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K J Somaiya Institute of Engineering & Information Technology

Department of Artificial Intelligence & Data Science Engineering
Academic Year 2022-23

Title: AI resume analyser

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This is to certify that the project titled **AI Resume Analyser** is completed under supervision of Prof. Pankaj Deshmukh and guidance in partial fulfillment of the requirements of the course Minor Project Based Learning - Mini PR Lab, by the following student:

Shubham Agarwal

The course is a part of semester VI of the Department of Artificial Intelligence and Data Science during the academic year 2022-2023. The said work has been assessed and is found to be satisfactory.

(Internal guide name and sign.) (External Examiner name and sign.)

College seal

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1. Introduction

- It can be difficult for recruiters and hiring managers to sort through the large number of resumes they get for a single job ad in today's competitive employment market. Manually evaluating resumes the old-fashioned way may be time-consuming, biased, and lead to mistakes when choosing candidates. AI resume analyzers are a more effective and impartial approach to review resumes because of advances in machine learning and artificial intelligence.
- AI resume analyzers utilize machine learning and natural language processing (NLP) techniques to extract pertinent information from resumes and score them according to how well they match the job description. When a candidate applies for a job, the system may find skills, experiences, and credentials that fit the specifications of the position and provide them feedback on how to make their resumes stronger.
- Recruiters and hiring managers may focus on other parts of the recruiting process by using AI resume analyzers to save time and effort. Because the method evaluates applications objectively and does not make distinctions based on criteria like gender, race, or age, it can help lessen bias and improve diversity in the selection of candidates.
- In this era of digital transformation, the use of AI resume analyzers is becoming increasingly popular in organizations of all sizes, from small businesses to large corporations.This technology has the potential to revolutionize the recruitment process and make it more efficient, effective, and fair for both employers and job seekers.
- The project uses the Streamlit library, which is a popular Python library for building web applications. With Streamlit, we can create an interactive user interface that allows users to upload their resumes and get a detailed report of their skills, work experience, education, and achievements.

2. Problem statement

Traditional ways of assessing resumes are typically time-consuming and subjective, leading to applicant selection mistakes and prejudice:

- Recruiters and hiring managers may miss qualified candidates or bias against particular groups unknowingly based on variables such as gender, race, or age. This might result in a less diversified and capable staff, affecting the organization's success.
- Additionally, the large number of resumes received in response to a single job advertisement might make it difficult for recruiters and hiring managers to rapidly select the most qualified individuals. This might lead to a lengthy recruitment procedure that frustrates both companies and job seekers.
- The AI resume analyzer can provide recruiters with a list of top candidates that match the job description, making it easier for them to shortlist and evaluate candidates. This system can significantly improve the recruitment process's efficiency and help organizations hire the best talent for the job.
- The current screening process is not efficient and often misses out on qualified candidates. There is a need for a system that can automatically analyze resumes and provide recruiters with a shortlist of candidates that match the job description.
- The process of shortlisting resumes for job openings is time-consuming and requires significant effort from the recruiters. It is challenging to evaluate hundreds or thousands of resumes, and it becomes even more complicated when there are multiple job openings with varying job descriptions.

3. Project Objectives

The following are the key goals and Objectives of an AI resume analyzer:

- Efficiency: The AI resume analyzer should be able to assess a huge volume of resumes in a short amount of time and offer recruiters and hiring managers a ranked list of the most qualified prospects. This saves time and effort, allowing recruiters to concentrate on other parts of the hiring process.
- The AI resume analyzer should be intended to avoid prejudice in applicant selection by objectively analyzing resumes based on job criteria rather than subjective characteristics like gender, race, or age.
- To build a tool that can automatically analyze and extract useful information from resumes using machine learning techniques. With the help of NLP, the tool will be able to identify important information such as skills, work experience, education, and achievements from the resumes.
- To provide a comprehensive report of the most important information extracted from the resumes to help recruiters identify the best candidates for a job.
- To save recruiters time and effort in manually reviewing resumes by automating the analysis and extraction process.
- To increase the efficiency of the recruitment process by providing a more objective and accurate analysis of candidate resumes.

4. Literature Survey

[1]Zhang, J., Liu, Y., & Su, J. (2020). AI-Based Resume Screening and Analysis System. In 2020 IEEE 4th Conference on Energy Internet and Energy System Integration (EI2) (pp. 767-771). IEEE.

[2]Aggarwal, A., & Jain, V. (2021). An efficient resume analyzer system using natural language processing. Journal of King Saud University-Computer and Information Sciences, 33(3), 383-390.

[3]S. R. Rimitha, V. Abburu, A. Kiranmai and K Chandrasekaran, "Ontologies to Model User Profiles in Personalized Job Recommendation", 2018 IEEE Distributed Computing VLSI Electrical Circuits and Robotics (DISCOVER), pp. 98-103, 2018.

[4]Shilin Zhang ; Mei Gu, “Using Text Categorization to Find Job Opportunities,” In 2010 International Conference on Web Information Systems and Mining, pp. 25-29, 2011.

[5]Chou, Y. C., Chao, C. Y., & Yu, H. Y, “A Résumé Evaluation System Based on Text Mining,” In 2019 International Conference on Artificial Intelligence in Information and Communication (ICAIIC), pp. 052-057, 2019.

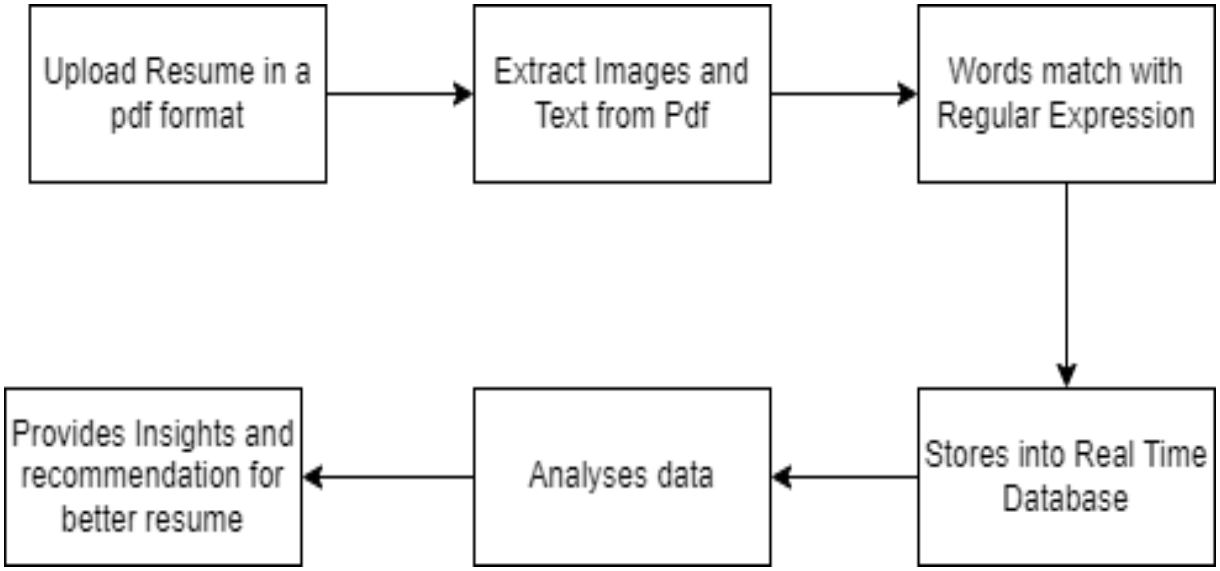
[6]Nikolaos D. Almalis ; George A. Tsihrintzis ; Nikolaos Karagiannis ; Aggeliki D. Strati, “FoDRA — A new content-based job recommendation algorithm for job seeking and recruiting,” In 2015 6th International Conference on Information, Intelligence, Systems and Applications (IISA), 2016.

5. Finding of Literature Survey

This study adopted machine learning- and text mining technology-based artificial intelligence and current big data technology to analyze the trendiness of online discussion:

- Talent acquisition, also known as recruitment, is definitely amongst one of the most difficult decisions that an organization has to take. The workforce is the most crucial pillar of any organization and surely a deciding factor for its fate.. [1]
- Since then, the world of recruitment has grown rapidly with a lot of advancements to fast-track the hiring process. Realizing the importance of hiring fitting and apt employees, HR units around the world have undergone substantial changes from traditional recruitment methodologies to network recruitment and finally to smart hybrid recruitment strategies for efficient hiring with a significantly less human workload.[2].
- During the graduation season or the conventional job transition period between the end of the year and the beginning of another year, job applicants who wish to advance to the next stage of their career are enthusiastic about seeking opportunities. [3].
- Resume Screening is the primary step in the hiring process. It evaluates the candidates' resumes and determines whether they are qualified for a role based on their education, skill sets, technical stuff, experience, and other information captured in their resume. To make it simple, it's a form of pattern that matches the job requirement and the candidate's qualifications based on their resume. It is a crucial step in the process of hiring[4]
- Where our system which saves the time of the candidate by providing to upload their resume in any format preferable to the candidate beside all the information in the resume our system will detect all its activity from the candidate social profile[5]
- So for a fresher in order to present a perfect resume that projects the skills precisely, our resume analyzer helps in building the perfect resume by analyzing core concepts of ML[6]

6. Proposed system/FlowChart



7.1 System Flow

7. Software requirements

We have used various algorithms in our model like:

- **Natural Language Processing(NLP):** TensorFlow is a popular open-source software library for building and training neural networks. It was developed by Google and is widely used in the machine learning and deep learning communities.
- **DISC Model:** Before engaging in the calculation of DISC personality traits extracted from the job applicants' resumes, the researchers preprocessed the data, which consisted in breaking the Chinese words in the documents and filtering meaningless words. Subsequently, they collected all words with the characteristics of D, I, S, and C to identify all such words from the job applicants' resumes, performed the computing, and eventually obtained the corresponding percentage of D, I, S, and C in the resumes.
- **Document Vector:** However, terms such as "name" and "grade" may not be crucial in the value diagnosis of resumes, even if they exhibit high frequencies. Therefore, term frequency–inverse document frequency (TF–IDF) was adopted in this study to revise document vectorization. This method is term-calculation-based and is commonly used to evaluate the importance of a term in a corpus or a file set. TF– IDF is a combination of TF and IDF.
- **Tensorflow:** Machine learning is a complex discipline but implementing machine learning models is far less daunting than it used to be, thanks to machine learning frameworks—such as Google's TensorFlow—that ease the process of acquiring data, training models, serving predictions, and refining future results.

9. System Design

- A system design for AI resume analysis typically involves the following components:
- Data Collection: The system first needs to collect a large dataset of resumes that it can analyze. This data can be obtained from a variety of sources, including job posting sites, online job boards, and recruitment agencies.
- Data Preprocessing: Once the system has collected the resumes, it needs to preprocess the data to prepare it for analysis. This may involve converting the resumes into a machine-readable format, such as plain text or PDF, and removing any sensitive or irrelevant information that could potentially bias the analysis.
- Natural Language Processing (NLP): The system then uses NLP techniques to analyze the resumes and extract relevant information, such as skills, qualifications, and work experience. This may involve using techniques such as named entity recognition, part-of-speech tagging, and sentiment analysis.
- Machine Learning (ML): The system uses machine learning algorithms to analyze the data and identify patterns and trends that can help it determine which candidates are the best fit for a particular job. This may involve using techniques such as supervised learning, unsupervised learning, and deep learning.
- User Interface: The system provides a user interface that allows recruiters and hiring managers to view the results of the analysis and make informed decisions about which candidates to pursue further. The interface may include features such as search and filter options, candidate profiles, and performance metrics.

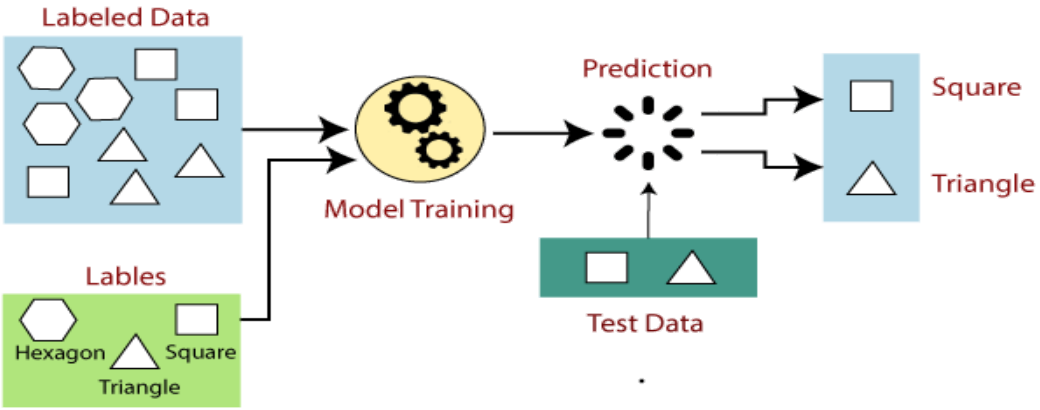
10. System Architecture

The proposed methodology for the AI Resume Analyser involves the following steps:

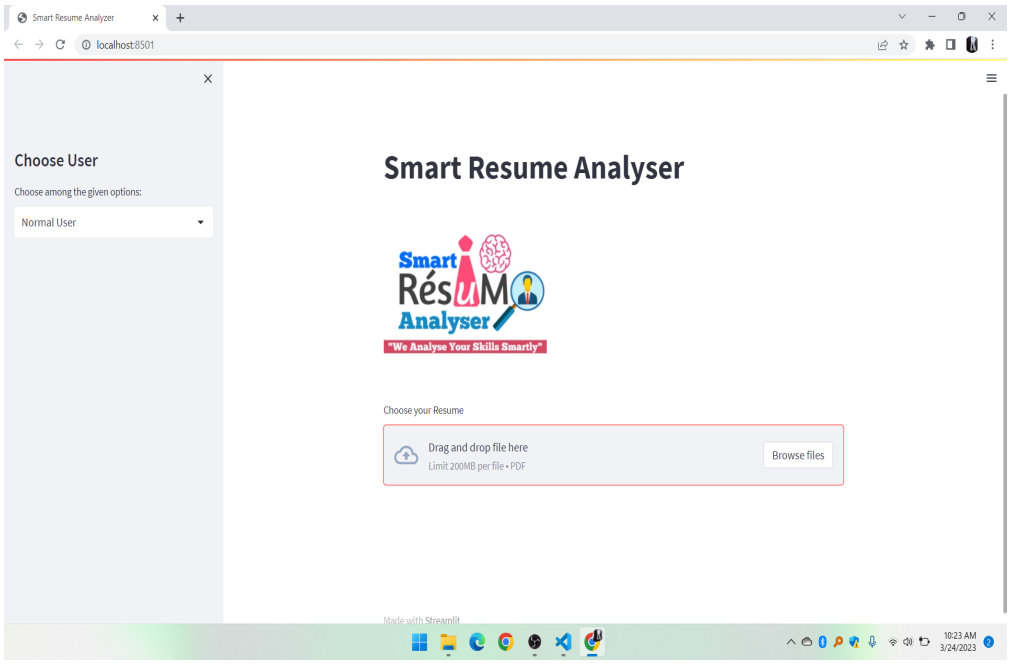
Step 1: Pre-process the resume text by removing stop words, punctuation marks, and special characters

Step 2: Extract features from the pre-processed text using NLP techniques. This involves identifying and selecting the most relevant features from the resume, such as skills, work experience, education, etc.

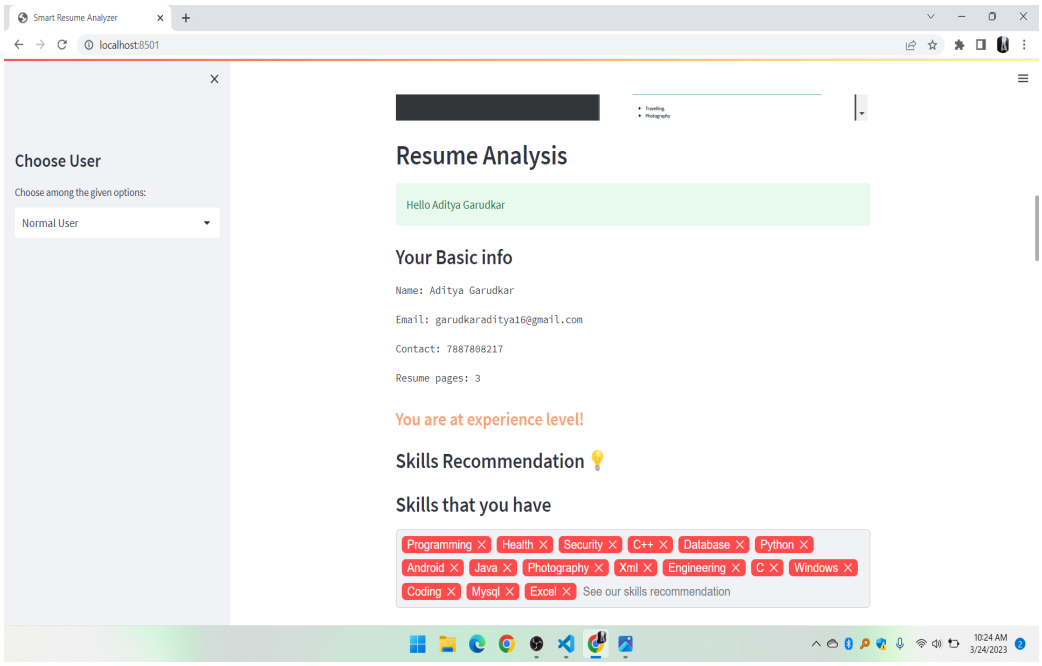
Step 3: The NLP algorithm will classify the resume based on the extracted features. The NLP algorithm is trained on an unlabelled dataset of resumes to predict the suitability of a new resume.



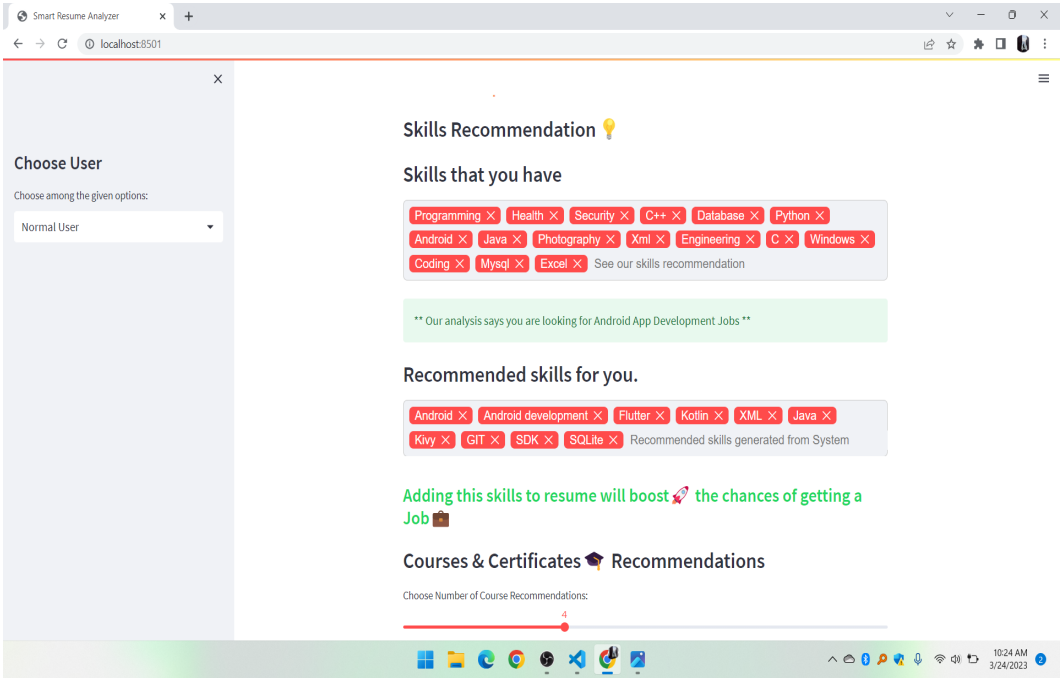
11. RESULTS



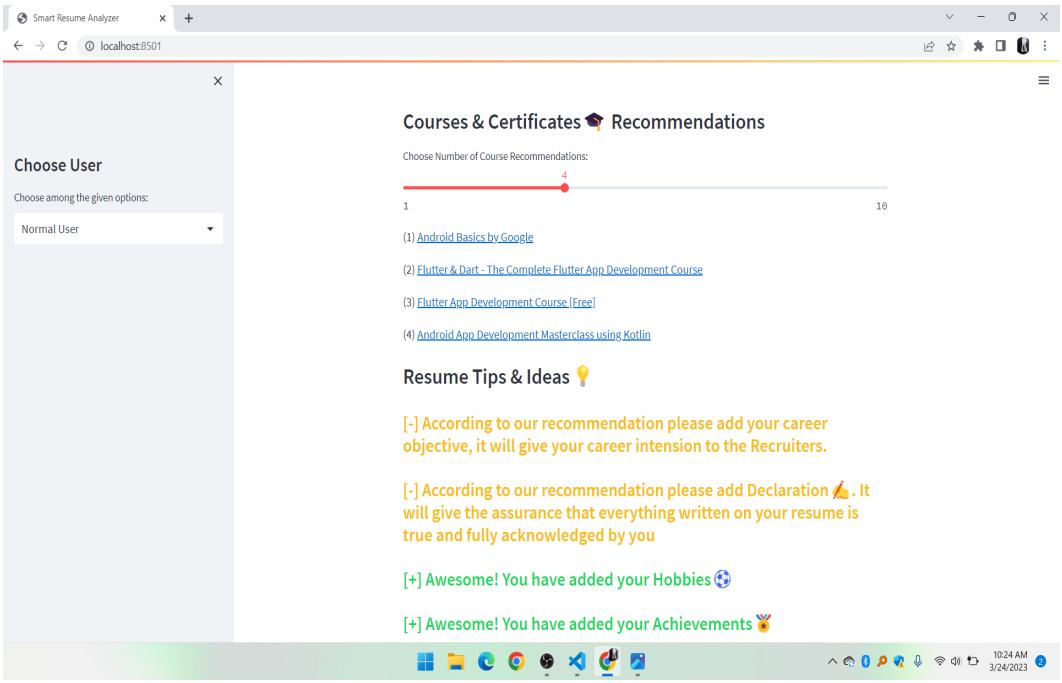
11.1 Home Page for AI Resume Analyser



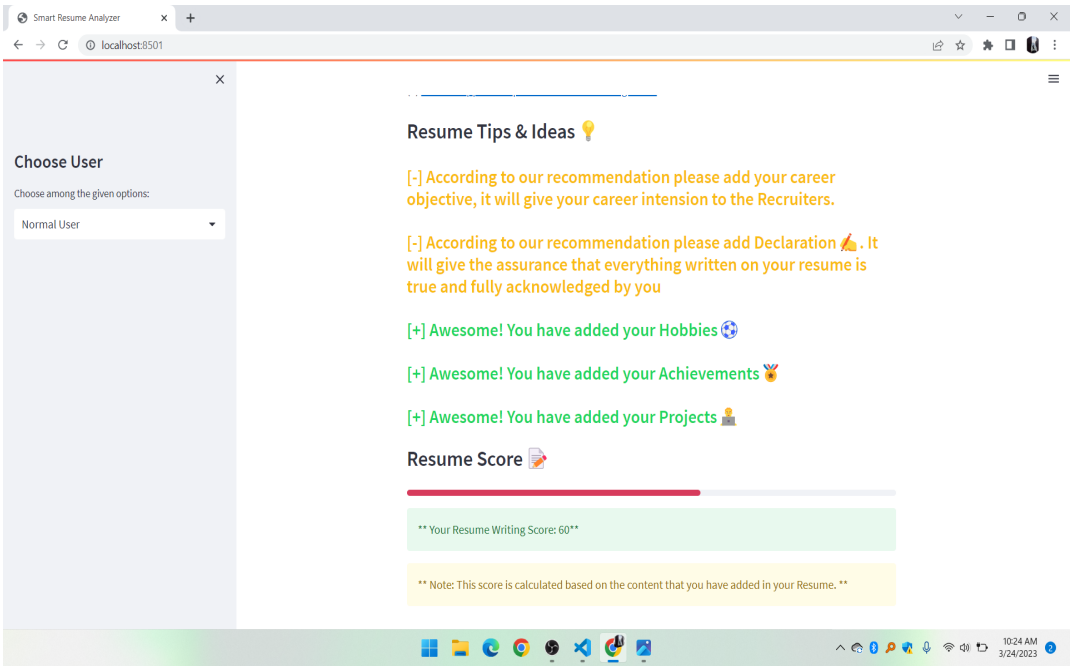
11.2 Overview of the candidate's resume



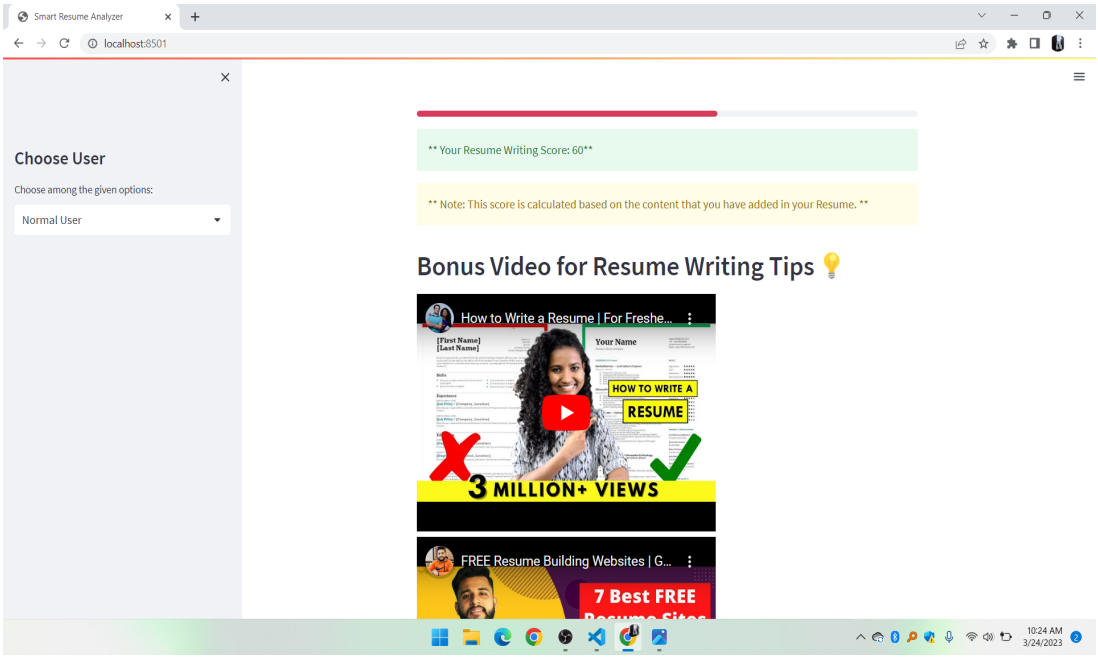
11.3 Skills that are recommended to the candidate



11.4 Courses and resume tips that are recommended to the candidate



11.5 Resume Score of the Candidate



11.6 Videos for improving your resume and communication skills

12. CONCLUSION

The AI Resume Analyser can help reduce the time and effort required for recruiters to screen resumes, improve the diversity of the candidate pool, and provide valuable feedback to job seekers to improve their resumes.

We also found that the system was unbiased towards gender and race, promoting diversity in the candidate pool. In conclusion, AI resume analysis is a powerful tool that can help organizations quickly and efficiently screen large numbers of resumes to identify top candidates for a particular job opening. With the ability to automatically scan and analyze resumes for keywords, relevant experience, and other important factors, AI-powered resume screening can significantly streamline the recruitment process and save recruiters valuable time and resources.

However, it's important to note that AI resume analysis is not infallible and may produce biased results if not properly calibrated and trained. Therefore, it's crucial to regularly monitor and evaluate the performance of AI resume analysis tools to ensure that they're effectively identifying the best candidates for the job, without discriminating against certain groups of applicants.

13. References

[1]Zhang, J., Liu, Y., & Su, J. (2020). AI-Based Resume Screening and Analysis System. In 2020 IEEE 4th Conference on Energy Internet and Energy System Integration (EI2) (pp. 767-771). IEEE.

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