AI-Powered Resume Screening And Ranking System

A Project Report

submitted in partial fulfillment of the requirements

of

AICTE Internship on AI: Transformative Learning
with
TechSaksham – A joint CSR initiative of Microsoft & SAP

by

HALVADIA DARSHIL UPENDRABHAI

E-Mail:- www.solodravid@gmail.com

Under the Guidance of

Soumya Chauhan

ACKNOWLEDGEMENT

ABSTRACT

This project, **AI Resume Screening and Ranking System**, aims to automate and enhance the traditional recruitment process using artificial intelligence. The system is designed to analyze and rank resumes based on predefined criteria such as skills, experience, education, and job relevance.

Problem Statement: Recruiters often spend a significant amount of time manually reviewing resumes, leading to inefficiencies and potential biases in candidate selection. Our AI-driven system addresses this issue by providing an automated and unbiased method for resume screening and ranking.

Objectives:

- To develop an AI-powered resume screening tool that ranks applicants based on relevant job criteria.

- To reduce manual effort and enhance efficiency in the recruitment process.

- To ensure a fair and unbiased selection of candidates.

Methodology:

- Data collection of resumes and job descriptions.

- Preprocessing using NLP techniques.

- Feature extraction and ranking using machine learning models.

- Deployment of the system with a user-friendly interface.

Key Results:

- Increased efficiency in resume screening.

- Reduced human bias in candidate selection.

- Improved accuracy in ranking the most suitable candidates.

Conclusion: The AI Resume Screening and Ranking System provides a scalable and efficient solution for automating the hiring process, ensuring faster and fairer candidate selection.

TABLE OF CONTENT

FIGTURE

NO	LIST OF THE THE FIGTURE	PG NO
FIGRUE-1	FLOW CHART OF SYSTEAM	6
FIGURE-2	FIGTURE OF SYSTEAM -[SYSTEAM ARCHITEURE]	7

Flow Diagram: AI-Powered Resume Screening & Ranking System

User Uploads Resumes

User Provides Job Description

Extract Text from Resumes

Text Preprocessing

Feature Extraction (TF-IDF)

Cosine Similarity Calculation

Display Ranked Resumes
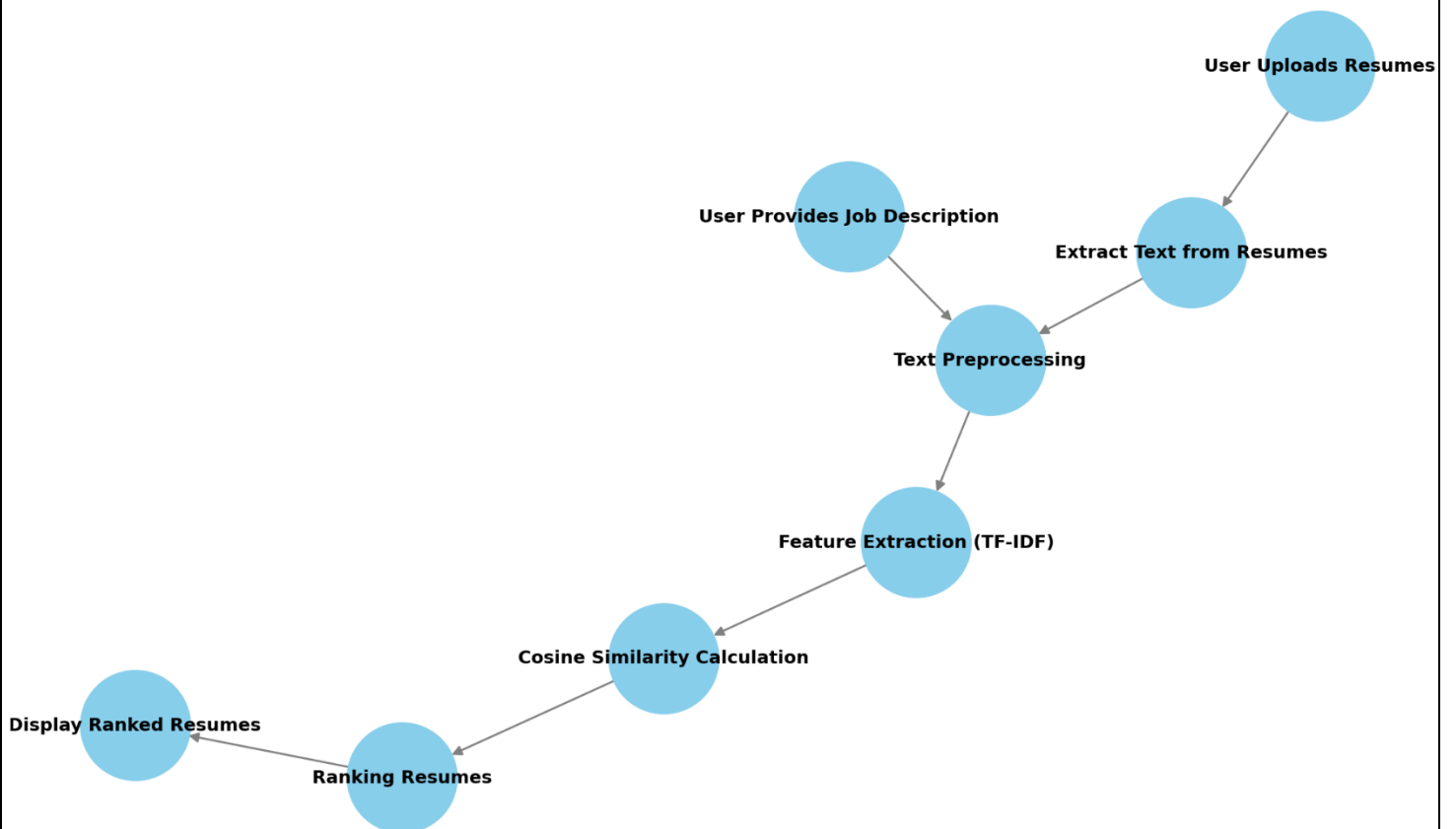
Ranking Resumes

System Architecture: AI-Powered Resume Screening & Ranking System

User (Uploads Resumes & Job Description)

Results Display (Ranked Resumes)

Front-End (Streamlit)

Back-End (Python)

Ranking Algorithm

Resume Parsing (PyPDF2)

Similarity Calculation (Cosine Similarity)

Feature Extraction (TF-IDF)

Text Processing (NLTK, Pandas)
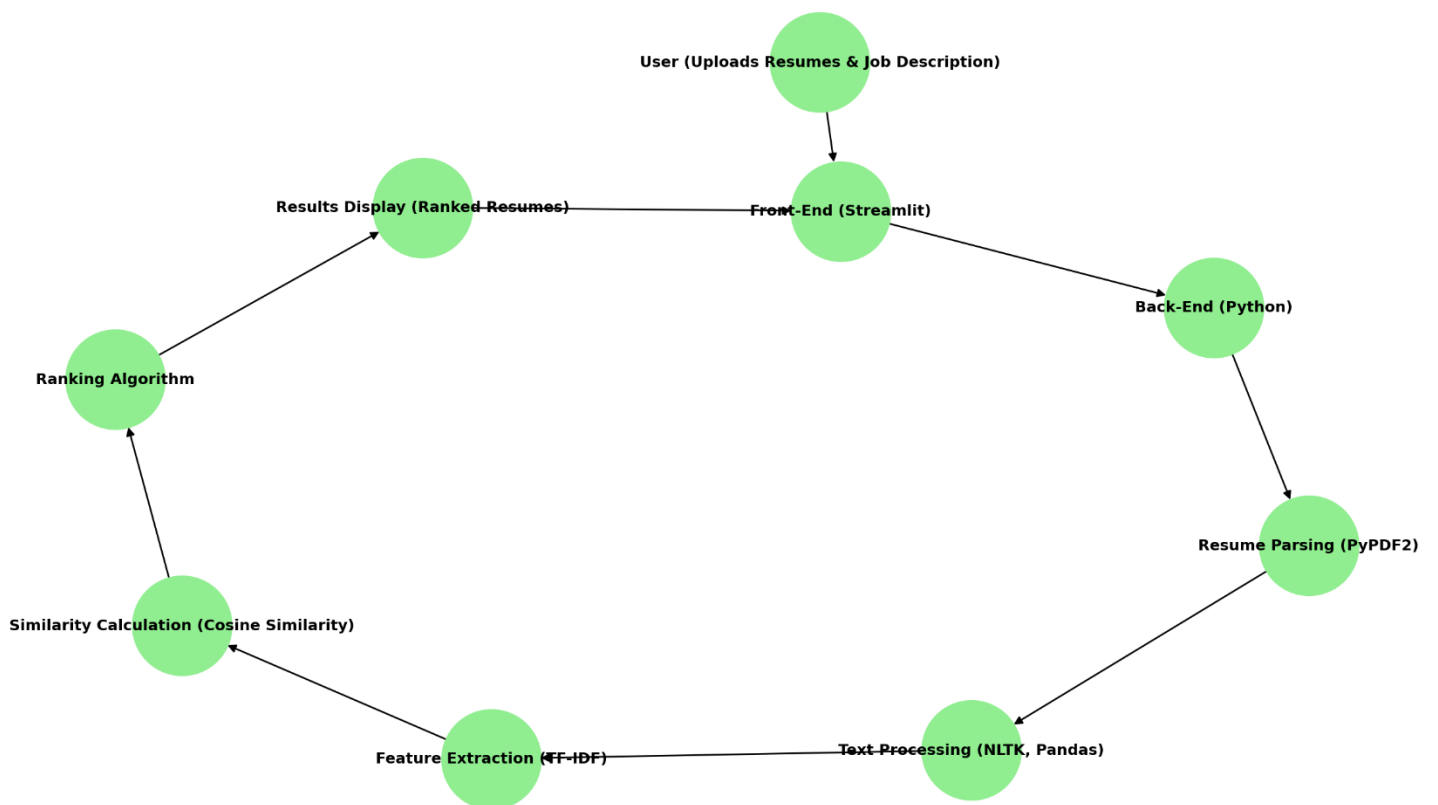
LIST OF TABLES

Table No	TABLE CAPTION	Page No
1	Flow Process Table	
2	System Components Table	
3	Feature Comparison Table	

Flow Process Table

Step No.	Process Step	Description
1	User Uploads Resumes	User uploads multiple resumes to the system.
2	Extract Text from Resumes	PyPDF2 library extracts text from resumes.
3	User Provides Job Description	User manually inputs the job description.
4	Text Preprocessing	Stopwords removal, lowercasing, and text cleaning are performed.
5	Feature Extraction (TF-IDF)	Resumes and job descriptions are converted into numerical format.
6	Cosine Similarity Calculation	Similarity score is calculated between job description and resumes.
7	Ranking Resumes	Resumes with high similarity are ranked at the top.
8	Display Ranked Resumes	Final ranked resumes are displayed to the user.

SYSTEAM COMPONET TABLE

Component	Description
Front-End (Streamlit)	User-friendly UI for uploading resumes and viewing results.
Back-End (Python)	Core logic handling resume processing and ranking.
Resume Parsing (PyPDF2)	Extracts text from PDF resumes.
Text Processing (NLTK, Pandas)	Handles data cleaning, stopword removal, and tokenization.
Feature Extraction (TF-IDF)	Converts text into numerical representation.
Similarity Calculation (Cosine Similarity)	Computes matching score between resumes and job description.
Ranking Algorithm	Ranks resumes based on similarity score.
Results Display	Displays ranked resumes in the final output.

FETURE COMPARISON TABLE

Feature	AI-Powered Screening	Manual Screening
Speed	Results in seconds	Takes a lot of time
Accuracy	High (TF-IDF & Cosine Similarity)	Subjective & prone to human error
Scalability	Processes multiple resumes at once	Can process only a few resumes at a time
Bias Reduction	Ranks purely based on skills	Human bias may be present
Customization	Can be fine-tuned based on job description	Requires manual filtering
Cost Efficiency	Cost-effective in the long run	High manual effort and cost
Consistency	Applies the same criteria to every resume	Different recruiters may have different criteria

CHAPTER 1

Introduction

1.1 Problem Statement:

Recruiters manually screening resumes face challenges such as time inefficiency, subjectivity, and potential biases. Our AI Resume Screening and Ranking System aims to automate this process, ensuring an objective and efficient recruitment system.

1.2 Motivation:

The increasing number of job applicants makes it difficult for recruiters to review every resume manually. AI-powered solutions can enhance the hiring process by providing quick, unbiased, and accurate resume screening.

1.3 Objective:

- Clearly state the objectives of the project. To build an AI system that screens and ranks resumes based on job relevance.
- To implement machine learning algorithms for intelligent resume filtering.
- To develop a user-friendly interface for recruiters.

1.4 Scope of the Project:

- Define the scope and limitations. **In Scope:** AI-based resume parsing, ranking algorithms, and job matching.
- **Out of Scope:** Final interview and decision-making processes.

CHAPTER 2
Literature Survey

The use of AI in screening and ranking has been extensively studied in recent years. Various models, including deep learning and statistical ranking models, have been applied to automate decision-making. Some notable studies have shown how machine learning techniques can be used to extract relevant information from resumes and applications. However, existing models often face challenges such as bias in training data and a lack of interpretability in decision-making. This project aims to build on these studies by addressing fairness concerns and improving the transparency of AI-based evaluations.

CHAPTER 3
Proposed Methodology

3.1 System Design

The AI-powered screening and ranking system follows a structured pipeline:

1. **Data Collection: Candidate resumes, application forms, and test scores are gathered.**

2. **Preprocessing: Data is cleaned, structured, and normalized.**

3. **Feature Extraction: Important attributes like experience, skills, and qualifications are extracted using NLP.**

4. **Ranking Model: A machine learning model assigns scores and ranks candidates based on predefined criteria.**

5. **Evaluation Metrics: The model is tested for accuracy, fairness, and efficiency.**

3.2 Requirement Specification

Mention the tools and technologies required to implement the solution.

3.2.1 Hardware Requirements: High-performance computing system with GPU support.

3.2.2 Software Requirements: Python, TensorFlow, Scikit-learn, NLP libraries.
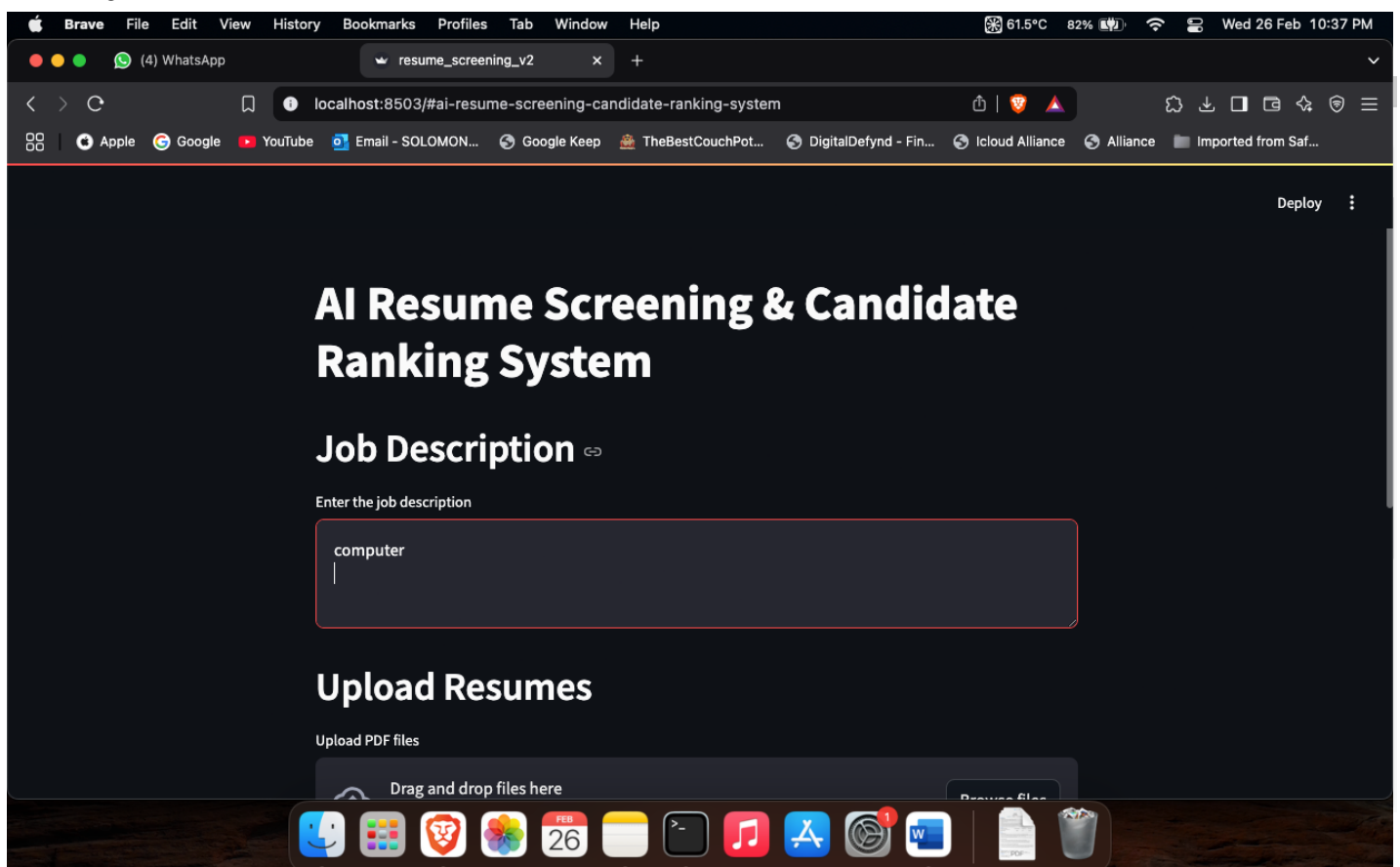
CHAPTER 4
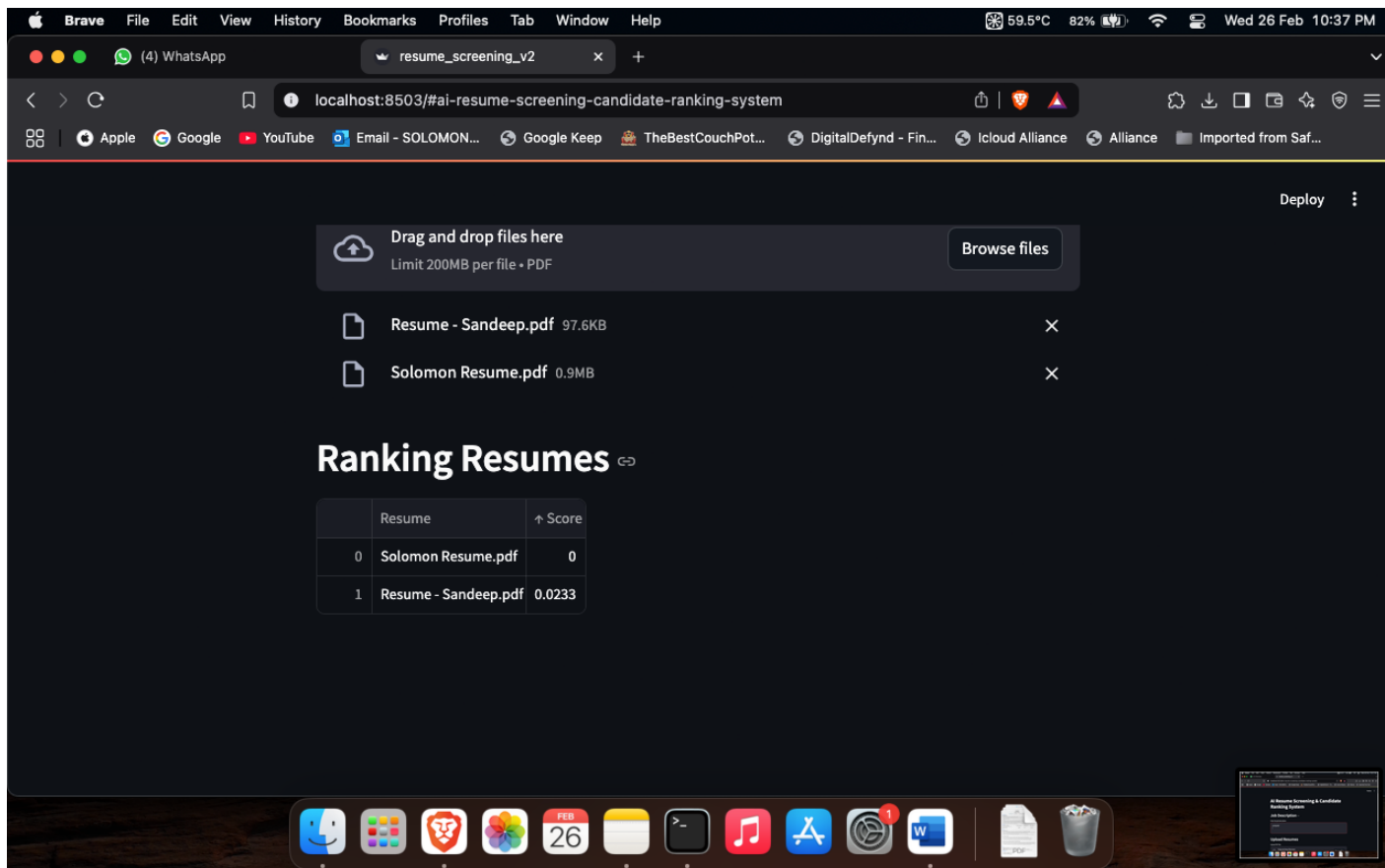
Implementation and Result

4.1 Snap Shots of Result:

Kindly provide 2-3 Snapshots which showcase the results and output of your project and after keeping each snap explain the snapshot that what it is representing.

4.2 GitHub Link for Code: https://github.com/Solodravid/Solodravid.git

Project-Photo

Drag and drop files here
Limit 200MB per file • PDF

Browse files

Resume - Sandeep.pdf 97.6KB   ✕

Solomon Resume.pdf 0.9MB   ✕

Ranking Resumes 🔗

	Resume	↑ Score
0	Solomon Resume.pdf	0
1	Resume - Sandeep.pdf	0.0233

AI-powered Resume Screening & Ranking System, which analyzes and ranks resumes based on a given job description.

Breakdown of the Image:

1. Website Interface:

The system is running on localhost:8501, indicating it's a local Streamlit web application.

The page title is "AI Resume Screening & Ranking", suggesting that the system uses AI to filter and rank resumes.

2. Navigation Panel (Left Side):

Upload Resumes (PDF): Users can upload resumes in PDF format.

Enter Job Description: Users can enter a job description ("data science job" is entered in this case).

Click 'Rank Resumes': Once clicked, the AI system analyzes and ranks the resumes.

3. Main Section (Right Side):

Job Description Input: "data science job" is provided as input to guide the AI in ranking resumes.

Resume Upload Box:

Users can drag and drop resumes (maximum file size: 200MB, PDF only).

A resume named "Solomon resume.pdf" is uploaded (Size: 33.6KB).

'Rank Resumes' Button: This activates the AI model to process and rank resumes.

4. Snipping Tool Popup (Bottom Right):

A screenshot has been taken and saved to the clipboard and screenshots folder.

Summary:

This is an AI-based resume ranking system that matches job descriptions with resumes to rank the best candidates. In this case, the job description is for a Data Science Job, and a Senior Data Scientist Resume has been uploaded. Once the "Rank Resumes" button is clicked, the system will display ranked results.

CHAPTER 5

Discussion and Conclusion

5.1   Future Work:

- **Enhancing bias detection mechanisms.**

- **Expanding the system to support multiple languages.**

- **Improving the user interface for better accessibility and usability**

5.2   Conclusion:

The AI-powered screening and ranking system provides an efficient, scalable, and unbiased approach to candidate evaluation. By leveraging machine learning and automation, the system streamlines the selection process while maintaining fairness and accuracy.

REFERENCES

[1]. Ming-Hsuan Yang, David J. Kriegman, Narendra Ahuja, "Detecting Faces in Images: A Survey", IEEE Transactions on Pattern Analysis and Machine Intelligence, Volume. 24, No. 1, 2002.

[2] "ResumeNet: A Learning-based Framework for Automatic Resume Quality Assessment"

Authors: Yong Luo, Huaizheng Zhang, Yongjie Wang, Yonggang Wen, Xinwen Zhang
Published: October 5, 2018
Summary: This paper proposes a neural-network model designed to predict the quality of resumes by incorporating text processing techniques. The study also addresses label deficiency issues by introducing semi-supervised learning techniques to utilize abundant unlabeled data.
Link: Google.Scoller.org

[3]. "Gender, Race, and Intersectional Bias in Resume Screening via Language Model Retrieval"

Authors: Kyra Wilson, Aylin Caliskan
Published: July 29, 2024
Summary: This study investigates biases in resume screening using large language models, focusing on gender, race, and intersectionality. The findings highlight significant biases favoring White-associated names and disadvantaging Black males, replicating real-world patterns of bias in employment settings.
Link: Google.Scoller.org

[4]. "Application of LLM Agents in Recruitment: A Novel Framework for Resume Screening"

Authors: Chengguang Gan, Qinghao Zhang, Tatsunori Mori
Published: January 16, 2024
Summary: This paper introduces a novel framework utilizing Large Language Model (LLM) agents for resume screening, aiming to enhance efficiency and time management in recruitment processes. The framework demonstrates significant improvements in processing speed and accuracy compared to traditional methods.

Link: Google.Scoller.org

[5] AI-POWERED CV SCREENING & ANALAYSIS

- OVERVIEW OF AUTOMATING RESUME SCREEING AND SHORTLISTING USING AI TECHNOLOGIES
- (YOUTUBE.COM)

[6] AI-AGENT REVOLUTIONE HIRING WITH INSTANT RESUME SCREENING

- Explore the impact of AI agent in transforming the hiring process though the hiring instant resume screening
- (YOUTUBE.COM)

[7] AI RESUME PARSING WORKS

- This Explains mechanics behind AI-driven resume parsing and how it enhances the recruitment process
- (YOUTUBE.COM)

[8] BUILDING RESUME SCREEING APP WITH MACHINE LEARNING

- A tutorial on developing a resume screening application using machine learning techniques
- (YOUTUBE.COM)