NLP - Automated resume analysis and skill suggesting website

[1.] **NUNNA PRASANNA SAI VENKATESH**, *B.Tech, Department of CSE, DNR COLLEGE OF ENGINEERING AND TECHNOLOGY, venkynunna2003@gmail.com*

[2.] **K. N. L. LAVANYA,** *B.Tech, Department of CSE, DNR COLLEGE OF ENGINEERING AND TECHNOLOGY, lavanyaharika.444@gmail.com*

[3.] **MURAPAKA SIVASANKAR**, *B.Tech, Department of CSE, DNR COLLEGE OF ENGINEERING AND TECHNOLOGY, sankarmurapaka9@gmail.com*

[4.] **VEGESNA SOMANADHA MAHIDHAR VARMA**, *B.Tech, Department of CSE, DNR COLLEGE OF ENGINEERING AND TECHNOLOGY, mahidharvarma22@gmail.com*

[5.] **Mr. K. SURYA RAM PRASAD**, *M. Tech, Assistant Professor, Department of CSE, DNR COLLEGE OF ENGINEERING AND TECHNOLOGY, surya.dnrcet@gmail.com*

Abstract: *The current system for screening resumes employs a manual process in which recruiters or human resource managers evaluate job applications based on their qualifications, experience, and other factors. By synergizing cutting-edge technology with recruitment needs, we present a dynamic solution an automated resume analysis and skill suggestion platform. To create an innovative Automated Resume Analysis & Skill Suggesting Website utilizing Resume Parser and NLP APIs. By automating the extraction of crucial information such as skills, qualifications, and personal details from resumes. By assessing applicant skills against job requirements, the system calculates scores to aid in effective short listing. It is streamlined, data-driven approach to enhance the recruitment process for both job seekers and employers. To address the diversity of resumes in structure and format, the platform employs a robust parsing engine capable of recognizing and categorizing information from various document types and styles, ensuring a fair analysis of each candidate's potential. The system is trained on a vast corpus of job-related data, enabling it to understand industry-specific terminologies and trends, which is critical for matching applicants to niche roles.*

Index Terms – *Natural Language Processing (NLP), Job Applications, Resume Screening, Resume-Parser, Resume Analysis.*

I.   INTRODUCTION

An essential step in the hiring process is the automatic review of resumes, which entails assessing job applications to find the applicant most suited for a given position. This procedure may take a long time and be prone to human mistake, which could lead to the loss of qualified individuals. Automated resume screening has grown in popularity recently as a solution to this problem. Automatic resume screening uses several methods to enhance accuracy and efficiency, including deep learning algorithms, machine learning, and natural language processing (NLP). Current automated resume screening systems are a testament to how artificial intelligence has permeated the recruitment industry, streamlining processes that once required hours of human labor. Through the utilization of sophisticated Natural Language Processing (NLP) techniques, such as entity identification, semantic search, and advanced machine learning algorithms, these systems can probe deeply into the intricacies of job applications, providing an in-depth relevance analysis against the requirements of a given job description.

Our cutting-edge system takes this automation a step further. Built upon the sturdy foundations of a predefined library, our platform meticulously scans, identifies, and extracts crucial information from each resume. This includes, but is not limited to, contact details, a list of pertinent skills, a comprehensive work history, and educational achievements. Such granular analysis allows for a nuanced evaluation of a candidate's professional narrative, bringing into focus their suitability for the role in question.

One of the most remarkable features of our system is its scalability. Designed to accommodate the expanding needs of our users, it stands ready to tackle the increasing volume and complexity of recruitment demands without a hitch. Whether you are a startup looking to hire your first employees or a multinational corporation seeking to manage thousands of applications, our system adapts and scales to fit your specific needs.

Moreover, our system has been crafted with integration at its core. It recognizes the diverse array of platforms and services within the recruitment ecosystem and offers seamless compatibility. From job boards and applicant tracking systems (ATS) to HR management software and beyond, our automated resume screening system can be easily incorporated to enhance existing workflows. This interoperability is crucial in an age where data is spread across multiple systems, and consolidation is key to efficiency.

At the heart of our platform lies the promise to transform recruitment from a daunting task into a manageable and even enjoyable process. Recruiters can wave goodbye to the tedium of sifting through resumes manually, and instead, engage with a curated list of top-tier candidates. This not only saves time but also ensures that human biases are minimized, fostering a more diverse and inclusive hiring practice.

As we step into the future of recruitment, our system stands as a beacon of innovation—a tool that not only refines the process of candidate selection but also enriches the experience of hiring, for recruiters and candidates alike. Our platform leverages the power of Natural Language Processing (NLP) to seamlessly extract, comprehend, and suggest skills from diverse resumes, empowering both job seekers and employers alike.

In a world where every resume is as unique as the individual it represents, the project stands at the intersection of technology and human capital, streamlining the hiring process for maximum efficiency.

Whether you're a seasoned professional looking to highlight your expertise or a recruiter seeking the perfect candidate, our platform offers a sophisticated solution that transcends traditional methods.

This journey is not just about parsing resumes; it's about empowering individuals to present their best selves and helping organizations discover the talent that aligns seamlessly with their needs. Join us on this transformative quest to redefine recruitment, one resume at a time.

II. LITERATURE SURVEY

In today's competitive job market, the process of resume screening is crucial for efficiently identifying potential candidates for various job positions. Traditional manual methods of resume screening are often time-consuming and prone to bias. To address these challenges, researchers have turned to automated techniques leveraging machine learning, natural language processing (NLP), and semantic similarity to streamline the resume screening process. This literature survey provides an overview of recent advancements in automated resume screening techniques, highlighting key studies and their contributions.

Singh and Shukla [1] proposed an automated resume screening and evaluation system based on machine learning techniques. They utilized features extracted from resumes and job descriptions to train classifiers for screening candidates. Their approach demonstrated promising results in accurately identifying suitable candidates based on predefined criteria.

Oh and Lee [2] conducted a study and extracting competencies from job postings and correlating them with resumes using NLP techniques. By analyzing the semantic similarity between job requirements and candidate resumes, they developed a framework for automated competency-based resume screening. Their work highlighted the importance of aligning candidate skills with job requirements for effective screening.

Xu et al. [3] explored deep learning and NLP methods for resume screening. They proposed a model that leverages word embeddings and neural networks to match candidate resumes with job descriptions. Their approach demonstrated improved performance compared to traditional methods, particularly in handling large volumes of resumes.

Several studies have focused on leveraging semantic similarity for automated resume screening. Bhowmik et al. [4] proposed a method based on semantic similarity and clustering algorithms to efficiently screen resumes. By measuring the similarity between candidate profiles and job descriptions, they achieved effective candidate filtering.

Elakkiya and Muthurajkumar [5] presented an automated resume screening system using semantic similarity. Their approach utilized semantic embeddings to compare resumes with job requirements, enabling accurate candidate ranking and selection.

Garg et al. [6] also explored semantic similarity-based sentence embeddings for automated resume screening. By representing resumes and job descriptions as vectors in a semantic space, they achieved robust matching and ranking of candidates.

Huang et al. [7] developed a resume screening and ranking system using NLP techniques. Their approach involved analyzing resume content and assigning relevance scores based on semantic similarity with job descriptions. This enabled efficient ranking of candidates according to job suitability.

Kang and Lee [8] proposed a resume analysis framework for job matchmaking using word embedding and ranking algorithms. By transforming resumes and job descriptions into word embeddings, they calculated similarity scores to identify suitable matches. Their approach facilitated accurate candidate-job matching while considering semantic similarities.

In conclusion, automated resume screening techniques have witnessed significant advancements leveraging machine learning, NLP, and semantic similarity. These approaches offer efficient solutions for handling large volumes of resumes while ensuring fair and unbiased candidate selection. By aligning candidate skills with job requirements and utilizing semantic representations, automated systems can effectively match candidates to suitable job positions. Future research in this area may focus on enhancing the accuracy and

scalability of automated resume screening systems, as well as addressing challenges related to bias and fairness in candidate selection processes.

III. METHODOLOGY

i) Proposed Work:

The proposed system represents a pioneering advancement in the realm of resume analysis and skills suggestion within the recruitment domain. Harnessing the sophisticated capabilities of Natural Language Processing (NLP), our system aims to redefine how resumes are evaluated and skills are recommended, offering a seamless and enlightening experience for both job seekers and employers alike.

By employing cutting-edge NLP algorithms, our system transcends traditional keyword-based approaches, diving deep into the contextual intricacies of resumes to truly grasp the essence of a candidate's professional trajectory. This nuanced understanding enables the system to provide insightful analyses, going beyond surface-level assessments to offer a holistic view of a candidate's qualifications and experiences.

It utilizes predefined modules to identify and extract information such as contact details, skills, work experience, and education. Our system is designed to scale with the growing demands of users. Additionally, it offers seamless integration capabilities, allowing for compatibility with various platforms and services within the recruitment ecosystem.

Furthermore, robust security measures are implemented to safeguard the confidentiality and integrity of user information, ensuring a secure environment for all parties involved in the recruitment process. With its innovative approach and unwavering commitment to excellence, our system sets a new standard for resume analysis and skills recommendation in the digital era.
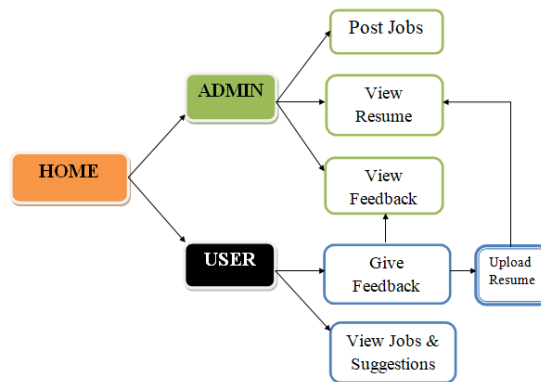
ii) System Architecture:

Fig 1 System Architecture

iii) Admin Module:

The admin module of the system comprises several sub-modules to facilitate efficient management and oversight of the recruitment process. Firstly, the Admin Login submodule provides secure access for administrators to the system, ensuring authorized personnel can perform their tasks securely. Secondly, the Post Jobs submodule enables administrators to post job vacancies with detailed descriptions, specifying required qualifications and skills. Thirdly, the View Resume Score submodule allows administrators to assess the suitability of candidates by viewing their resume scores generated through automated screening algorithms. Finally, the View Feedback submodule enables administrators to access feedback provided by candidates or hiring managers, facilitating continuous improvement of the recruitment process. Together, these sub-modules streamline administrative tasks, enhance decision-making, and contribute to the overall effectiveness of the recruitment system.

The admin module comprises several essential sub-modules designed to facilitate streamlined management of the recruitment process:

Admin Login:

This submodule allows administrators to securely access the system by providing their credentials, typically consisting of a username and password. By authenticating themselves through this module, admins gain authorized access to the system's functionalities.

Post Jobs: In this submodule, administrators can input job details such as job title, company name, required skills, and job description. By utilizing this submodule, admins can effectively post new job vacancies, ensuring that pertinent information is accurately conveyed to potential candidates.

View Resume Score:

Within this submodule, administrators can access resume files stored on the server and review the extracted details in JSON format. Additionally, administrators have the capability to view the score values associated with each resume, providing insights into the suitability of candidates for specific job roles.

View Feedback:

This submodule enables administrators to monitor user feedback through pie chart representations, providing a visual summary of feedback data. Admins can gain valuable insights from user feedback, allowing them to identify areas for improvement and make informed decisions regarding the recruitment process.

Collectively, these sub-modules empower administrators to effectively manage various aspects of the recruitment process, from posting job vacancies to evaluating candidate resumes and analyzing user feedback. By leveraging these functionalities, administrators can streamline administrative tasks, enhance decision-making processes, and ultimately contribute to the overall efficiency and effectiveness of the recruitment system.

iv) User Module:

The user module comprises several sub-modules aimed at providing a seamless experience for individuals seeking job opportunities:

New User Signup:

This submodule facilitates the registration process for new users. Users can create an account by providing essential information such as a username, password, and contact details. The signup process allows new users to complete their profiles and gain access to the system's features and services. By inputting all required details, users can successfully register and begin utilizing the platform for job search and application purposes.

User Login:

The User Login submodule enables registered users to access their accounts securely. By providing their username and password, users can log into the system and access personalized features and functionalities. Authentication through this submodule ensures that users can securely access their accounts and avail themselves of the platform's services, including viewing job listings, uploading resumes, and receiving job suggestions.

View Jobs & Get Suggestions:

Within this submodule, users can explore available job opportunities and receive personalized suggestions based on their skills and preferences. Users can browse through job listings, view detailed job descriptions, and assess the suitability of positions based on their qualifications and interests. Additionally, users receive suggestions for relevant skills to enhance their candidacy for specific job roles. If a job appears suitable, users can proceed to upload their resumes to obtain a resume score, providing valuable insights into their compatibility with the position.

Upload Resume & Get Resume Score:

This submodule allows users to upload their resumes and receive a score based on automated screening algorithms. Users can upload their resumes directly through the platform, and the system evaluates the content to generate a score reflecting their suitability for various job positions. This feature enables users to assess the strengths and weaknesses of their resumes, identify areas for improvement, and enhance their chances of success in the job application process.

Collectively, these sub-modules empower users to navigate the job search process effectively, from creating accounts and logging in to exploring job opportunities, receiving personalized suggestions, and evaluating their candidacy through resume uploads and scoring. By providing a user-friendly interface and seamless functionality, the user module enhances the overall experience for individuals seeking employment opportunities within the system.
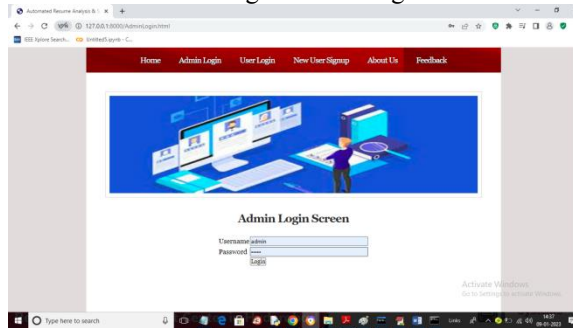
IV.   EXPERIMENTAL RESULTS

Now double click on 'run.bat' file to start python DJANGO server and then open browser and enter URL as http://127.0.0.1:8000/index.html' and press enter key to get below page
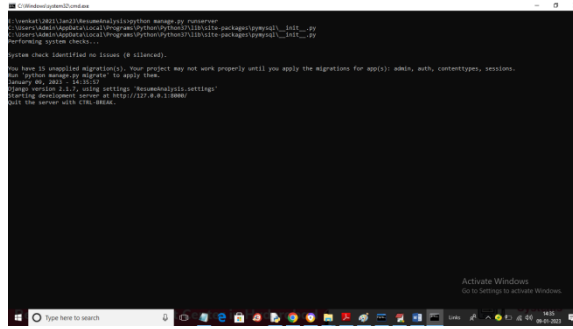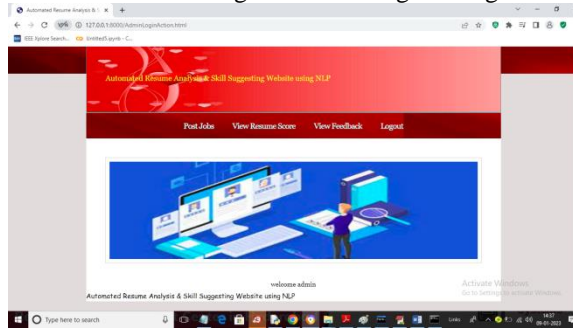
In above screen Django server started and now open browser and enter URL to get below page

In above screen click on 'Admin Login' link to login as admin and then post jobs
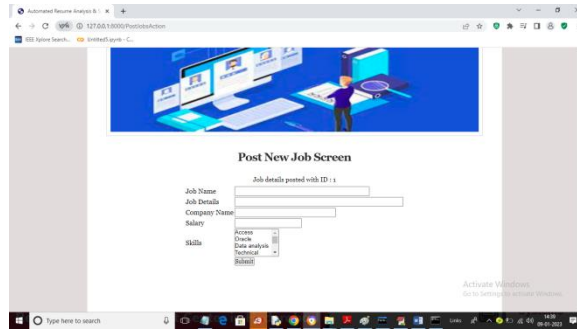

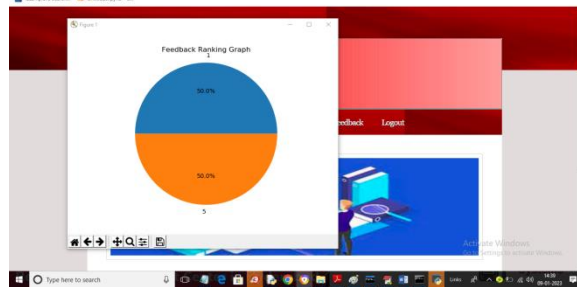In above screen admin is login and after login will get below page

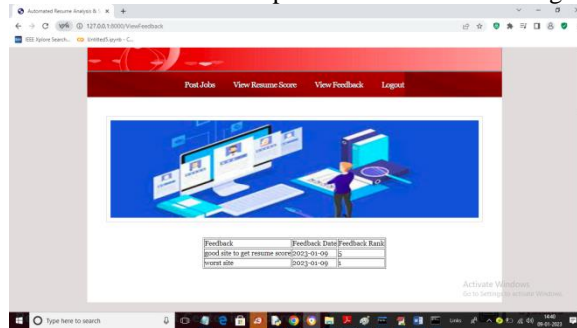In above screen click on 'Post Jobs' link to post jobs

In above screen admin will enter job details and then select require skills and press button to get below output

In above screen job details added with JOB ID 1 and now click on 'View Feedback' link to get below screen
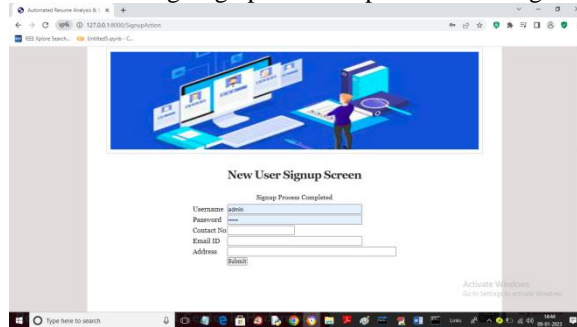

In above screen admin can view Feedback as pie chart and close above graph to get below page

In above screen admin will view all feedbacks and now logout and signup and login new user

In above screen user is signing up and then press button to get below page

In above screen signup process completed and now click on 'User Login' link to get below login page

In above screen user is login and after login will get below page
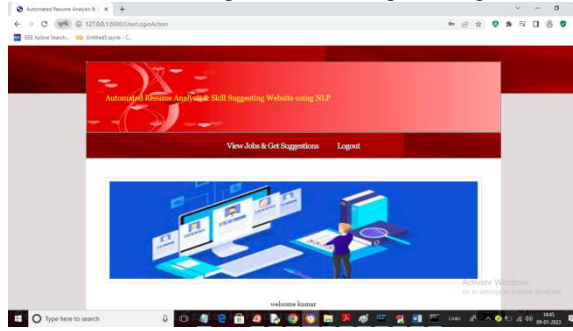
In above screen click on 'View Jobs & Get Suggestions' link to view all jobs and suggestion

In above screen user can view available jobs and suggested skills and if job is suitable for user then he can click on 'Click Here to Upload Resume' link to upload resume and get score

In above screen user is selecting and uploading resume and press 'Open' and 'Submit' button to get below score value

In above screen in blue colour text we can see user resume got 50% score and now login as admin to view all resume details

In above screen admin is login to get below page

In above screen admin can click on 'View Resume Score' to view all applicant resumes with score

In above screen admin can view resume file name which he can read from server and he can view all resume extracted details in JSON format and in last column he can see the score values

Similarly you can upload and extract details and score from resume and supported formats are only PDF and DOCX files.

V. CONCLUSION

In the rapidly evolving world of recruitment, our proposed project emerges as a trailblazing force, reshaping the conventional paradigms of resume analysis. With a steadfast commitment to harnessing the transformative potential of Natural Language Processing (NLP), This project aims to develop an advanced Resume Analysis & Skill Suggestion Website using NLP and Resume Parser. The primary goal is to automate the extraction of skills, qualifications, and personal details from resumes, easing the burden of manual screening for companies. By assessing applicant skills against job requirements, the system calculates scores to aid in effective shortlisting. This solution offers a streamlined, data-driven approach to enhance the recruitment process for both job seekers and employers. our solution empowers both job seekers and employers alike. Through the meticulous assessment of applicant skills against job requirements, our system facilitates effective shortlisting, thereby optimizing the recruitment process and ensuring the best possible matches between candidates and positions. In essence, our project represents more than just a technological innovation—it embodies a transformative force that is propelling the recruitment industry towards greater efficiency, transparency, and alignment. As we continue on this journey of progress, we remain committed to driving positive change and shaping a future where talent acquisition is not just a transaction, but a catalyst for mutual growth and success.

VI. FUTURE SCOPE

Following the resume score assessment, we can implement a feature to promptly notify users of their application status. Upon evaluation, the system will display a message indicating whether the resume has been selected or rejected for the specific company. This real-time feedback mechanism ensures transparency and enables applicants to promptly gauge their candidacy, enhancing the user experience and streamlining the recruitment process.

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