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Empowering Candidates with Experience Sharing and Advanced Resume Screening - A Comprehensive Survey

Shreyash Bachate[1], Prajwal Kakade[2], Harish Sugandhi[3], Prof. Parag Jambhulkar[4]
[1, 2, 3]*B.E. Students of Department of Computer Engineering, Pune Institute of Computer Technology, Pune, India*
[4]*Full Professor, Department of Computer Engineering, Pune Institute of Computer Technology, Pune, India*

Abstract: ***In the dynamic realm of higher education and career advancement, our college community now has access to a transformative portal. Here, students can delve into a vast repository of real-world interview experiences shared by peers, alumni, and industry professionals. These firsthand accounts offer a unique opportunity for current students to gain an inside perspective on interview processes, company cultures, and expectations across various organizations. Furthermore, our portal boasts a cutting-edge resume analysis feature. Students can upload their resumes, and a sophisticated algorithm scrutinizes their qualifications, skills, and experiences. Utilizing this analysis, the system generates tailored recommendations for companies and positions that closely align with each student's unique profile, academic background, and career aspirations. This streamlines the job search process, broadens students' horizons, and empowers them to explore career opportunities they might not have considered otherwise. Our aim is to facilitate professional growth, ensuring that our students seamlessly transition into the workforce. By fostering the sharing of interview experiences and delivering personalized company suggestions, our platform equips students to make informed career decisions, enhance their job application strategies, and embark on successful career paths.***

Keywords: Resume Screening, Web Scraping, Experience Sharing Portal.

I. INTRODUCTION

The journey from student life to the professional realm is a transformative phase in one's academic career. It's a time of great anticipation and excitement but often marred by challenges and uncertainties. This pivotal juncture is marked by the transition from absorbing theoretical knowledge in lecture halls to applying it in the real-world workplace. It's a transition that requires more than just academic acumen; it necessitates practical wisdom, insights, and a roadmap to navigate the maze of interviews and job applications.

Recognizing the significance of this transition, our college community takes immense pride in introducing a revolutionary portal tailored to our students' specific needs. This innovative platform promises to be a beacon of guidance and support as they embark on their professional journeys. Our portal serves two critical functions: firstly, it curates a vast repository of real-world interview experiences generously shared by fellow students, esteemed alumni, and industry professionals. These candid accounts offer an authentic and unvarnished glimpse into the interview processes, company cultures, and expectations that exist across a diverse spectrum of organizations. Through these stories, students can gain an intimate understanding of what to expect, demystifying the often intimidating interview experience. Moreover, they equip students with the knowledge and insights needed to approach interviews with confidence and poise, armed with a comprehensive understanding of what lies ahead.

Beyond this treasure trove of interview experiences, our portal incorporates an advanced resume analysis feature. Here's where technology meets personalized career development. Students can upload their resumes, and an intricate algorithm meticulously examines their qualifications, skills, and experiences. Leveraging this analysis, our system generates customized company recommendations. These recommendations are not one-size-fits-all; instead, they align students with organizations and positions that most closely match their unique profiles, academic backgrounds, and career aspirations. This approach is designed to streamline the job search process, saving students precious time and effort while broadening their horizons. Perhaps most significantly, it encourages students to explore career opportunities they may not have previously considered, expanding their potential and increasing their career prospects.

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Our ultimate goal with this portal is to foster the professional growth and success of our students. We aim to facilitate a seamless transition from academic life to the workforce, ensuring that every student is well-prepared, well-informed, and well-placed to embark on a fulfilling career. By promoting the sharing of interview experiences and providing tailored company suggestions, our platform empowers students to make informed career decisions, enhance their job application strategies, and ultimately, set them on a path to success in their chosen fields. We believe this portal will not only ease the anxieties that often accompany the transition from college to career but also significantly enhance the prospects and opportunities available to our esteemed students.

II. LITERATURE WORK

In the context of selecting the most qualified candidates from a pool, a variety of Natural Language Processing (NLP) techniques, including bigram, trigram, and n-gram analyses, alongside text classification, are harnessed. This model harnesses Machine Learning to execute the classification process, making use of the algorithm mentioned in [1]. Leveraging web service APIs, this information is subsequently used to assess students' resumes based on the skill sets demanded by job roles. Named Entity Recognition (NER) software such as Apache OpenNLP and the Stanford Named Entity Recognizer play a pivotal role in this process [9] [10] [11].

Yong Luo crafted a proprietary dataset categorized into two distinct segments: positive and negative. In total, 33 resumes were categorized as positive, while 89 were identified as negative [3] [10].

The objective here was to develop a web-based application for the screening of 220 resumes, with 200 of them designated for training and the remaining 20 for testing. This application is partitioned into three key sections:

1) Job Applicant's Interface
2) Server-Side Processing
3) Recruiter's Portal

The applicant submits their resume on the applicant's side, ´ with server-side processing and training executed via the NLP Pipeline, incorporating the usage of SpaCy, an NLP framework [6]. The recruiter, on their end, receives a ranked list of resumes determined through a scoring mechanism, enabling them to select the most suitable candidate for the job [2].

This system introduces an innovative approach wherein candidates submit their resumes post-interview. The system then employs a face-based technique to extract key skills from the resume, followed by TF-IDF vectorization to transform words into vectors for machine comprehension. The K-Nearest Neighbours (KNN) algorithm is then employed to identify the resume that closely matches the job description provided by the recruiter. The system consistently achieves an average parsing accuracy of 85% [4] [5]. The NER model is employed to extract valuable entities from documents, bolstered by the word2vec model, rendering the system more versatile. Similarities are computed using the cosine similarity algorithm [7].

Al-Otaibi et al. presented a comprehensive examination of job recommendation services. The authors delve into the various stages characterizing the recruitment process within organizations. They expound upon how e-recruitment portals facilitate organizational recruitment processes, outline factors that influence candidate selection, and provide insights into relevant aspects of the recruitment process [12]. Resume screening is a crucial process in talent acquisition, where organizations receive a large volume of job applications and need to efficiently identify the most suitable candidates for a given job opening. Traditional manual screening methods are time-consuming and subject to human bias. To address these challenges, there has been growing interest in lever aging Natural Language Processing (NLP) and Long Short Term Memory (LSTM) networks for automating the resume screening process. This literature survey provides an overview of existing research in this area [13].

Several studies have proposed the integration of NLP and LSTM to enhance the accuracy and efficiency of resume screening. By using NLP for text preprocessing, including entity recognition and keyword extraction, and then employing LSTM for the actual classification task, these models have achieved significant improvements in matching resumes to job requirements [13]. NLP-based resume screening methods address various challenges. They can handle resumes in different formats, including PDF and Word documents, by converting text into a structured format. Additionally, NLP enables the identification of relevant keywords and phrases within resumes to ensure a better match between job descriptions and applicants [14]. One of the primary benefits of using NLP in resume screening is enhanced efficiency. Automation reduces the time and effort required for reviewing resumes. NLP-based systems can process a large volume of applications quickly, allowing recruiters to focus on the most promising candidates [15].

Attention-based deep learning models have emerged as powerful tools for keyword extraction. These models, such as BERT, are pre-trained on vast text corpora and possess a strong contextual understanding of language. This contextual understanding enables them to capture nuances and context-specific keywords from job descriptions [25].

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BERT has been a game changer in the field of Natural Language Processing (NLP). Its pre-trained contextual embeddings have shown remarkable performance in various NLP tasks, including keyword extraction. Researchers have adopted BERT as a foundation for developing attention-based models for job description analysis [19].

The recruitment process plays a pivotal role in the success of organizations. To ensure the selection of the best-fit candidates, an intelligent decision support system for recruitment has become indispensable. This system encompasses two essential components: resume screening and applicants ranking. Recent advancements in artificial intelligence (AI) and machine learning have led to innovative approaches in this domain. Resume screening is the initial step in the recruitment process, where organizations evaluate numerous resumes to identify potential candidates. Traditional methods, often manual, are time-consuming and can be prone to human bias. The advent of AI and machine learning has revolutionized this process [20] [21]. Stacked models refer to a machine learning approach that combines the predictions of multiple models to improve overall performance. In the context of resume screening and ranking, stacked models can offer a sophisticated solution to enhance decision-making. Ensemble learning is a fundamental concept in the application of stacked models. It involves combining the outputs of multiple base models to produce a final prediction. In the context of resume analysis, ensemble learning can enhance the accuracy and reliability of resume screening and ranking [17].

Software engineering resumes often contain extensive technical information and require a nuanced screening process. The use of advanced technologies and techniques aids in automating this screening, resulting in more efficient and effective talent acquisition. NLP plays a pivotal role in the screening process. NLP models are designed to parse and analyze the content of software engineering resumes.

They extract information about skills, qualifications, and work experience, enabling automatic screening. Word matching involves comparing the content of resumes to predefined lists of keywords, phrases, or terms relevant to software engineering positions. This technique aids in identifying candidates who possess the specific skills and qualifications required for the role.

Character positioning, also known as character-level analysis, involves the identification of specific characters or sequences within resumes. This technique is particularly useful for identifying technical certifications, languages, or technologies mentioned within the text. Regex provides a powerful and flexible way to search for and match patterns within textual data. In software engineering resume screening, Regex can be employed to identify patterns related to skills, programming languages, certifications, and other qualifications [15].

ATS systems are widely used to manage and categorize job applications. They help recruiters sort and filter through a large volume of resumes. While efficient, ATS systems often rely on keyword matching and may not provide a comprehensive analysis of candidate suitability. ”ATS BREAKER” is introduced as a system designed to enhance the capabilities of existing ATS solutions. It goes beyond keyword matching and offers a more nuanced and holistic approach to comparing candidate resumes with specific company requirements. ATS BREAKER employs an advanced comparison mechanism that takes into account not only keywords but also the contextual relevance of the information provided in candidate resumes. This approach aims to reduce false positives and false negatives in the candidate selection process. ATS BREAKER leverages machine learning algorithms for more accurate resume analysis. Machine learning models can be trained to identify the most suitable candidates based on a wider range of criteria, including skills, qualifications, and experience [24].

III. METHODOLOGY

The development of a portal to compile interview experiences of college students and offer personalized company recommendations based on their resumes requires a systematic approach. The following methodology outlines the steps involved in creating this portal:-

A. Needs Assessment

1) Conduct surveys, interviews, or focus groups with college students to understand their career development needs, job search challenges, and preferences.

2) Identify the coding platforms most popular among the student community [1].

B. Content Aggregation

1) Collect and curate a rich database of interview experiences from students, alumni, and professionals in various industries.

2) Ensure the interview experiences span a wide range of companies and job positions [22].

C. Resume Analysis Engine

1) Develop a robust resume analysis engine that extracts key information from resumes, such as skills, qualifications, and experiences [3].

2) Utilize Natural Language Processing (NLP) techniques and named entity recognition (NER) for efficient parsing and indexing.

D. Coding Profile Scraping

1) Implement web scraping tools to extract coding profiles and rankings from popular coding platforms like Codeforces, Codechef, Leetcode, etc [18].

2) Ensure compliance with the terms of use and ethical web scraping practices.

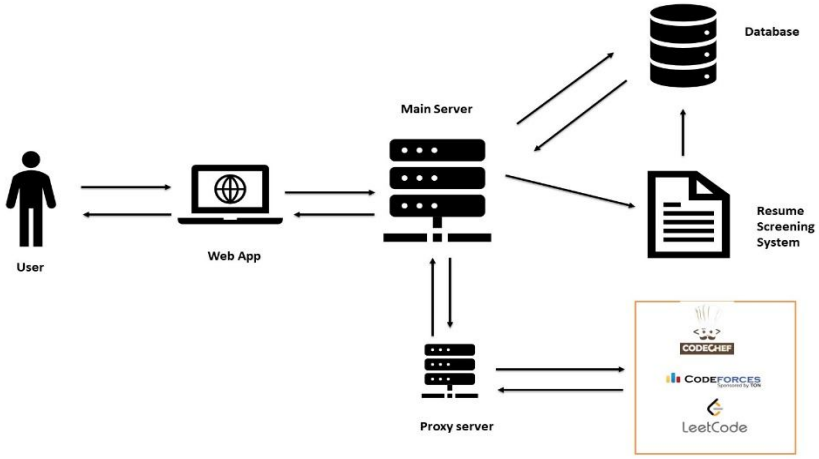


Fig. 1. Architectural Diagram

E. Data Preprocessing

1) Clean and preprocess both the interview experiences and coding profiles data to eliminate noise, standardize formats, and remove irrelevant information.

2) Maintain data integrity and security throughout the process [21].

F. Recommendation System

1) Implement a recommendation system that suggests companies to students based on the analysis of their resumes. •

2) Utilize machine learning algorithms to match resume attributes with job requirements and company profiles [14] [15].

G. User Profiles

1) Enable users to create and manage profiles, including their resumes, coding profiles, and personal information.

2) Implement a secure and user-friendly profile management system [8].

H. User Interface Design

1) Create an intuitive and user-friendly web interface for students, alumni, and recruiters.

2) Ensure that the portal is accessible and responsive on various devices.

I. Security and Privacy

1) Implement robust security measures to protect user data and ensure data privacy.

2) Comply with relevant data protection regulations.

J. Testing and Validation

1) Conduct rigorous testing to identify and rectify any technical glitches or usability issues.

2) Validate the recommendation system's accuracy and effectiveness by comparing its suggestions with user feedback [16].

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K. User Feedback Collection

1) Collect feedback from users regarding the portal's usability, features, and content.
2) Use user feedback to make iterative improvements to the portal.

L. Launch and Promotion

1) Launch the portal within the college community, and promote it through various channels, including social media, college websites, and information sessions.
2) Encourage students and alumni to contribute interview experiences to enrich the portal's content.

M. Continuous Improvement

1) Monitor portal usage and user engagement over time.
2) Continuously update and expand the portal's content, interview experiences, and company database [23].

N. User Support and Training

1) Provide user support and training resources to help students make the most of the portal's features.
2) Address user queries and concerns promptly.

O. Data Analytics

1) Implement data analytics to gather insights into user behavior, popular job sectors, and the effectiveness of company recommendations.
2) Use these insights to further refine the recommendation system.

P. Feedback Loop

1) Maintain an open feedback loop with users, regularly soliciting input and suggestions for portal improvements.
2) Incorporate user feedback to ensure the portal remains relevant and valuable [24].

Here is a table listing the various technologies and tools employed in the development of an experience-sharing platform:-

Development Area	Technologies and Tools
Front-End Technologies	HTML/CSS, JavaScript, React, Angular, Vue.js, UI/UX Design Tools
Back-End Technologies	Server-Side Languages (Python, Ruby, Node.js, Java), Databases (MySQL, PostgreSQL, MongoDB), API Development, Authentication Libraries,
Database and Data Storage	Relational Databases (MySQL, PostgreSQL), NoSQL Databases (MongoDB, Cassandra), Object-Relational Mapping (ORM)
Content Management	File Storage (Amazon S3, Google Cloud Storage), Content Delivery Networks (CDN)
User Authentication and Authorization	JSON Web Tokens (JWT), OAuth, Role-Based Access Control (RBAC)
Search and Recommendation	Elasticsearch, Recommendation Algorithms
DevOps and Deployment	Version Control (Git), CI/CD (Jenkins, Travis CI, CircleCI), Containerization (Docker), Orchestration (Kubernetes), Cloud Services (AWS, Google Cloud, Azure), Web Servers (Nginx, Apache)
Security	HTTPS (SSL/TLS), XSS and CSRF Prevention, Firewalls and WAF
Monitoring and Analytics	Logging and Monitoring (ELK Stack), Analytics Services (Google Analytics, Mixpanel)
Mobile App Development (if required)	React Native, iOS and Android SDKs

Fig. 2. Key Development Tools and Technologies

This table provides a structured overview of the technologies and tools used in different aspects of the platform's development. We can use this as a reference to plan your project's technology stack.

The methodology outlined above provides a structured approach to developing a comprehensive portal that not only compiles interview experiences but also offers tailored company recommendations to college students based on their resumes. It aims to enhance the career development process, helping students make informed career decisions and streamline their job search.

IV. CONCLUSION

In the dynamic landscape of higher education and career development, the creation of a portal that seamlessly integrates interview experiences and personalized company recommendations marks a significant milestone in the journey of our college community. This multifaceted portal serves as a beacon of support and guidance, empowering our students as they navigate the challenging transition from the halls of academia to the corridors of the professional world.

The repository of interview experiences, generously shared by our students, alumni, and industry professionals, offers a treasure trove of insights into the intricacies of real-world interviews. These firsthand accounts provide an authentic window into the interview processes, corporate cultures, and expectations spanning a myriad of industries and companies. They act as a bridge, connecting classroom knowledge with practical know-how, enabling our students to approach interviews with a newfound sense of confidence and preparedness.

Beyond this, the portal's innovative recommendation system adds a layer of sophistication, using resume analysis and machine learning to match individual student profiles with the requirements and cultures of prospective employers. This personalized approach simplifies the job search process and encourages our students to explore a wide spectrum of career opportunities that align with their qualifications and aspirations.

In essence, this portal embodies our commitment to the holistic development of our students. It provides them with a toolkit to make informed career decisions, enhance their job application strategies, and ultimately embark on successful and fulfilling career paths. It is a testament to our dedication to their professional growth and a manifestation of our belief that their journey should be marked not only by academic excellence but by a seamless transition into the professional world.

In conclusion, this portal stands as a guiding light, helping our students make the leap from academia to the professional realm with confidence and clarity. It underscores the fusion of technology, shared experiences, and a supportive community. With this portal at their disposal, our students are better equipped to face the opportunities and challenges that await them in the world of work, and we look forward to celebrating their future successes and contributions to their chosen fields.

V. ACKNOWLEDGEMENT

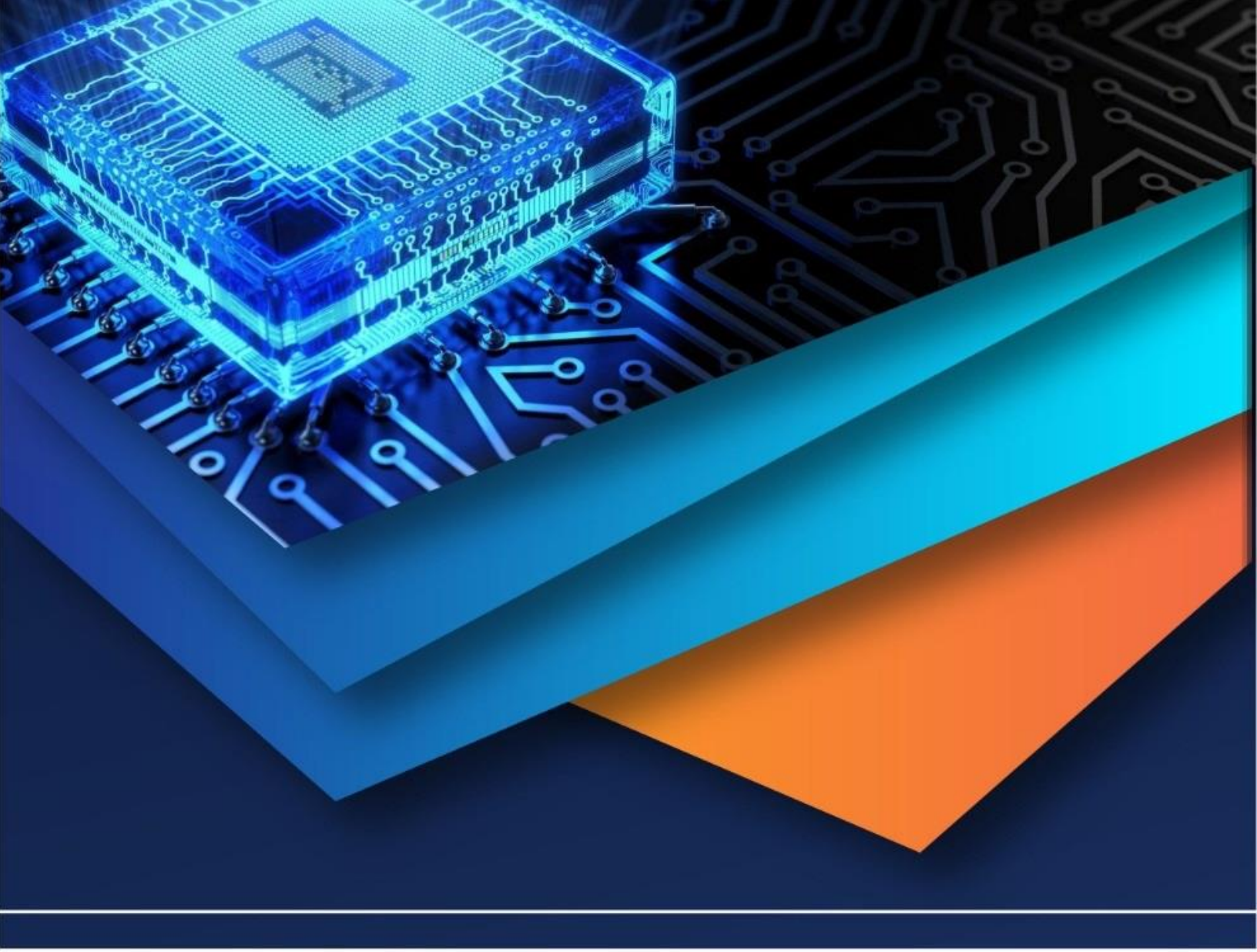
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