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Skill Gap – Aware Intelligent Job Recommendation System for Freshers

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ABSTRACT: In today's job market, mismatches between candidate skills and industry requirements reduce hiring efficiency and limit fresher employability. This work presents a role-based intelligent job recommendation system with integrated skill gap analysis. The platform follows an admin-approved registration process for both users and companies to ensure authenticity and secure access. Verified companies can post vacancies, manage applications, and communicate with applicants, while users can build detailed profiles including skills, education, projects, internships, and certifications. The system computes a profile-job match percentage, identifies missing skills for selected roles, and recommends personalized learning resources with estimated completion timelines. Job recommendations are also generated based on user profile data and activity. Overall, the proposed framework improves recruitment accuracy while supporting continuous skill development.

KEYWORDS: Text detection, Inpainting, Morphological operations, Connected component labelling. Job Recommendation System, Skill Gap Analysis, Fresher Employability, Profile-Job Matching, Personalized Learning Recommendation, Recruitment Platform, Role-Based Recommendation, Admin Verification System, Career Guidance, Web-Based Application.

I. INTRODUCTION

In recent years, recruitment has become more difficult due to rapidly changing job requirements and the continuous emergence of new industry skills. Many traditional job portals mainly focus on posting vacancies and collecting resumes, but they provide limited support for evaluating how well a candidate fits a role or for guiding users in improving missing skills. As a result, hiring becomes less efficient and job seekers often struggle to meet employer expectations. In addition, the absence of strong verification processes and intelligent matching features reduces trust and transparency in recruitment platforms. With the growth of data-driven technologies and intelligent systems, there is a clear demand for solutions that can connect candidate abilities with job requirements while also supporting continuous upskilling. To meet these needs, this project proposes a secure, role-based recruitment platform that combines job recommendation, skill gap identification, and administrative monitoring to improve both hiring efficiency and career development.

II. LITERATURE SURVEY

Several studies have explored job recommendation, skill gap identification, and career guidance using machine learning and data-driven techniques. The following works are closely related to the proposed system.

In paper [1], Mashayekhi et al. introduced ReCon, a scalable job recommendation approach that reduces recommendation congestion using optimal transport, improving fairness and coverage in job suggestions.

In paper [2], Ashrafi et al. proposed Career-gAlde, an AI-based framework that analyzes resumes to recommend suitable job roles and provides rapid re-education paths using deep learning and NLP.

In paper [3], Qin Shi presented a deep learning and big data-based employment management model focused on

improving job matching for college students. The proposed approach learns feature interactions between student profiles and enterprise requirements to enhance recommendation accuracy. The results showed that the model effectively captured candidate–job relationships and improved employment matching performance.

In paper [4], Puji Catur Siswipraptini et al. conducted an analysis of real-world IT job postings to identify hidden patterns in job roles and required skills. The authors applied average-linkage hierarchical clustering to group job profiles and extract frequently occurring skill and technology keywords. The study highlighted the importance of structured job profile analysis to reduce skill mismatch and support curriculum updates aligned with industry needs.

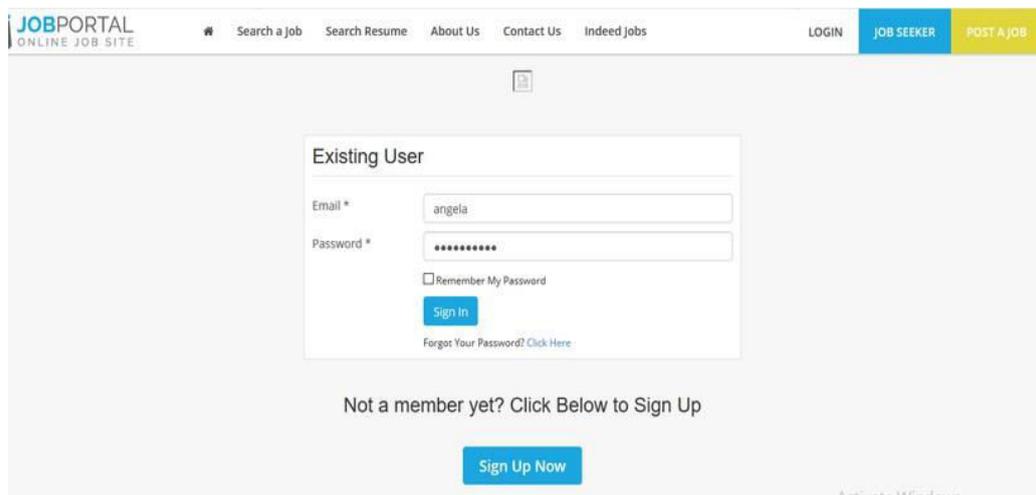
III. METHODOLOGY

The proposed Job Recommendation System is designed to analyze user profiles and match them with suitable job opportunities based on skills, qualifications, and experience. The system follows a structured approach that integrates profile management, job matching, and skill gap analysis to improve recruitment efficiency. The methodology focuses on collecting candidate data, comparing it with job requirements, and generating personalized job recommendations.

Initially, the system allows users to register and create a professional profile containing details such as educational qualifications, technical skills, certifications, and project experience. This information is stored in the system database and used as the primary input for the recommendation process. Companies can also register on the platform and post job openings with specific requirements including job role, required skills, and eligibility criteria..

IV. EXPERIMENTAL RESULTS

Fig.1 The system allows users to register and create a professional profile by entering details such as education, skills, certifications, and project experience. This information is stored in the database and used as input for the job recommendation process.

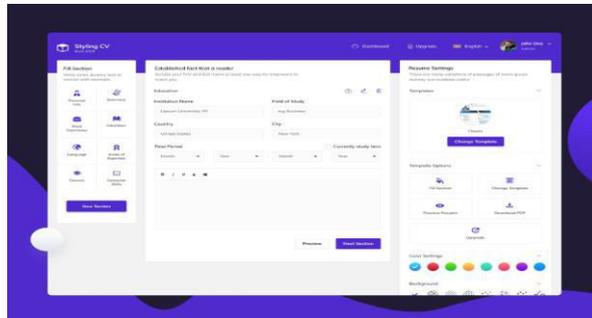


The screenshot shows the 'JOBPORTAL ONLINE JOB SITE' header with navigation links: Search a job, Search Resume, About Us, Contact Us, Indeed Jobs, LOGIN, JOB SEEKER, and POST A JOB. The main content area features a login form titled 'Existing User' with the following elements:

- Email * field containing 'angela'
- Password * field with masked characters
- Remember My Password
- Sign In button
- Forgot Your Password? Click Here link

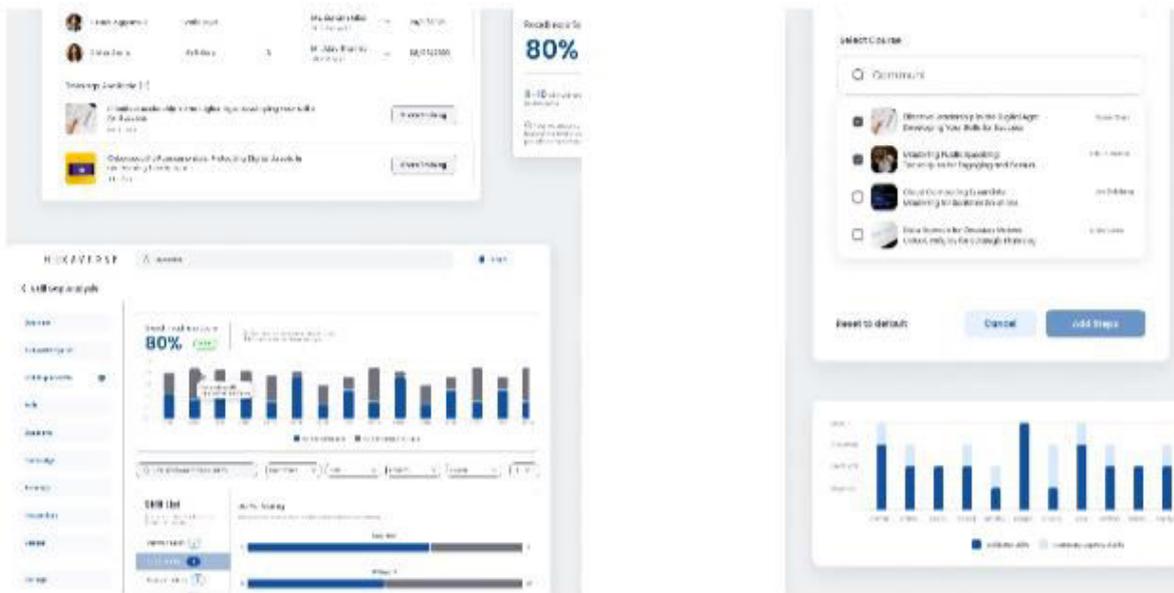
Below the form, there is a link 'Not a member yet? Click Below to Sign Up' and a Sign Up Now button.

(a)



(b)

Fig.2 Job recommendation results with match score. This system compares the candidate skills with job requirements and generates a **match percentage**. The result helps users identify job opportunities that best match their qualifications.



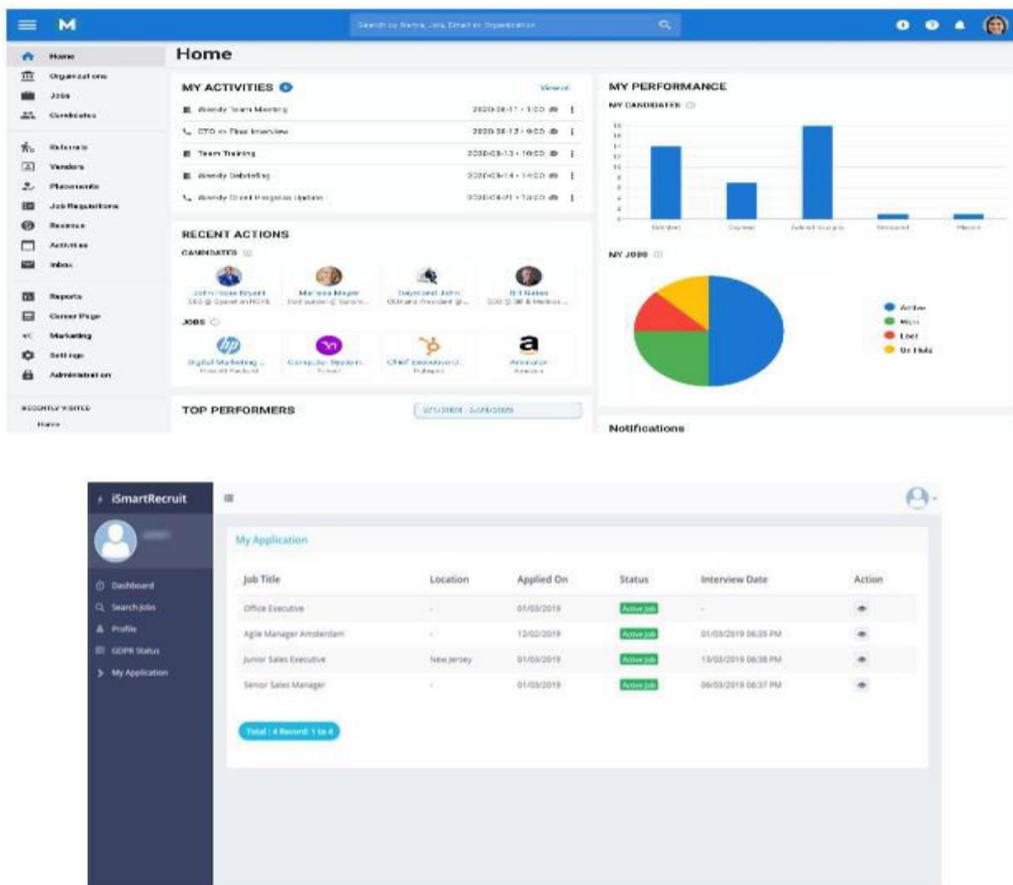
(a)

(b)

Fig. 3 Skill gap identification and learning suggestions. The system identifies missing skills required for a particular job role and highlights them for the user. Based on the analysis, the platform provides recommendations to improve these skills.



Fig.4 Candidate application review by recruiters. Recruiters can review candidate profiles, manage applications, and shortlist suitable candidates based on skill compatibility and job requirements.



V. CONCLUSION

This project presented a Skill Gap–Aware Intelligent Job Recommendation System designed to improve recruitment efficiency and support fresher employability. Unlike traditional job portals that mainly provide job listings, the proposed platform integrates profile-based job matching, match percentage computation, and skill gap identification within a secure role-based framework. The system enables verified companies to post vacancies and manage applications, while job seekers can create detailed professional profiles, explore relevant job opportunities, and receive personalized upskilling recommendations. Administrative verification ensures controlled access and improves trust in

the platform. Overall, the system provides a unified solution that not only connects candidates with suitable job roles but also guides them toward acquiring the skills required to meet industry expectations, thereby enhancing career readiness and improving the overall recruitment process.

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