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# Resume Optimization Tool

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***ABSTRACT***

*In today's competitive job market, organizations are continually seeking innovative ways to optimize their recruitment processes to attract, identify, and onboard top talent efficiently. Traditional methods of managing resumes and job applications through manual processes have proven to be time-consuming, error-prone, and inefficient. In response to these challenges, the Resume Optimization Tool emerges as a trans-formative software solution designed to revolutionize the recruitment landscape.*

*The Resume Optimization Tool is a sophisticated software solution designed to streamline the recruitment process by automating the management of resumes and job applications. Traditional methods of managing resumes and job applications through manual processes are time-consuming, error-prone, and inefficient. Resume Optimization Tool addresses these challenges by offering a comprehensive platform that allows Job Seekers to efficiently upload,scan,analyze and track resumes and job applications.*

## 1.INTRODUCTION

In today's highly competitive job market, organizations are constantly looking for innovative ways to improve their recruitment processes and attract top talent more efficiently. Traditional methods of managing resumes and job applications reliant on manual processes have become increasingly time-consuming, error-prone, and inefficient. These challenges often lead to delays, missed opportunities, and frustration for both recruiters and job seekers.

The Resume Optimization Tool is a sophisticated software solution that addresses these inefficiencies by evaluation and tracking of resumes and job applications. Designed to streamline the recruitment process, the platform enables job seekers to upload, scan, analyze, and track their resumes and applications with ease. For recruiters, it simplifies candidate management by providing tools to quickly assess resumes, match candidates to job openings, and track the progress of applications, all from a centralized and intuitive interface.

**Existing System**

Applicant tracking systems (ATS) are widely used tools in the recruitment process, and offer features such as resume parsing, candidate tracking, and reporting. In spite of the fact that existing applicant tracking systems streamline hiring processes, they are subject to a number of limitations, including limited candidate visibility, keyword-based screening, and complex user interfaces. It is also common to encounter challenges related to integration, data security, and potential bias in recruitment.

**Proposed System**

The proposed system is a Python-based application integrated with Google Gemini (LLM) and deployed using Stream-lit. It allows users to paste a job description (JD) and upload their resume (in PDF or Word format). The system extracts text from the resume using libraries like PyPDF2 or python-docs and processes the job description and

resume content to identify relevant keywords, skills, and qualifications. With the help of Google Gemini, the system analyzes the JD and resume, identifies missing keywords, and provides actionable feedback to improve the resume. It also generates a detailed profile summary tailored to the job description and calculates a job description matching percentage, giving users insights into how well their resume aligns with the job requirements. The user interface built with Stream-lit ensures a seamless experience, displaying the results interactively, including highlighted missing keywords and personalized recommendations.

## 2-REQUIREMENTS ANALYSIS

Functional Requirements

**2.1.1 Modules:**

- User:

1. View Job Description
2. Insert Job Description
3. Upload resume
4. Submit
5. View Results

- Admin:

1. Add Job Description
2. View Job Description
3. Resume Parsing

Non - Functional Requirements

- Security : Implement robust security measures to protect applicant data.
- Scalability : Ability to handle a growing number of applicants.
- Usability : User-friendly interface that is easy to navigate.
- Performance: It works efficiently and Fastly.
- Availability : it is available for 24/7 hours.
- Portability: it can be used on different operating systems.

## 3. DESIGN

Architectures

The architecture of this project is designed to ensure seamless interaction between the user interface, data processing, and predictive algorithms. It incorporates modular components for better scalability, maintainability, and performance. Architecture is of two types. They are

(1)Software Architecture

(2)Technical Architecture

**Software Architecture**

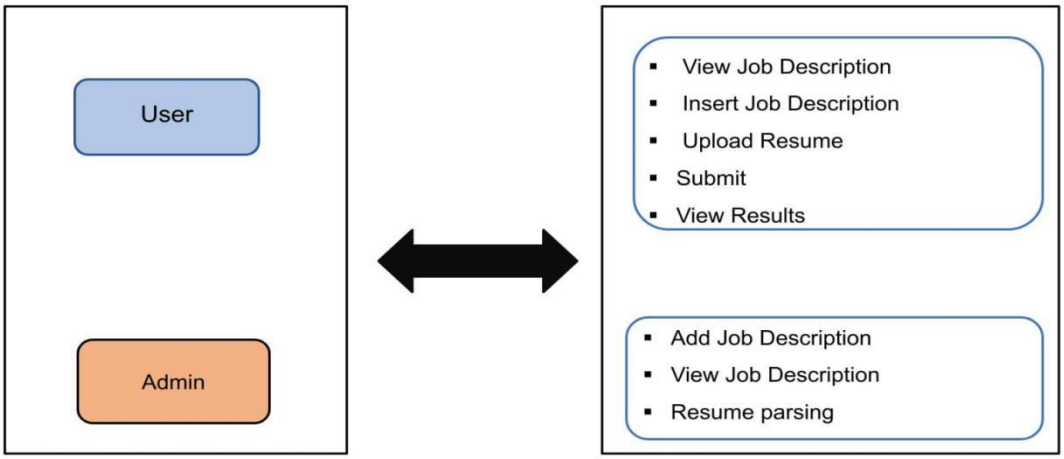



Fig 3.1.1 Software Architecture

**Technical Architecture**

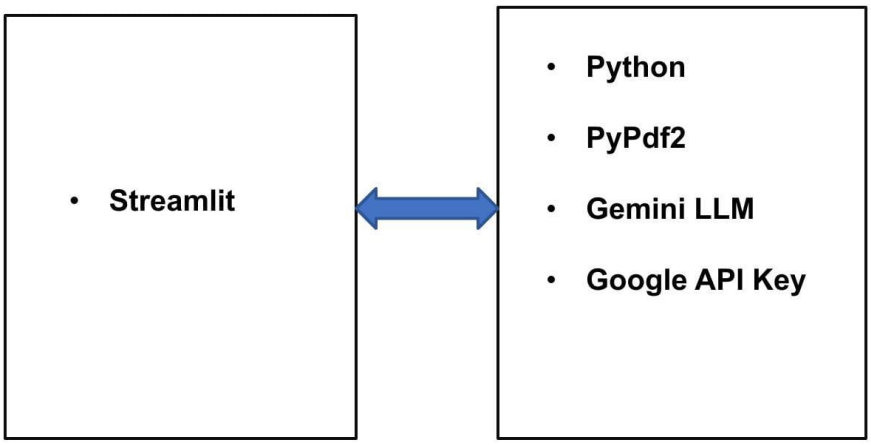



Fig 3.1.2 Technical Architecture

**UML Design**

The UML (Unified Modeling Language) design for the Resume Optimization Tool provides a clear representation of the system's structure and interactions between its components. The tool is divided into classes, each with specific responsibilities to ensure modularity and maintainability. The **User** and **Admin** classes represent the primary actors, where Users can upload resumes, input job descriptions, and view results, while Admins manage job descriptions and oversee the parsing and analysis processes.

**Class Diagram**

A class diagram represents the static structure of a system by modeling its classes, attributes, methods, and the relationships between the classes. Each class is depicted as a rectangle with three compartments: the top compartment for the class name, the middle for attributes, and the bottom for methods. The relationships between classes are shown using lines, arrows, or symbols to indicate associations, inheritance, dependencies, or aggregations. Class diagrams provide a blueprint of the system and are often used in object-oriented design to understand and communicate the structure of the system.

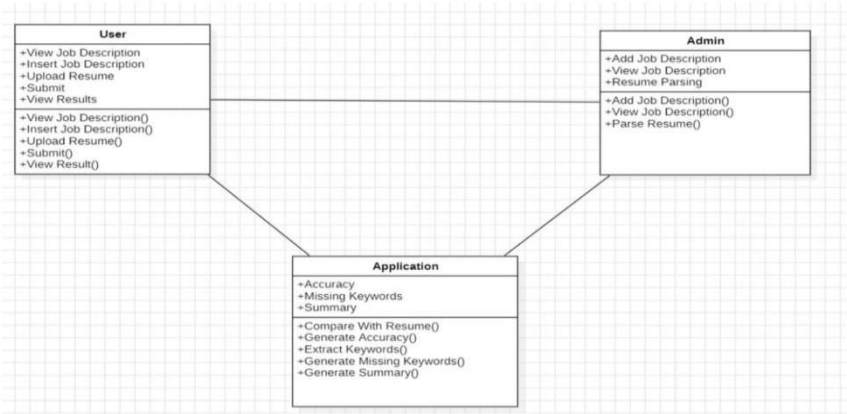



Fig 3.2.2 Class Diagram

## 4-Implementation

Technologies

This system is developed using the Python programming language and integrates Generative AI with Large Language Models (LLMs).

**Python**

Python is one of the most popular programming languages today, known for its simplicity and extensive features.It was created by Guido van Rossum, and released in 1991. Its clean and straight forward syntax makes it beginner-friendly, while its powerful libraries and frameworks makes it perfect for developers. It can be used on a server to create web applications. It can be used to handle big data and perform complex mathematics. Its demand is growing at a very rapid pace due to its vast use cases in Modern Technological fields like Generative AI, Data Science, Machine learning, and Automation Tasks. For many years now, it has been ranked among the top Programming languages. Python runs on an interpreter system, meaning that code can be executed as soon as it is written. This means that prototyping can be very quick.Python can be treated in a procedural way, an object-oriented way or a functional way.Python relies on indentation, using whitespace, to define scope; such as the scope of loops, functions and classes. Other programming languages often use curly-brackets for this purpose.Python is a versatile, high-level programming language that emphasizes simplicity and readability.

**Generative AI**

Generative AI refers to a subset of artificial intelligence that focuses on creating new content, such as text, images, music, code, or videos, that is similar to human-generated outputs. It achieves this by leveraging advanced machine learning models, particularly deep learning techniques like generative adversarial networks (GANs), variational autoencoders (VAEs), or transformer models such as GPT. Unlike traditional AI, which primarily analyzes data and makes decisions based on predefined rules, generative AI learns patterns and structures in data to generate entirely new outputs. This technology is widely used in various applications, including content creation, chatbots, design, gaming, and personalized recommendations, making it a powerful tool for enhancing creativity and productivity. However, it also raises ethical concerns, such as the potential misuse for creating misleading information or deepfakes, emphasizing the need for responsible usage and regulation.

## 5-Testing

Overview of Testing

Testing ensures the functionality and reliability of the system while verifying that it meets the defined requirements. For the resume matching and analysis tool, testing was performed to validate its core features, from job description parsing to final result generation.

**Objectives of Testing**

1. **Validation of Functional Requirements:** Ensure the system performs all intended operations, such as uploading files, parsing resumes, and generating matching results.

2. **Verification of Parsing and Matching Accuracy:** Assess the system's ability to accurately extract data, such as skills, education, and keywords, and compare resumes with job descriptions.

3. **Error Detection and Resolution:** Identify and correct any issues, including file upload failures, data extraction inaccuracies, or improper matching percentages.

4.**System Performance Evaluation:** Verify that the tool processes inputs efficiently and provides results in a timely and user-friendly manner.

**Testing Metrics**

1.**Data Parsing Accuracy:** Measure how effectively the system extracts relevant information from resumes.

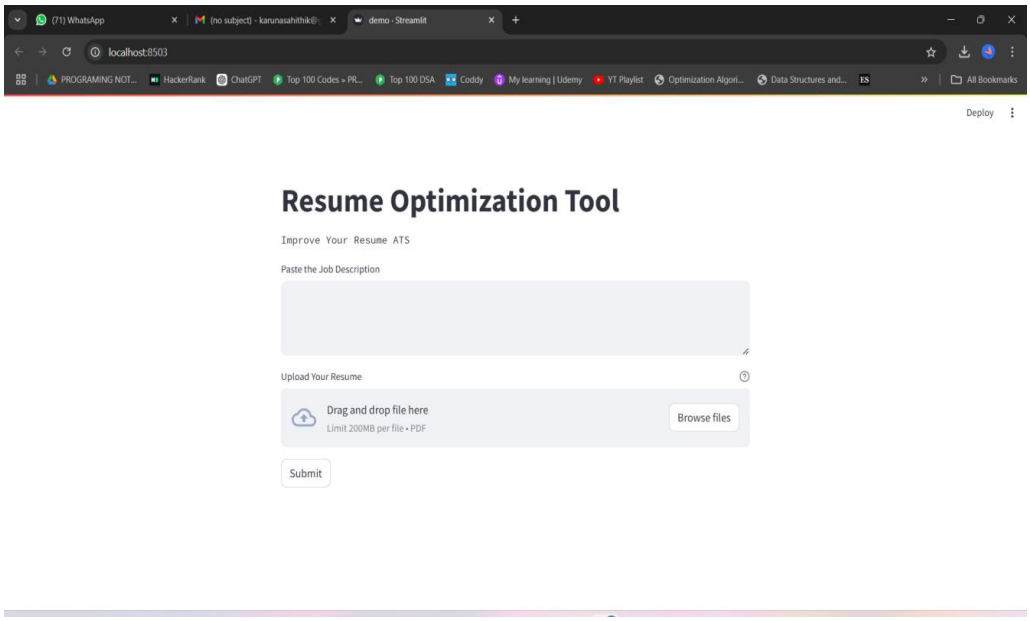
2. **Matching Precision:** Assess the correctness of matching resumes with job descriptions based on provided criteria.

3. **Matching Recall:** Evaluate the system's ability to identify missing or relevant keywords for each job description.

4.**User Interface Responsiveness:** Confirm the tool provides a seamless experience during file uploads and result visualization.

5. **Execution Time:** Measure the time taken for each process, from input loading to result generation.

## 6-RESULTS




Screenshot 6.1 Image of Generated webpage

Job Description:

TCS is hiring for Data Scientist

Desired Experience Range: 0-3 Years

Job Location: Gurgaon / Bangalore

Required Skill Set: Python, and database query languages like SQL.Familiarity with Scala, Java, or C++, Machine learning , Data Wrangling

Must-Have: Python, Machine learning, data Wrangline.

Good-to-Have: Hadoop, Spark, Tableau,Power BI,GCP,AWS,Azure

Expectations from the Role:

1. Programming Skills – knowledge of statistical programming languages like R, Python, and

database query languages like SQL. Familiarity with Scala, Java, or C++ is an added advantage.

2. Statistics – Good applied statistical skills, including knowledge of statistical tests, distributions, regression, maximum likelihood estimators, etc. Proficiency in statistics is essential for data-driven companies.

3. Machine Learning – good knowledge of machine learning methods like k-Nearest Neighbors, Naive Bayes, SVM, Decision Forests.

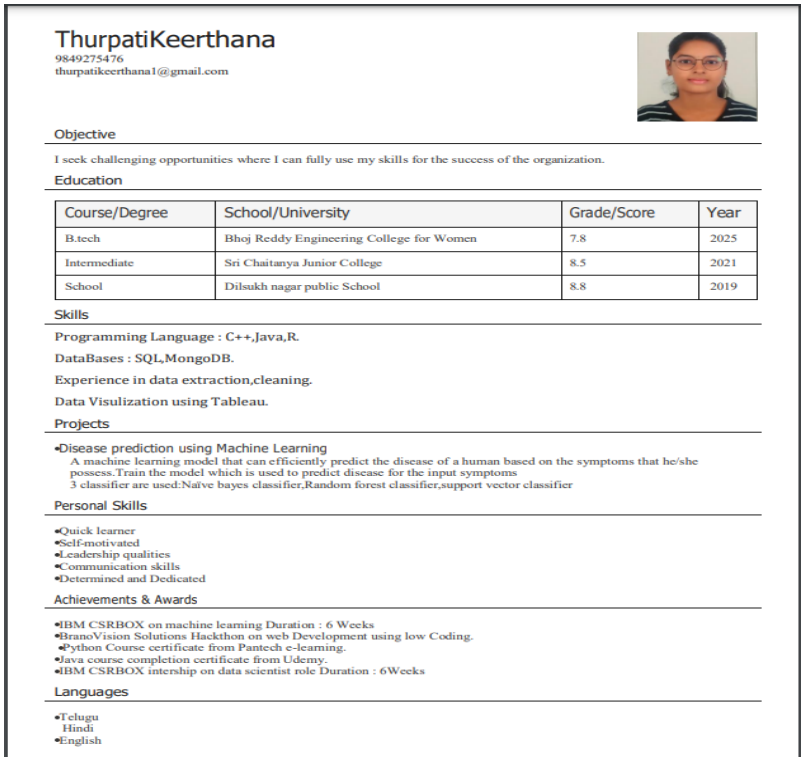
4. Proven Experience as Data Scientist or Data Analyst

5. Knowledge in Spark is added advantage

6. Experience in large scale enterprise application implementation.

7. Hands-on experience with data science tools

8. Knowledge in Hadoop is added advantage.



ThurpatiKeerthana

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Objective

I seek challenging opportunities where I can fully use my skills for the success of the organization.

Education

| Course/Degree | School/University | Grade/Score | Year |
|---|---|---|---|
| B.tech | Bhoj Reddy Engineering College for Women | 7.8 | 2025 |
| Intermediate | Sri Chaitanya Junior College | 8.5 | 2021 |
| School | Dilsukh nagar public School | 8.8 | 2019 |

Skills

Programming Language : C++,Java,R.

DataBases : SQL,MongoDB.

Experience in data extraction,cleaning.

Data Visulization using Tableau.

Projects

•Disease prediction using Machine Learning
A machine learning model that can efficiently predict the disease of a human based on the symptoms that he/she possess.Train the model which is used to predict disease for the input symptoms
3 classifier are used:Naïve bayes classifier,Random forest classifier,support vector classifier

Personal Skills

•Quick learner
•Self-motivated
•Leadership qualities
•Communication skills
•Determined and Dedicated

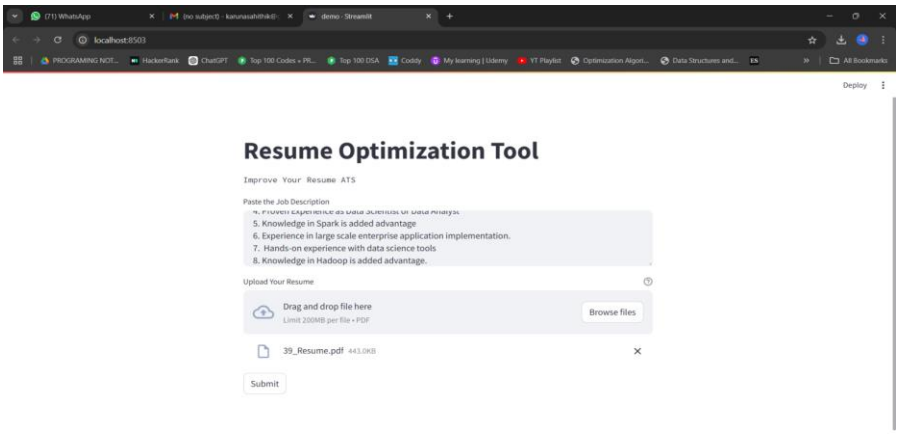
Achievements & Awards

•IBM CSRBOX on machine learning Duration : 6 Weeks
•BranoVision Solutions Hackthon on web Development using low Coding.
•Python Course certificate from Pantech e-learning.
•Java course completion certificate from Udemy.
•IBM CSRBOX intership on data scientist role Duration : 6Weeks

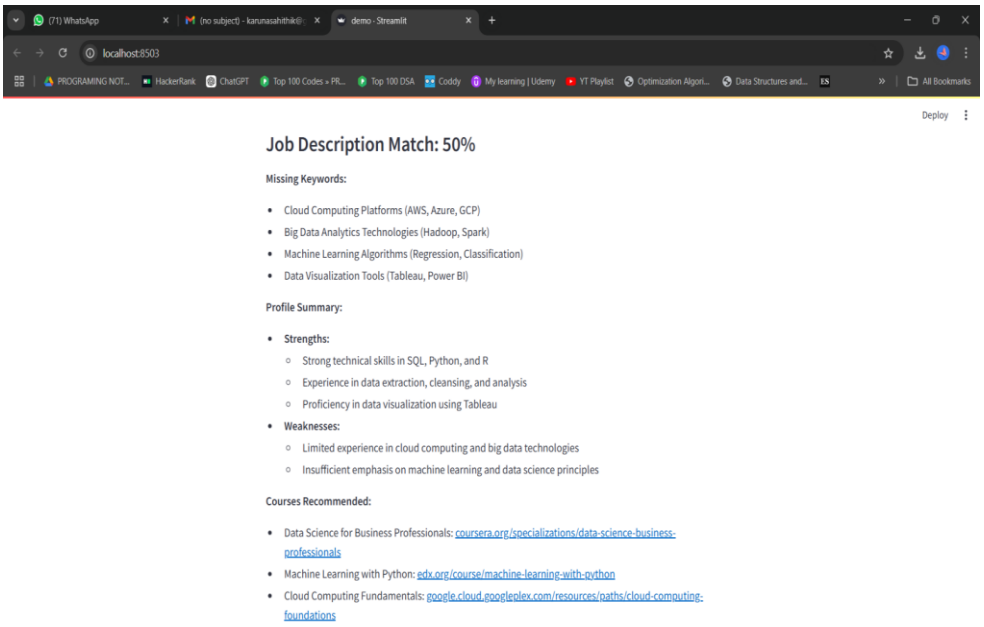
Languages

•Telugu
Hindi
•English

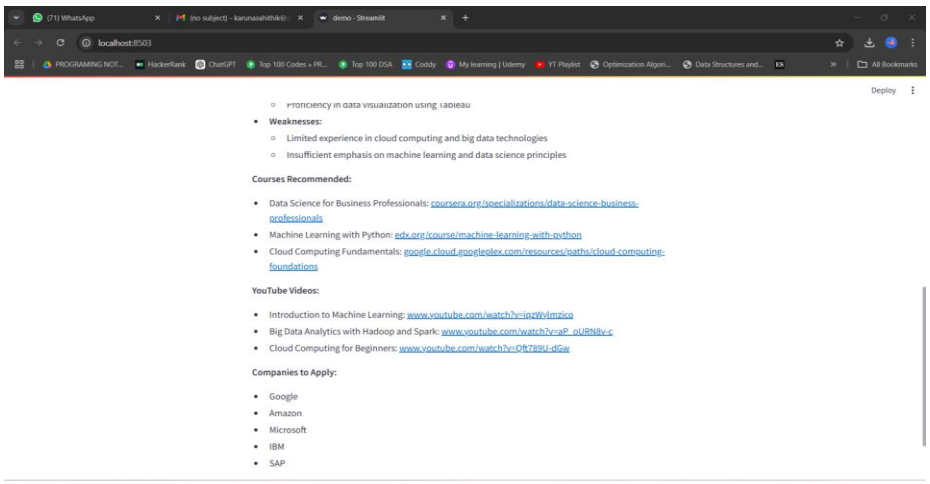
Screenshot 6.2 Image showing uploaded Resume.




Screenshot 6.3 Image showing home page of user interface after uploading Resume along with Job Description.




Screenshot 6.4 Output generated by Resume Optimisation Tool




Screenshot .5 Output generated by Resume Optimisation Tool

## 7. CONCLUSION AND FUTURE SCOPE

### Conclusion

Resume Optimization Tool increase job seekers chances of landing interviews in a competitive job market.This Resume Optimization tool represents a trans-formative solution that revolutionizes the recruitment process, offering a comprehensive set of features and functionalities to address the challenges faced by organizations in talent acquisition.This tool could be helpful for job seekers ensuring their resumes are optimized for ATS screening processes.

### Future Scope

The tool will enhance resumes with AI-driven insights, real-time accuracy scoring, and job matching while ensuring ATS compliance. Future updates include mobile apps, career guidance, and blockchain-based claim verification.

## 8. REFERENCES

[1].D. Hong, K. Wang, Z. Li, and F. Zhang

"A Generative Adversarial Network Approach for Automatic Resume Generation,"
2021 IEEE International Conference on Big Data (Big Data).

[2]. X. Liu, J. Wu, and M. Tang"
Enhancing Resume Parsing and Recommendation with Generative Language Models,"
2020 IEEE 20th International Conference on Software Quality, Reliability and Security (QRS).

[3].Ranjith Kumar Gatla,Anitha Gatla,Patti Sridhar,Devineni Gireesh Kumar,D S Naga Malleswara Rao
“Advancements in Generative AI: Exploring Fundamentals and Evolution,"
2024 IEEE 20th International Conference on Software Quality, Reliability and Security (QRS).