed with a user-friendly interface to ensure a seamless experience for both job seekers and employers. Job seekers can easily create a detailed profile, upload their resumes, and receive personalized job recommendations based on their skills, experience, and preferences. The intuitive dashboard provides real-time updates, matching results, and suggestions that eliminate the need for extensive manual job searches. Employers, on the other hand, can post job openings, manage company profiles, and access an AI-curated list of candidates who best match their job criteria. The platform streamlines the hiring workflow by allowing employers to screen resumes, schedule interviews, and communicate with applicants directly through an integrated dashboard.

To enhance usability, the system automates the parsing of resumes and job descriptions using natural language processing (NLP), which ensures accurate candidate-job matching. It also provides resume feedback and insights to job seekers, helping them improve their chances of getting hired. The platform is cross-device compatible and can be accessed from desktops, tablets, and mobile devices without the need for installation, making it highly accessible. Its responsive design and scalable backend architecture ensure a smooth and efficient experience for all users, even during high-traffic periods. Moreover, the platform is built with robust security measures, offering secure data handling, user authentication, and reliable system uptime. For administrators, the platform includes a control panel to manage user accounts, job postings, analytics, and content moderation, ensuring full oversight and operational efficiency. This combination of intelligent automation, accessibility, and administrative control makes the platform highly effective and easy to use for all stakeholders.

Abbreviations and Acronyms

Common abbreviations such as AI (Artificial Intelligence) and NLP (Natural Language Processing) are used contextually where needed.

2.1 Population and Sample

The scope of the project encompasses two primary user populations: job seekers and employers. Job seekers include individuals actively looking for employment or career enhancement, while employers include companies and recruitment agencies seeking qualified candidates for various roles.

For system testing and evaluation, sample user profiles and job listings were generated across industries such as IT, finance, and healthcare. These profiles were selected to cover diverse educational backgrounds, skill levels, and experience to ensure the matching algorithm performs well across real-world variations.

2.2 Data and Sources of Data

The study uses synthetic and publicly available datasets, including resume samples, job descriptions, and industry-specific hiring patterns. Job data was sourced from open job board APIs and anonymized resume data from online repositories. Natural Language Processing (NLP) techniques were applied to extract relevant skills, experience, and education data from resumes and job descriptions. This processed data served as the foundation for training and testing the AI matching algorithm.

2.3 Theoretical framework

The system's core depends on matching theory and machine learning models. The dependent variable is the *job match score*, which measures how well a resume aligns with a job description. Independent variables include skills, experience, education, location, and keywords extracted from both resumes and job descriptions.

Cosine similarity and TF-IDF were used to quantify textual alignment between candidate resumes and job listings. Further enhancement was done using BERT, a deep learning model that captures the semantic context of words and phrases.

By applying these models, the platform ensures intelligent, context-aware matches rather than relying on keyword-based searching alone. This framework supports a more robust and scalable system for AI-driven job matching.

III. RESEARCH METHODOLOGY

The methodology section outlines the plan and method that how the study is conducted. This includes Universe of the study, sample of the study, Data and Sources of Data, study's variables and analytical framework. The details are as follows;

A. Requirement Analysis and Planning

Within this phase, the goals and requirements that the platform will have. This entails identifying the most important features, such as resume parsing, job description understanding, candidate-job linkage, user authentication and dashboard visualization. They are then audited to verify that the UI/UX (both user interface and backend logic) adhere to the audience this product is targeting—recruiters (and job seekers). At this point, you will decide on a technology like the use of Python for AI/NLP, Node and Express stack for back end, React/Redux, and MongoDB for the front-end.

B. System Architecture and Design

Architecture provides platforms with scalability and modularity.

- Frontend: The job search page, a display of match result and resume upload or result page with information are all developed by React Components. State management and routing language is provided for easier user navigation.
- Backend – Express is used to build RESTful APIs that manage data flow to and from our AI model. Also, Implementing the CRUD APIs for user, job ads & resumes

Development of the DB: Schema design in MongoDB for the purpose of doing a downside job description, candidate profile and the matching result the relationship between datasets (such as user-job interaction) will be arranged in using Mongoose.

C. Data Pre-processing and Cleaning

Quality of data is the primary concern with respect to manual as well as AI matched process. During this stage:

- **Resumes:** Resumes are cleaned, formatted and tokenized/sentence chunked using libraries like SpaCy to understand the necessary information extracted from those technical tasks (skills, experience etc.).
- **Job Descriptions:** Analyzed in the same manner, job description is looked at to figure out what the role encompasses (duties) what skill set should be possessed and add requirement for each role.

Stop words is eliminated for both datasets and further get rid of unrelated information or useless formatting so that dataset are formatted properly for exact analysis.

D. AI Model Development

This is where one embeds the core intelligence of the platform:

- **Feature Extraction:** features relevant to job descriptions and resumes are extracted and a method like TF-IDF are converted into numerical vectors.
- **Algorithm to find match:** Similarity uses cosine similarity for comparing relevance between resumes and job descriptions giving you similarity score with each match.
- **High-level Models:** For better accuracy pre-trained models, such as BERT etc that understands the semantic meaning of text can be utilized. This allows the system to understand multi-faceted requirement and effectively match candidates with this criterion.

E. MERN Integration

MERN stack with AI will provide user experience seamlessly

- **Frontend Integration:** Axios is for connecting React .js components to backend APIs. This allows users to post resumes, search for jobs and see real-time match results.
- **Backend Integration:** Using python-shell to integrate into Node.js backend, and run the AI/NLP Python scripts right from the server-side with machine learning models. Furthermore, the data of the backend is responsible for processing the data, answering the API returns and also user's authentication.
- **Database Integration:** MongoDB, the job description, match results data and parsed resume data will be stored & retrieved with this actual let's have a look. Mongoose also has some operate and schema definitions that would help you do the database interaction more efficiently.

F. Testing and Optimization

This phase is to thoroughly validate and assess the platform for accuracy, efficiency and usability on the platform

- **Frontend Testing – User Interaction,** API calls and UI responsivity are captured in order to ensure a frictionless experience.
- **Back End Testing;** Test Scalability of the projects APIs using Postman (etc)

Validation of the AI: The Automatically identified matches are compared to manually verified matches to evaluate the accuracy (in a pairwise comparison).

Hyperparameters of the AI models are tweaked to optimize them.

- **Performance tuning:** System is tweaked so it can respond quickly even when faced with large amount of Data and multiple users.

G. Deployment and Maintenance

The platform is deployed to production after tested. There are frequent updates which include bug fixing, accuracy improving of AI model and a feature added. With a higher user base, ongoing observation continues to put platform dependability and responsiveness at heart.

IV. EXISTING SYSTEM

The current job matching and recruitment systems primarily rely on static job boards and keyword-based filtering mechanisms. These traditional platforms require job seekers to manually browse through numerous job listings, which often leads to irrelevant or mismatched results. On the employer side, recruiters must sift through large volumes of resumes without intelligent sorting or contextual analysis of candidates' qualifications.

Most existing platforms lack artificial intelligence and depend heavily on exact keyword matches rather than semantic understanding. This often causes capable candidates to be overlooked if their resumes use different terminology than the job descriptions.

Challenges in Existing Systems:

- **Manual Filtering:** Recruiters spend significant time reviewing resumes manually, which reduces efficiency and increases hiring time.
- **Lack of Personalization:** Job seekers are rarely provided with job recommendations tailored to their unique skills, goals, or preferences.
- **No Intelligent Matching:** Keyword-based search engines cannot analyze the semantic context of candidate profiles or job descriptions.

- **Limited Automation:** Scheduling interviews, communicating with candidates, and tracking applications are mostly handled manually.
- **Minimal Feedback for Job Seekers:** Applicants rarely receive insights about why they were not shortlisted, leaving them with little guidance for improvement.

Due to these limitations, there is a growing demand for smarter, AI-driven solutions that can provide personalized job recommendations, automate screening, and streamline the entire recruitment pipeline for both employers and job seekers.

V. EXISTING SYSTEM

The anticipated result of this AI oriented job matching platform would be a radical system that optimizes the jobseeker employer experience a lot from start to finish.

Some attributes we think will be helpful for job seekers are a simple interface that makes it easier to search jobs, some application process time-saving buttons and algorithmic suggestions regarding individualized hire.

Thankful for them would be users that the career resources, including interview prep and resume generator also helps users enhance their employability so they can efficiently accomplish their career goals.

EMPLOYERS Will find that AI candidate matching delivers selected sets of qualified applicants matching job criteria leading to an improved recruiting process more effective for employers. Unified management of job ads, applications and interview schedules will streamline recruitment processes and advanced screening features deepen knowledge of candidate's background.

Taking into account the advanced use of natural language processing and semantic analysis, these capabilities shall ensure best matches for the platform meta-data lowering errors and thus unlocking a higher recruitment success rate. Predictive insights with respect to market conditions market trends will help candidates and employers match job ads to in-demand talents.

ADMINISTRATION: Well-connected reporting and analytics, that expose administrators to insights about how their customers are engaging with the platform; tools for administrators to manage user accounts jobs and the platform content.

From friendly customer service, all users would be exceedingly satisfied. It will radically change the hiring process and will go one step ahead in the job matching technology market by declaring itself as a scalable, efficient and easier to use product.

VI. FUTURE ENHANCEMENT

The AI-powered job matching platform will feature advanced algorithms to enhance user experience, accuracy, and efficiency. It will implement deep learning models, such as BERT, to improve the job-candidate matching process, providing more accurate results. The platform will also offer personalized career growth recommendations, including courses and certifications, and perform automated gap analysis of skills to help users identify areas for improvement. AI-driven career advice will assist in comparing resumes with job descriptions, identifying missing skills, and suggesting learning opportunities to fill these gaps. Voice and chatbot assistance will make the job search and interview preparation easier, while voice search functionality will streamline the process. Additionally, the platform will provide real-time job market trends and insights, using predictive analytics for job market forecasting, salary predictions, and skills demand. Blockchain technology will be used for resume verification to reduce fraud and ensure credential authentication, giving employers more confidence. The platform will also automate interview scheduling and use AI to match candidates with positions based on their availability, test scores, and background data, further aligning candidates with the right job opportunities.

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