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Ai-based Resume screening & analysis

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Abstract:

In today's world of fast-paced employment trends and technology developments, the Resume Analyzer App has become an indispensable resource for connecting companies with qualified candidates. Utilizing cutting-edge Natural Language Processing (NLP) methods, such as SpaCy and BERT embeddings, this program compares resumes to job postings. It helps applicants improve their resumes by giving them practical data like match percentages, skill comparisons, and missing skills. In addition to improving congruence between applicant profiles and organizational goals, the program improves the recruiting process, minimizing biases and inefficiencies.

The massive number of applications received for each job opening is a major obstacle in contemporary recruiting, as it makes human review tedious and error-prone. To solve this problem, we developed the Resume Analyzer, which automates the first screening and uses defined, objective measures to evaluate candidates. Not only does this automation help recruiters save time, but it also increases the likelihood of finding undiscovered talent. The system understands the context and semantics of job descriptions and resumes thanks to its dependence on BERT embeddings. This technique guarantees that even resumes with various formatting or language are effectively assessed, leading to more reliable skill evaluations and match scores, in contrast to standard keyword-based systems. The software provides a detailed assessment that is in line with recruiter expectations since it picks up on linguistic nuances.

Candidates are given explicit feedback on how their resumes match with particular job criteria with the addition of a skills comparison function. In addition to assisting with application refinement, this actionable knowledge boosts self-confidence by showcasing the applicant's abilities. It makes it easier for hiring managers to find people whose skill sets are a good fit for their open positions. Everyone from seasoned pros to recent college grads just starting out in the field will be able to utilize the app thanks to its intuitive design. It reduces the barrier for those unfamiliar with technical jargon or recruiting procedures by breaking down complicated statistics into understandable representations and practical advice. A more efficient, transparent, and egalitarian recruiting environment might be the result of using the Resume Analyzer Application, which could ultimately lead to a dramatic shift in hiring procedures. By improving communication, decreasing prejudices, and bringing the supply and demand sides of the labor market closer together, it is beneficial for all parties involved. In the future, thanks to this innovation, applicants and employers will have an easier time accomplishing their objectives.

Introduction

Resumes must be carefully matched with job descriptions in order to stand out in today's competitive employment market. A lot of people lose out on great possibilities because they can't tell how well their resumes meet the needs of certain jobs. This problem is solved by the Resume Analyzer Application, which uses state-of-the-art Natural Language Processing (NLP) methods to streamline and improve the resume review process. This software helps users improve their resumes by giving them an easy-to-understand, data-driven analysis. Due to the little amount of time recruiters spend evaluating resumes before making a shortlist, resume alignment is crucial. This emphasises the need of having a tool that does more than just assess resume relevancy; it must also provide insights that may be put into action. In order to help applicants improve their profiles to match company expectations, the Resume Analyzer is available to bridge this gap.

In addition, the program incorporates cutting-edge technologies like as BERT and SpaCy to provide accurate and dependable results. It delivers a

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professional-grade analysis in a fraction of the time it would take by automating the comparative process. Jobseekers from all walks of life and all sectors of the economy now have equal access to cutting-edge resume improvement tools.

This page provides an overview of the Resume Analyzer Application's main features, as well as its methodology and aims. Further exploration of the problems it seeks to solve and the novel approaches it proposes is also provided. This introduction provides readers with a thorough grasp of the application's importance and possible effects.

Literature Survey

Resume Screening Using Machine Learning and NLP

Using student resumes as input, the proposed algorithm determines which jobs are a suitable match and where the students might make improvements. The machine learning process takes the resume and, if desired, additional information from LinkedIn and GitHub as inputs. Job role forecasting makes use of one of two methods—Support Vector Machine or K-Nearest Neighbor—and is built into the architecture of a SQL database, which stores structured data. Recommendation systems enhance resumes based on desired roles and existing experience using cosine similarity. skills and experience. The data used to train the models is sourced from Kaggle.

Resume Screening Classification using Artificial Intelligence and Natural Language Processing

The Prospect model, an automated approach for screening resumes that relies on machine learning. This model surpasses conventional convolutional neural network models by 19.5% with an astounding accuracy of 93.5%. There are two parts to the procedure. The first is pre-processing, which involves extracting features from a one-of-a-kind dataset called the Prospect dataset. This dataset contains around 5,000 resumes. The implementation of this system guarantees that resumes are impartially categorized as "selected" or "rejected" using a complex matching score algorithm and bespoke logic. An encouraging step toward making the resume screening process more efficient and equitable is the use of AI and machine learning methods into this approach.

A Machine Learning approach for automation of Resume Recommendation System

This research compares and contrasts four ML models that use resume classification to provide improvements and job position suggestions. The following are the models and their accuracies: Linear Support Vector Machine Classifier (78.53 percent), Logistic Regression (62.40%), Multinomial Naive Bayes (44.39%), and Random Forest (38.99%). In comparison to other classifiers, the SVM performs better when it comes to resume categorization and job recommendation tasks.

METHODOLOGY

A multi-stage methodology integrating state-of-the-art technology and principles of user-centric design was employed in the development of the Resume Analyzer Application. Gathering text inputs such as resumes and job descriptions is the first step in the data collecting process. In order to make these texts compatible with natural language processing models, they go through a preprocessing step that involves cleaning, tokenizing, and formatting. Contextualized text representations provided by BERT embeddings provide the basis of the core analysis. These embeddings are used to compute similarity scores between the resume and jobdescription. By utilizing a predefined dictionary of skills and case-insensitive matching techniques, SpaCy's natural language processing capabilities are also put to use for skill extraction.

The app is constructed using Flask, a lightweight web framework, to guarantee scalability and resilience. This makes it possible to combine a user-friendly front end with powerful back-end processing. To safeguard user information and keep applications running smoothly, security procedures like file validation and size limits are put in place.

The last thing to do is to provide a clear and practical presentation of the analysis's findings. In addition to the extracted CV content, users also get a match percentage and a list of matched and missing abilities. Users may utilize these information to improve their job application methods and resumes.

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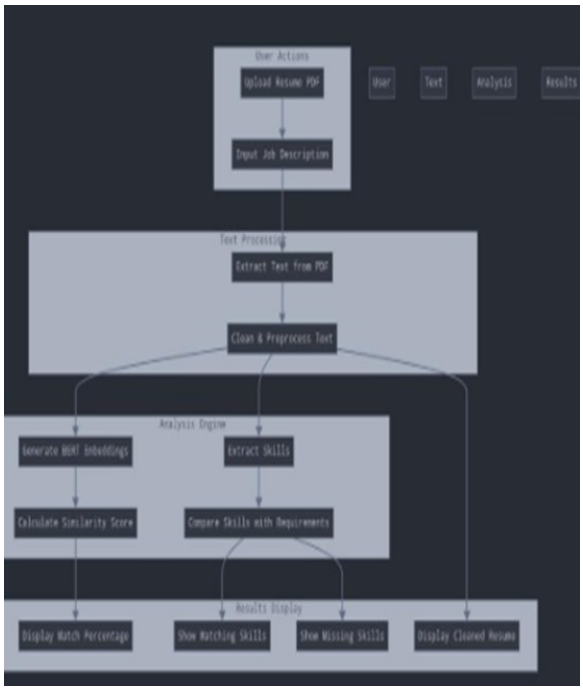

Proposed diagram

Modules

Model Selection

Semantic similarity scoring in the Resume Analyzer is achieved via the use of BERT (Bidirectional Encoder Representations from Transformers) embeddings. Ideal for comparing job descriptions and resumes, BERT can grasp the contextual meaning of words and phrases. Utilizing SpaCy's Named Entity Recognition (NER) capabilities, essential credentials and skills are located within the text for the purpose of skill extraction.
To enhance the study with additional insights based on conventional keywords, other models like TF-IDF (TermFrequency-Inverse Document Frequency) may be used. Nevertheless, BERT embeddings continue to be the principal method for capturing the complex connections between job descriptions and resumes.

Training the Model

During training, the pre-trained BERT model is adjusted using domain-specific data, including annotated job descriptions and resumes. This checks if the model is familiar with the specific words and phrases used in the hiring process. To make BERT work in the recruiting area, we use transfer learning and other techniques that don't need large labelled datasets.

Evaluation Metrics

Several criteria are used to assess the models' performance, including F1 score, recall, accuracy, and precision. Resume and job description BERT embeddings are cosine-similarity-computed for similarity scoring. We compare skill extraction results to ground truth datasets that have been hand-curated in order to determine their quality.

Model Inter pretability

To ensure transparency, techniques like SHAP (SHapley Additive exPlanations) can be used to explain the model's predictions. Recruiters and applicants benefit from this since it explains why certain resumes scored better than others and where they might make improvements.

Iterative Refinement

Based on the input from the early assessments, the models are improved repeatedly. Inability to generalize across varied jobros and overfitting are two common difficulties. dealt with by tweaking the parameters and adding more data augmentation methods.

Deployment Readiness

To make sure the models are reliable and resilient, they are tested using unknown test datasets. To find out whether it's ready for deployment, performance standards are established. At the end of the assessment process, you will get confirmation if the models are accurate and scalable enough.

Making the Resume Analyzer Application available to end-users is the emphasis of the deployment phase. This entails making sure the application is user-friendly, secure, and scalable, and incorporating the learned models into it.

Backend Integration

Frameworks such as Flask or FastAPI are used to construct the application's backend, which incorporates the NLP models. Requests like resume uploads, job description input, and analysis result returns are handled by the backend. The goal of creating APIs is to make it easier for front-end and back-end systems to communicate with one another.

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ALGORITHM

Evaluation, similarity scoring, skill extraction, and actionable feedback production are all functions of the Resume Analyzer Application, which utilizes a number of sophisticated algorithms. A comprehensive breakdown of the system's primary algorithms.

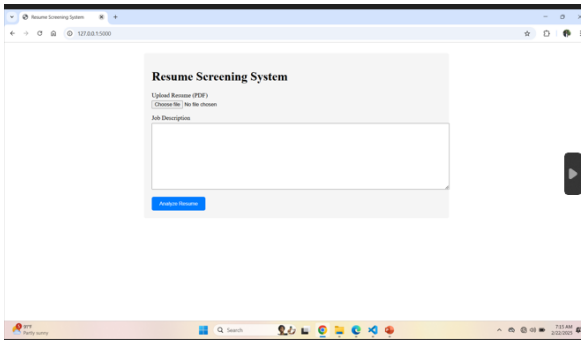
BERT

A deep learning algorithm built on transformer architecture, BERT was developed by Google. It understands the context of a word based on both the words that come before and after it in a phrase, meaning that it can read text in both directions.

Semantic similarity between job descriptions and resumes is computed using BERT embeddings. The subtleties of language, such context and synonyms, are captured by BERT by transforming text into high-dimensional vectors. For instance, it deduces that "projectmanagement" and "managing projects" in a résumé are synonymous.

BERT is great for assessing resumes with different structures and terminology since, unlike conventional keyword-based matching, it guarantees strong analysis even when the resume contains various wording.

RESULTS



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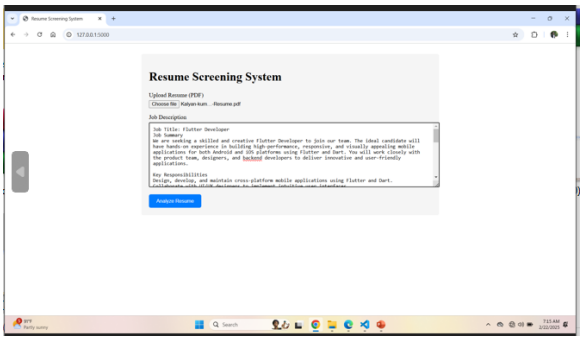

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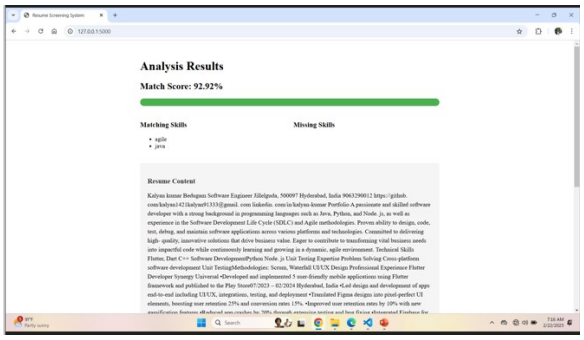

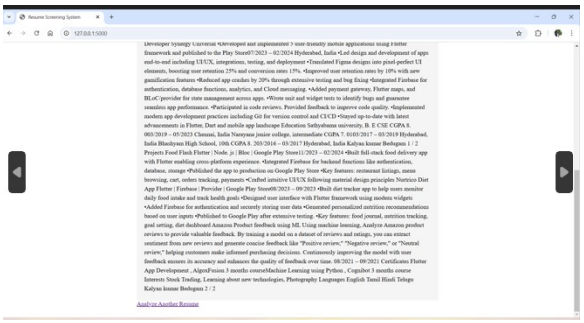

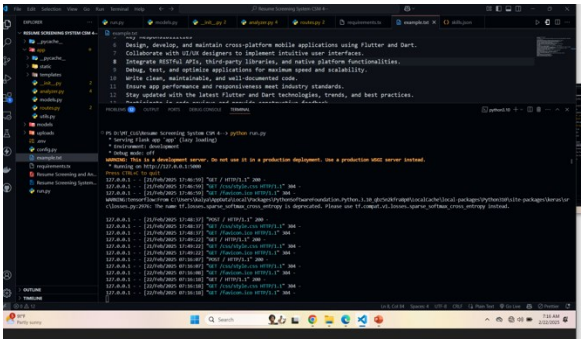

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Conclusion

Reviewing the Process of Resume Screening and Shortlisting in This Paper: The primary goal of developing AI resume analyzers was to make the screening and shortlisting process easier for human resources experts. Resumes that align with the employment criteria in terms of keywords, abilities, and qualities Because of their scalability, AI resume analyzers can process a huge number of applications, making them a good fit for businesses of all sizes.

Future Scope

Add additional domains to the skill database. Secondly, use optical character recognition to resumes that use images. Bring support for several languages for worldwide use.

REFERENCES