

Proposal (Resume Analyser)

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Problem Statement:

Due to the presence of vast numbers of opportunities across a multitude of domains throughout the globe, students as well as people working in any industry often have trouble finding job openings in today's date. Solving this problem is of much importance today's date. When the right people are given the right opportunities that match their skillset, not only does the individual benefit through better work-life balance and better pay, but the country is also at a huge advantage since this makes the workforce much more efficient and also leads to a decrease in the countries' unemployment rate which eventually leads to the country's growth which creates even more opportunities for the population and the cycle goes on. Through our project, we aim to retrieve suitable job openings for the user and then assist them in modifying their resume to maximize chances of being shortlisted. Relevance ranking scores will be used to provide suggestions and recommendations so that users have flexibility in selecting the opportunities.

Literature Review:

In recent years, advancements in technology have led to significant developments in the field of job recruitment and matching, particularly with the rise of online platforms. This has prompted researchers to explore various methods to automate and optimize the hiring process, aiming to enhance efficiency and effectiveness while reducing manual labor. A review of recent literature reveals several approaches and methodologies proposed by researchers to address the challenges associated with job-resume matching and candidate recommendation systems.

"A Two-Step Resume Information Extraction Algorithm" by Jie Chen, Chunxia Zhang, and Zhendong Niu presents an innovative approach to resume data mining for internet-based recruiting platforms. The algorithm combines text block classification and Writing Style analysis to efficiently extract relevant information.

One approach involves leveraging machine learning algorithms for resume parsing and candidate ranking. Bhatia et al. (2019) present an end-to-end system utilizing BERT sentence pair classification for resume parsing and ranking candidates based on job descriptions. Their system extracts complete information from candidate resumes and uses BERT to assess suitability for job positions, achieving accurate assessments of candidate compatibility.

Another avenue of research focuses on machine learned resume-job matching solutions. Lin et al. (2016) propose a solution comprising configurable modules for unsupervised feature extraction, base classifiers training, and ensemble method learning. By incorporating both shallow and deep estimators such as Random Forest and LSTM, they achieve effective resume-job matching by considering semantic similarities and clustering features.

Pal et al. (2022) explore the classification of resumes using various machine learning algorithms, including Naive Bayes, SVM, and Random Forest. Their study involves data gathering from multiple websites, data cleanup, TF-IDF vectorization, and applying classification algorithms to the dataset. The authors emphasize the importance of preprocessing and model evaluation in achieving accurate resume classification for job matching purposes.

Yi et al. (2016) propose a job recommendation method optimized by incorporating position descriptions and resume information. By modeling preferences through memory profiling and utilizing deep neural networks, they aim to improve job-resume matching accuracy. Their method leverages previous interview

histories to learn preferences of both recruiters and job-seekers, enhancing the relevance of job recommendations.

Lastly, Yan et al. (2019) introduce a method to improve job-resume matching through profiling memories. By leveraging deep neural networks with preference profiles learned from interview histories, they aim to enhance the relevance and effectiveness of job recommendations. Their approach incorporates previous interview histories to learn preferences of both recruiters and job-seekers, offering a novel insight into job-resume matching. Overall, the reviewed literature demonstrates the importance of leveraging advanced technologies such as machine learning and deep neural networks to enhance job recruitment processes. By combining techniques such as resume parsing, classification, recommendation systems, and memory profiling, researchers aim to achieve more accurate and efficient job-resume matching, ultimately benefiting both recruiters and job-seekers in the increasingly competitive job market.

Novelty:

There's a website called jobscan.co which optimizes resumes based on job descriptions provided by the user. It provides limited flexibility and the website in itself is quite buggy. It doesn't provide optimization based on Indian context and lacks the functionality to suggest job openings. Similarly there are a lot of softwares/websites providing optimization services but few provide suggestions for job openings. These websites are usually overpriced and there's zero to none for the Indian job market. Our solution is novel in a sense that it can provide job opening information by considering multiple platforms rather than a single one. It will be able to suggest people jobs on the basis of their resume's content and strength.

Techniques and algorithms to be used:

There are publicly available datasets that are resume based online on various data sharing platforms like Kaggle. These datasets can be used to fine tune as well as build custom language/classification models that can read textual content and classify it into different job categories. We can also go about fine tuning other strong classification models which are open source and available on hugging face. After the model is prepared, we will create a user-friendly web interface incorporating our model. This interface will take the user's resume as input and provide a list of job openings that match the requirements. We either use apis or data scraping techniques to retrieve information from job posting websites.

Evaluation:

We will evaluate the classification result from our NLP model by testing it with multiple online datasets. Currently we have identified two datasets. If it is performing well on these testing sets we will go ahead and integrate it with a user-friendly web interface. We will test the usability of the web interface by letting fellow classmates and TAs play around with our solution and will ask them to rate the application.

Contributions:

We will be trying to finetune existing textual classification models as well as come up with our own for job classification tasks. We will also be integrating multiple platforms in our custom web application. We will also establish robust evaluation frameworks to assess the performance of our NLP model and usability of the web interface. We will also be open to open source our codebase and project once completed. If this project's usability is proven and tested to work well, we might as well deploy it to the web for people to use.

References:

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