AI-BASED JOB PORTAL

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Abstract: The rapid evolution of the job market and advancements in technology have catalyzed the need for more efficient and personalized solutions for job seekers and employers. Our project report details the creation and implementation of an AI-based job portal website to meet these emerging demands. Our project's primary goal is to design and develop a user-friendly web platform that employs Artificial Intelligence (AI) to improve job matching, simplify the application process, and enhance the overall user experience. By utilizing similarity algorithms such as Jaccard similarity, Range overlap, and percentage similarity, the website offers job seekers personalized job recommendations based on their skills, experience, and preferences. For employers, the system provides advanced features for job posting, automated candidate screening, and application management. The outcomes of this project reveal the significant advantages of AI integration in the job portal domain. These benefits include increased job matching accuracy, reduced administrative burdens for employers, and a more engaging and productive experience for job seekers. Our portal has the potential to revolutionize the job-seeking and recruitment process, offering a glimpse into the future of employment solutions.

Keywords: AI-based job portal, job seekers, recruiters, Jaccard similarity, job matching, skill test

I. INTRODUCTION:

In today's rapidly evolving digital landscape, the job market is becoming increasingly competitive. Job seekers are seeking more efficient and personalized ways to connect with potential employers, while businesses are searching for innovative methods to identify the right talent for their organizations. Harnessing the power of Artificial Intelligence (AI) presents an exciting opportunity to revolutionize the way we approach job searching and recruitment. An AI-Based Job Portal Website holds the potential to transform the employment industry by providing intelligent, user-friendly, and efficient solutions to job seekers and employers alike.

The project aims to design and develop a cutting-edge AI-Based Job Portal Website that utilizes advanced machine learning algorithms and natural language processing techniques to enhance the job search and recruitment process. This innovative platform will provide a seamless experience for both job seekers and employers, offering intelligent matchmaking, personalized job recommendations, and automated screening processes. Implement AI algorithms to analyze job listings and candidate profiles, ensuring accurate and relevant job matches based on skills, experience, and preferences. Utilize machine learning to understand user behavior and preferences, offering personalized job suggestions to job seekers, enhancing their job search experience. Integrate a chatbot powered by natural language processing to provide real-time assistance to users, answering queries, providing application status updates, and guiding them through the platform.

Develop algorithms to automatically screen resumes and applications, shortlisting candidates based on predefined criteria, saving time for employers and improving the efficiency of the hiring process. Integrate online skill assessments and personality tests powered by AI to evaluate candidates' abilities and cultural fit for specific roles, assisting employers in making informed decisions. Provide employers with a comprehensive dashboard equipped with data analytics tools, enabling them to track recruitment metrics, analyze candidate behavior, and optimize their hiring strategies. Ensure the platform is mobile-responsive, allowing users to

access the job portal from various devices, enhancing accessibility and user engagement. Job seekers find relevant positions faster, and employers discover suitable candidates swiftly, reducing the time-to-hire significantly. Intuitive interface, personalized recommendations, and real-time assistance create a seamless experience for users, increasing user satisfaction. Employers can make data-driven decisions by leveraging analytics, leading to more effective recruitment strategies and talent acquisition. Automated processes reduce manual efforts, minimizing costs associated with traditional hiring methods and saving time for both job seekers and employers.

II. LITERATURE SURVEY

[1] In the paper presented by Hong W, et al., they evaluate the evolving landscape of online job recommender systems (JRSs), highlighting their significance in modern recruitment platforms. It emphasizes the need for tailored recommendation approaches based on user characteristics, which traditional systems often overlook. To bridge this gap, they introduce iHR, a localized JRS that categorizes users into groups and selects recommendation methods accordingly. The paper contrasts JRSs with generic recommender systems, underscoring the unique challenges inherent to job recommendation. By delineating these challenges and proposing solutions, the authors aim to enhance the precision and efficiency of JRSs.

[2] In the paper presented by S. Amin, et al., the proposed approach suggests employing machine learning to train datasets specific to job positions, coupled with section-based segmentation for data extraction using Natural Language Processing (NLP). By limiting resume matching to only those job openings in which candidates have expressed interest, the approach seeks to enhance time efficiency. Furthermore, the results of resume matching are made accessible solely to the recruiter of the respective company, easing their burden of analyzing numerous resumes manually.

[3] In the paper presented by Dr. K. Satheesh (Professor), et al., they address the inefficiencies of traditional resume screening processes and propose an automated solution leveraging advanced Natural Language Processing (NLP), a subset of Machine Learning. Traditional resume screening involves manual parsing of resumes, which is time-consuming and prone to errors due to the abundance of irrelevant information. In recent years, NLP has gained prominence in automating various text-related tasks, including resume parsing. They have developed models and techniques to extract relevant information from resumes efficiently. Techniques such as Named Entity Recognition (NER), as implemented with the Spacy NER model, have been successful in automatically identifying and extracting entities such as skills, experiences, and qualifications from resumes.

[4] In the paper presented by Rajath V, et al., they present advancements in automated resume screening techniques. The use of machine learning algorithms, such as the K-Nearest Neighbors (KNN) Algorithm, for resume classification, has gained traction in recent years. KNN, a supervised learning algorithm, is adept at categorizing resumes into predefined categories based on features extracted from the text. They introduce Cosine Similarity as a means to quantify the similarity between a candidate's resume and the job description. Cosine Similarity is a widely utilized metric in information retrieval and natural language processing tasks, capable of measuring the resemblance between two documents represented as vectors.

[5] In the paper presented by Zarrin T, et al., they present the growing importance of business intelligence and analytics in modern enterprises, emphasizing the need for data-driven decision-making to thrive in today's competitive business landscape. Business intelligence and analytics solutions are pivotal in collecting, analyzing, and interpreting data to derive actionable insights, facilitating informed decision-making processes. In the context of online job portals, this paper proposes a module that integrates machine learning algorithms to enhance the functionality of the system. The module consists of three phases: Clusters similar kind of job search (CSK), Email notifications send (ENS), and extract the job circular (EJC).

[6] In the paper presented by Pratik Nikumbe, et al., addresses the challenges inherent in the hiring process, particularly the time-consuming nature of candidate filtering and the inefficiencies stemming from disparate job portals and testing methods. It proposes a unified system where both applicants and recruiters can interact on a single platform, streamlining the recruitment process. Literature on recruitment and hiring underscores the importance of efficiency and effectiveness in candidate selection. Traditional methods often involve manual screening of resumes and disjointed processes across multiple job portals, leading to increased workload for recruiters and potential oversight of qualified candidates.

[7] In the paper presented by Liang H, et al., explores methods to enhance user experience in AI-powered job portals. It discusses the integration of natural language processing (NLP) techniques for job search optimization, personalized recommendations, and chatbot assistance for user queries. By focusing on improving user interaction and satisfaction, the study aims to increase engagement and effectiveness of AI-driven job portals.

[8] In the paper presented by Gupta R, et al., the ethical implications of AI in recruitment are investigated. This paper discusses potential biases and discrimination in AI-based job portals and strategies for algorithmic transparency, fairness, and accountability to mitigate biases in candidate selection processes. By incorporating ethical principles into AI algorithms, the study aims to foster trust and equity in recruitment practices.

[9] In the paper presented by Patel D et al., focusing on diversity and inclusion, this paper explores AI-based initiatives to mitigate bias and promote equitable hiring practices in job portals. It discusses the use of machine learning algorithms to anonymize candidate profiles, remove identifying information, and monitor diversity metrics in recruitment processes. By fostering inclusive workplaces, the study aims to enhance organizational culture and performance.

[10] In the paper presented by Kim J et al., addressing the need for lifelong learning, this paper proposes AI-based skill gap analysis functionalities in job portals. It discusses the integration of machine learning algorithms to assess individuals' skills against job requirements and recommend personalized learning resources to bridge skill gaps. By promoting continuous learning and development, the study aims to support career advancement and employability in the age of AI.

III. METHODOLOGY

In terms of flexibility, the algorithms used include the Similarity algorithm, Percentage algorithm, and Jaccard algorithm, as these algorithms typically operate in feature spaces, where data points are represented as vectors. The "distance" between these vectors indicates their similarity. The smaller the distance, the more similar they are.

Similarity Algorithm: Similarity learning, a branch of machine learning, focuses on training models to recognize the similarity or dissimilarity between data points. This is crucial for tasks like recommendation systems, image recognition, and anomaly detection as it enables machines to understand patterns, relationships, and structures within data.

Jaccard Algorithm: It is a common proximity measurement used to compute the similarity between two objects, such as two text documents. Jaccard similarity can be used to find the similarity between two asymmetric binary vectors or two sets. In literature, Jaccard similarity can also be referred to as the Jaccard Index, Jaccard Coefficient, Jaccard Dissimilarity, or Jaccard Distance.

Percentage Similarity Algorithm: Calculate the percentage similarity by dividing the number of common elements by the total number of unique elements, and multiplying the result by 100. Use the format method to print the result with two decimal places. The resulting output shows that the two lists have a similarity of 33.33%.

3.1 Modules:

After careful analysis, the system has been identified to consist of the following modules:

Job Seeker:

In this module, a job seeker registers themselves, uploads their resume, and fills out the profile provided by the admin. After login, they can search for jobs based on various conditions, update their profiles and resumes, and apply for jobs. They can also view responses from companies and contact company representatives for interviews.

Job Provider:

In this module, job providers register themselves and their companies. After login, they can add new jobs, search for job seekers based on various conditions, offer jobs to job seekers according to job profiles, and view responses from job seekers. They can also communicate with job seekers via email.

Skill Test:

Pre-employment assessments, often referred to as job assessment tests, help hiring managers determine if candidates possess the necessary knowledge, abilities, work style, or personality traits to excel in a position. These assessments are commonly used by businesses in the early stages of the interview process to make informed hiring decisions.

Authentication:

This module contains all information about authenticated users. Users without their username and password cannot log in. Only authenticated users can access their accounts.

3.1 PROPOSED SYSTEM

The homepage will feature a prominent header displaying the website logo, navigation menu, and options for user login/registration. A search bar will be provided for job searches. A visually appealing hero section will showcase the website's key features, accompanied by a call-to-action button for job seekers and employers to create accounts or login. Below the hero section, a curated list of featured jobs will be displayed, highlighting premium job listings with attractive visuals and brief descriptions. User authentication will be facilitated through secure login and registration forms. Django's built-in authentication system will be utilized for user management.
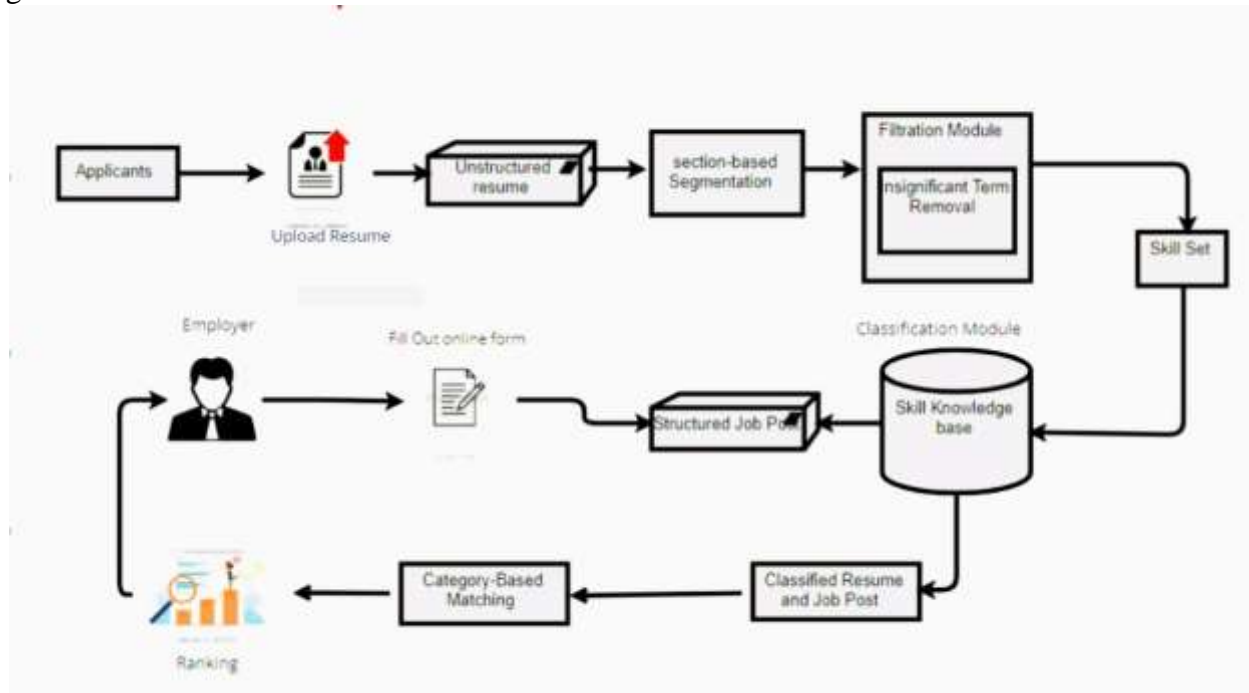
Fig 1. System Architecture

Users can filter job listings based on criteria such as job category, location, experience level, and company. A search bar with intelligent autocomplete functionality will enable quick and precise job searches. Job listings will be presented as interactive cards, displaying key information such as job title, company name, location, and a brief description. Each card will have a "Learn More" button leading to the detailed job description page. The job details page will provide a comprehensive overview of the job, including responsibilities, qualifications, benefits, and application instructions. A prominent "Apply Now" button will initiate the application process. A section suggesting related jobs based on the current job listing will encourage users to explore similar opportunities.

IV. RESULTS AND DISCUSSION

The proposed web application, designed for screening and evaluating resumes according to the job requirements advertised by company recruiters, comprises different modules. It caters to two types of users: Applicants and Recruiters. Recruiters are empowered to create job profile descriptions, while applicants can apply for positions by uploading their resumes. Text extraction from resumes is performed on the backend, after which related entities extracted from each resume are compared with the job description, and a rank is calculated.

The home screen, along with its various settings, is displayed in Fig 2. Both the sign-up and login pages are included. The sign-up page allows users to register by utilizing auto-profile filling, wherein they can simply upload their resume, and their profile will be automatically filled using our enhanced resume parser model.
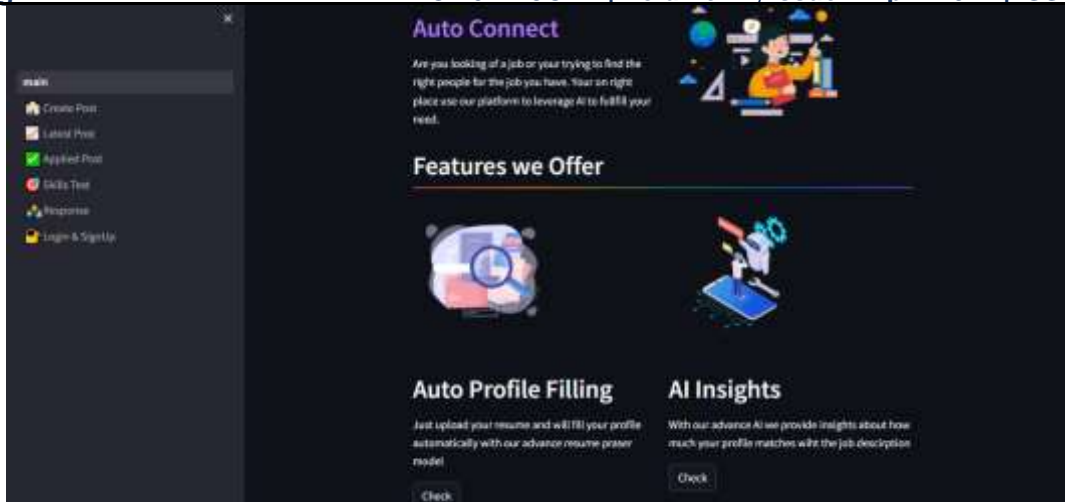
Fig 2. Home Page

In Fig 3, the resume parser model examines the text and structure of the document using a pre-trained library, namely SpaCy, for resume parsing. It retrieves data by extracting relevant categories such as name, contact information, work experience, education, and skills. The extracted information is then mapped to corresponding fields in the profile form.
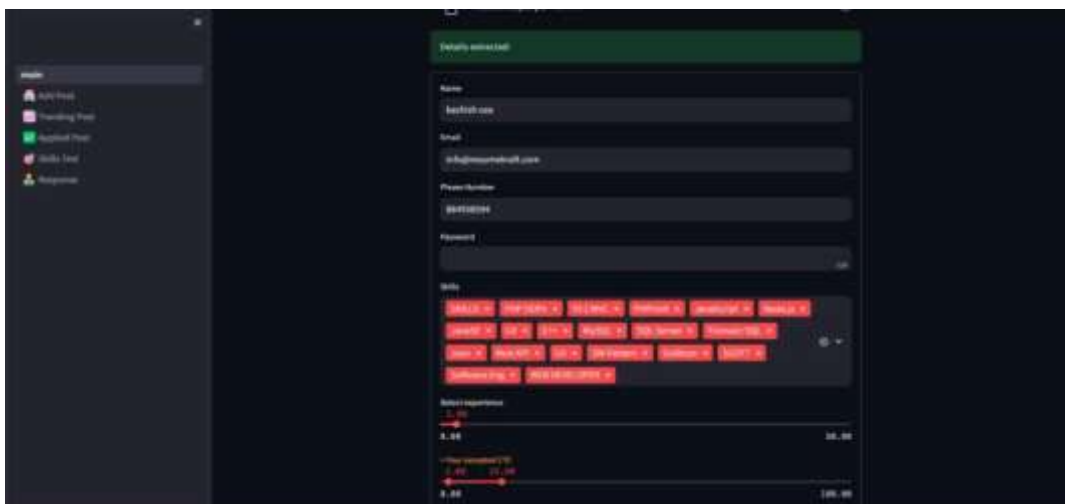

Fig 3. Signup and Login

In Fig 4, the recruiter creates a post by uploading a PDF of the job description. The job description parser model automatically extracts details of the job post, such as the job role, description, etc.
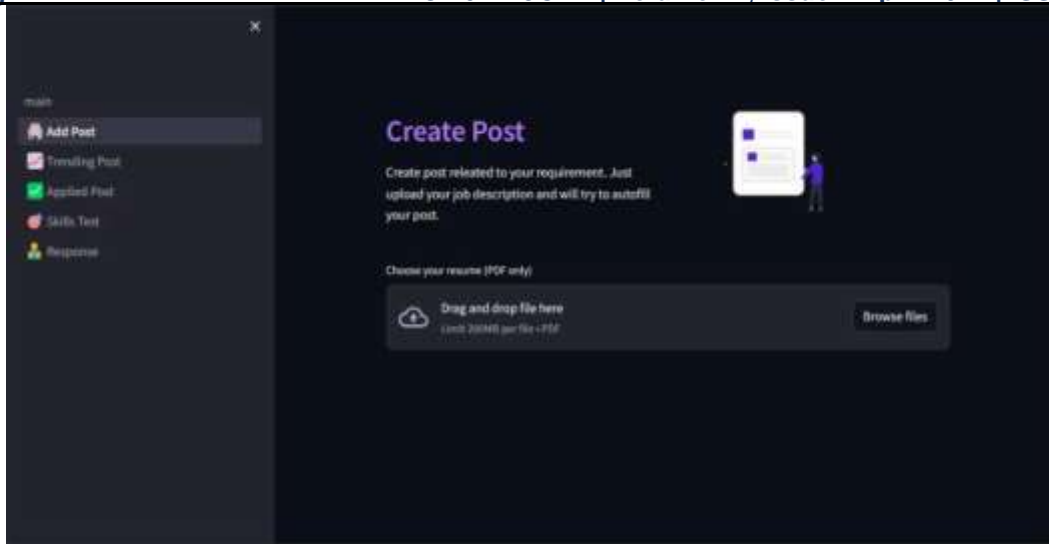
Fig 4. Create Post Page

In Fig 5, the latest job posts are shown to the user, along with the accuracy match score of the job with the skills of the employee. The accuracy score is calculated using Jaccard similarity by comparing resumes against job descriptions or against each other
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Fig 5. Latest posts page

In Fig 6, the skill test provides practice questions which assist in pre-employment assessments. These assessments, frequently referred to as assessment tests for jobs, help hiring managers determine if a candidate possesses the knowledge, abilities, work style, or personality necessary to thrive in a position.

Fig 6. Skill Test page

Fig 7 shows the response page on the recruiter side. It provides the response to the job post and also displays the accuracy match of candidates with the job post using skills extraction and the percentage similarity algorithm.
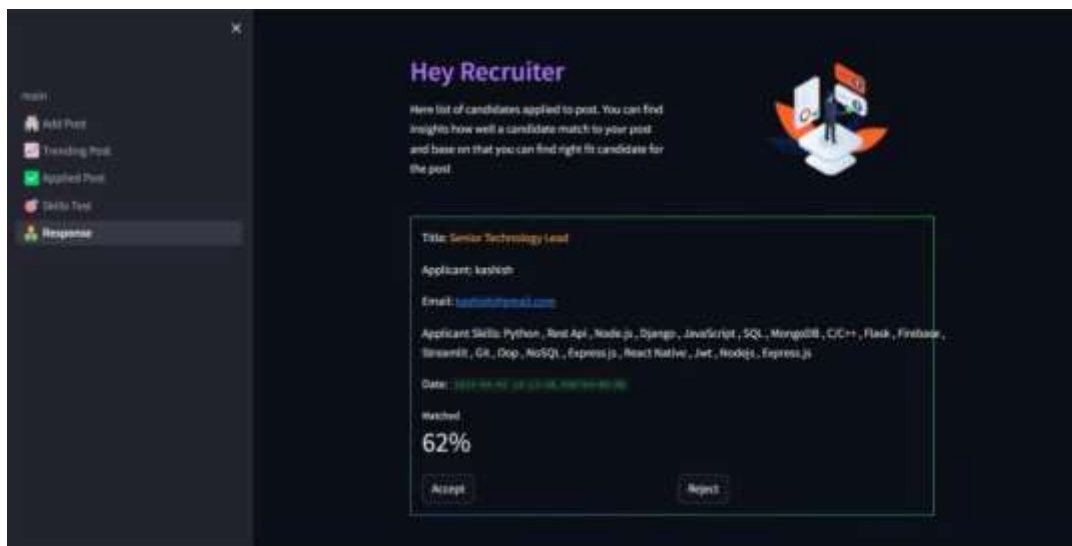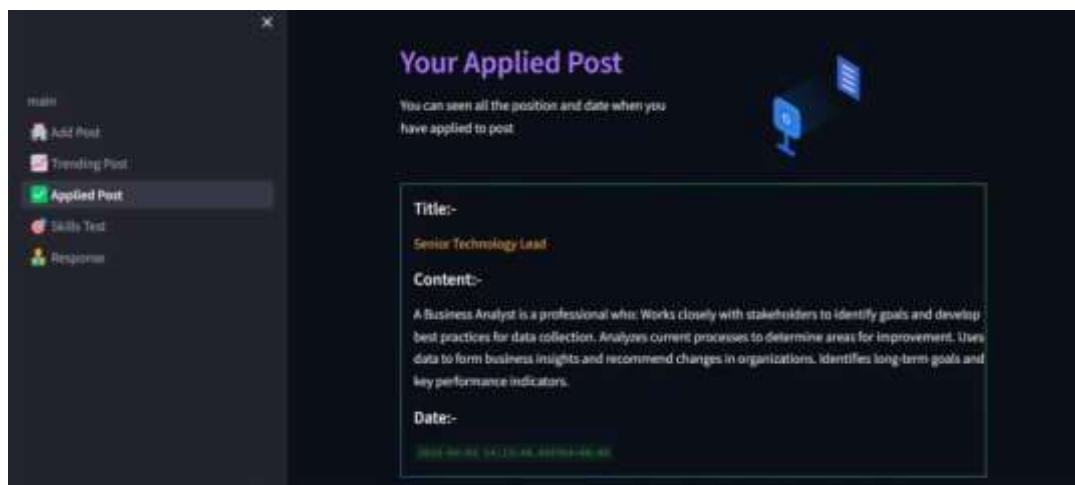

Fig 7. Post response page

Fig 8. Applied post page

V. ADVANTAGES

AI algorithms can analyze vast amounts of data, including candidate profiles and job requirements, to provide more accurate and relevant job recommendations. This leads to better matches between candidates and job openings, increasing the likelihood of successful hires. AI automates various tasks in the recruitment process, such as resume screening and candidate sourcing. This saves recruiters significant time, allowing them to focus on more strategic aspects of hiring. AI-based job portals can personalize the user experience by tailoring job recommendations and content based on individual preferences, skills, and past interactions. This enhances engagement and satisfaction among both candidates and employers. By streamlining the recruitment process and reducing manual labor, AI-based job portals can lower hiring costs for organizations. They can also help optimize advertising spending by targeting job postings to the most relevant audiences. AI algorithms can help identify and mitigate biases in the hiring process, leading to more diverse and inclusive candidate pools. By focusing on qualifications and skills rather than demographic factors, AI-based job portals promote fairness and equality in recruitment.

AI-based job portals can connect candidates and employers across geographical boundaries, facilitating remote hiring and expanding access to job opportunities. This enables organizations to tap into a broader talent pool and overcome geographic constraints. AI-driven job portals can provide valuable insights and analytics to recruiters, such as candidate sourcing trends, hiring success rates, and market demand for specific skills. This data-driven approach helps organizations make more informed hiring decisions and optimize their recruitment strategies.

VI. ACKNOWLEDGMENT

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