DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

SUSHILA DEVI BANSAL COLLEGE OF TECHNOLOGY
INDORE- 453331

Jul-Dec 2022

ProTrack.ai [ATS]

A project report submitted to

Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

in partial fulfillment for the award of

the degree of

Bachelor of Engineering

in

Computer Science & Engineering

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PROJECT GUIDE

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ACKNOWLEDGEMENT

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CERTIFICATE

This is to certify that **Raginee Darade (0834CS221125)** have completed their project work, titled **“ProTrack.ai [ATS]”** as per the syllabus and have submitted a satisfactory report on this project as a part of fulfillment towards the degree of **“BACHELOR OF ENGINEERING” (Computer Science & Engineering)** from **RAJIV GANDHI PROUDYOGIKI VISHWAVIDHYALAYA, BHOPAL.**

HEAD OF THE DEPARTMENT **PROJECT GUIDE**

DIRECTOR

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INTERNAL EXAMINER **EXTERNAL EXAMINER**

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1 Introduction

In the modern recruitment landscape, matching resumes with job descriptions effectively and efficiently is a significant challenge for employers. Traditional methods often involve manual screening, which can be time-consuming, inconsistent, and prone to bias. Additionally, existing Applicant Tracking Systems (ATS) frequently fail to provide comprehensive analyses, resulting in missed opportunities to identify the most suitable candidates.

The **ProTrack.ai [ATS]** system addresses these challenges by leveraging advanced AI algorithms to automate the resume evaluation process. This system provides a streamlined, unbiased, and efficient approach to assessing resumes against job descriptions. Users can upload resumes in PDF format and input job descriptions to receive a detailed evaluation that highlights strengths, weaknesses, and missing keywords. The system also calculates a percentage match, making it a valuable tool for recruiters and job seekers alike.

1.1 Purpose of the Project

The project aims to revolutionize the recruitment process by offering an automated solution for resume evaluation. By reducing manual effort and bias, it ensures a fairer and faster candidate selection process.

1.2 Scope

he system's capabilities include:

- Evaluating resumes in PDF format against any job description.
- Providing ATS-based insights, including keyword matches and evaluation reports.
- Ensuring usability and scalability for multiple users.

1.3 Problem in Existing Systems

Current ATS solutions lack the ability to deliver in-depth contextual analysis and often miss specific skill sets critical for a role. Manual processes are resource-intensive and inconsistent, further complicating hiring decisions.

3. System Requirement Analysis

2.1 Introduction

The **ProTrack.ai [ATS]** system is designed to automate the evaluation of resumes against job descriptions, ensuring precision, efficiency, and unbiased results. This section outlines the system requirements to achieve these objectives effectively.

2.2 Overall Description

2.2.1 Product Perspective

The system is a standalone web-based application built using Python, AI tools, and an intuitive interface. It integrates external libraries and APIs to ensure efficient resume evaluation and report generation.

2.2.2 Product Functions

- **Resume Upload**: Users can upload resumes in PDF format.
- **Job Description Input**: Employers or users can input the job description.
- **Evaluation Process**: The system analyzes the resume using ATS criteria and generates an evaluation report.
- **Match Percentage**: Displays a calculated percentage of the resume's alignment with the job description.
- **Detailed Report**: Highlights strengths, weaknesses, and missing keywords.

2.2.3 User Classes and Characteristics

- **Employers/HR Professionals**: Utilize the system for evaluating multiple resumes quickly.
- **Job Seekers**: Use the system to refine their resumes to align with job descriptions.

2.2.4 Operating Environment

- **Platform**: Web-based application.
- **Hosting**: Cloud environment for scalability.
- **Tools Used**: Python, Streamlit, and AI-based APIs.

2.3 External Interface Requirements

2.3.1 User Interfaces

- Simple and intuitive interface for uploading resumes and job descriptions.
- Display results in a visually engaging and comprehensible format.

2.3.2 Hardware Interfaces

- Devices: Accessible on desktops, laptops, and tablets.
- No specialized hardware requirements.

2.3.3 Software Interfaces

- Operating System: Cross-platform compatibility (Windows, macOS, Linux).
- Dependencies: Python libraries such as **PIL**, **Pdf2Image**, and external tools like **Google Generative AI API**.

2.3.4 Communication Interfaces

- Internet connection required for API integration and report generation.
- Secure transfer protocols for user data privacy.

2.4 Functional Requirements

- **Resume Upload**: Support for PDF format only.
- **Job Description Input**: Text-based input field for job descriptions.
- **Match Percentage Calculation**: Algorithm to compute alignment percentage.
- **Report Generation**: Automated detailed reports highlighting keyword matches and resume optimization suggestions.

2.5 Non-functional Requirements

- **Performance**: Results generated within 10–15 seconds.
- **Usability**: Designed for non-technical users with a minimal learning curve.
- **Scalability**: Handles multiple user requests simultaneously.
- **Security**: Ensures the privacy of uploaded resumes and job descriptions.

2.6 Project Plan

2.6.1 Team Members

- **Raginee Darade**
- **Raj Pratap**

2.6.2 Division of Work

- **Frontend Development**: User interface and interaction design.
- **Backend Development**: Implementation of core algorithms and API integration.
- **Testing**: Ensuring functionality and performance metrics

2.6.3 Time Schedule

The project timeline is structured into four phases:

- **Requirement Gathering and Planning** – Week 1–2
- **Development Phase** – Week 3–6
- **Testing and Optimization** – Week 7–8
- **Deployment and Documentation** – Week 9–10

3.Analysis

3.1 Methodology Used

The **Object-Oriented Methodology** is adopted to design the system, ensuring modularity, reusability, and scalability. This methodology facilitates effective data management and supports future system enhancements.

3.2 Use Case Diagram

A **Use Case Diagram** represents the interaction between the user and the system, showcasing key functionalities such as uploading resumes, inputting job descriptions, and receiving evaluation reports.

Key Use Cases:

1. User uploads a resume in PDF format.
2. User inputs a job description.
3. System generates a match percentage and detailed evaluation report.

3.3 Activity Diagram

The activity flow includes:

1. User inputs (resume and job description).
2. System processes the data.
3. Results (match percentage and report) are displayed.

3.4 Sequence Diagram

Illustrates the sequence of interactions:

1. User submits resume and job description.
2. Backend algorithms process the inputs.
3. Report is generated and displayed to the user.

3.5 Class Diagram

Identifies classes and their attributes, such as:

- **Resume**: Stores PDF content, parsed data.
- **Job Description**: Contains input text and key attributes.

- **Evaluation Report**: Includes match percentage, keyword analysis, and detailed feedback.

4. Design

4.1 Architectural Design

4.1.1 System Architecture Diagram

The system follows a **three-tier architecture**:

- **Presentation Layer**: The user interface built using **Streamlit**.
- **Logic Layer**: Core algorithms for matching resumes and job descriptions.
- **Data Layer**: Secure storage for uploaded resumes and evaluation results.

4.1.2 Description of Architectural Design

- The **frontend** ensures ease of interaction.
- The **backend** leverages Python libraries (e.g., Pdf2Image, Google Generative AI) for data processing.
- APIs and external tools facilitate robust and scalable operations.

4.2 Database Design

4.2.1 Normalization

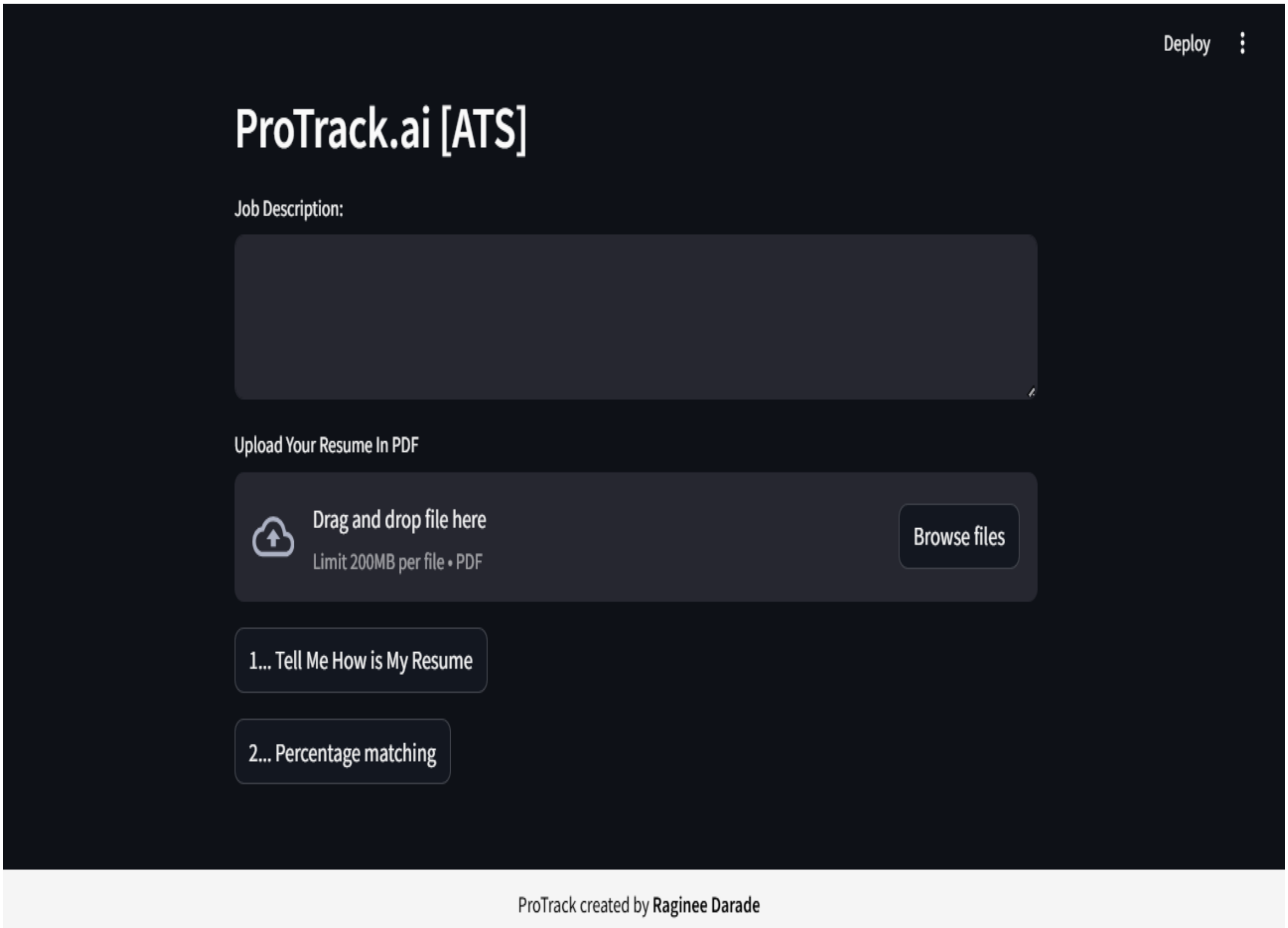
Data is structured into normalized tables to eliminate redundancy and ensure efficient data retrieval.

- **User Table**: Stores user details.
- **Resume Table**: Contains parsed resume data.
- **Job Description Table**: Stores job descriptions and extracted keywords.

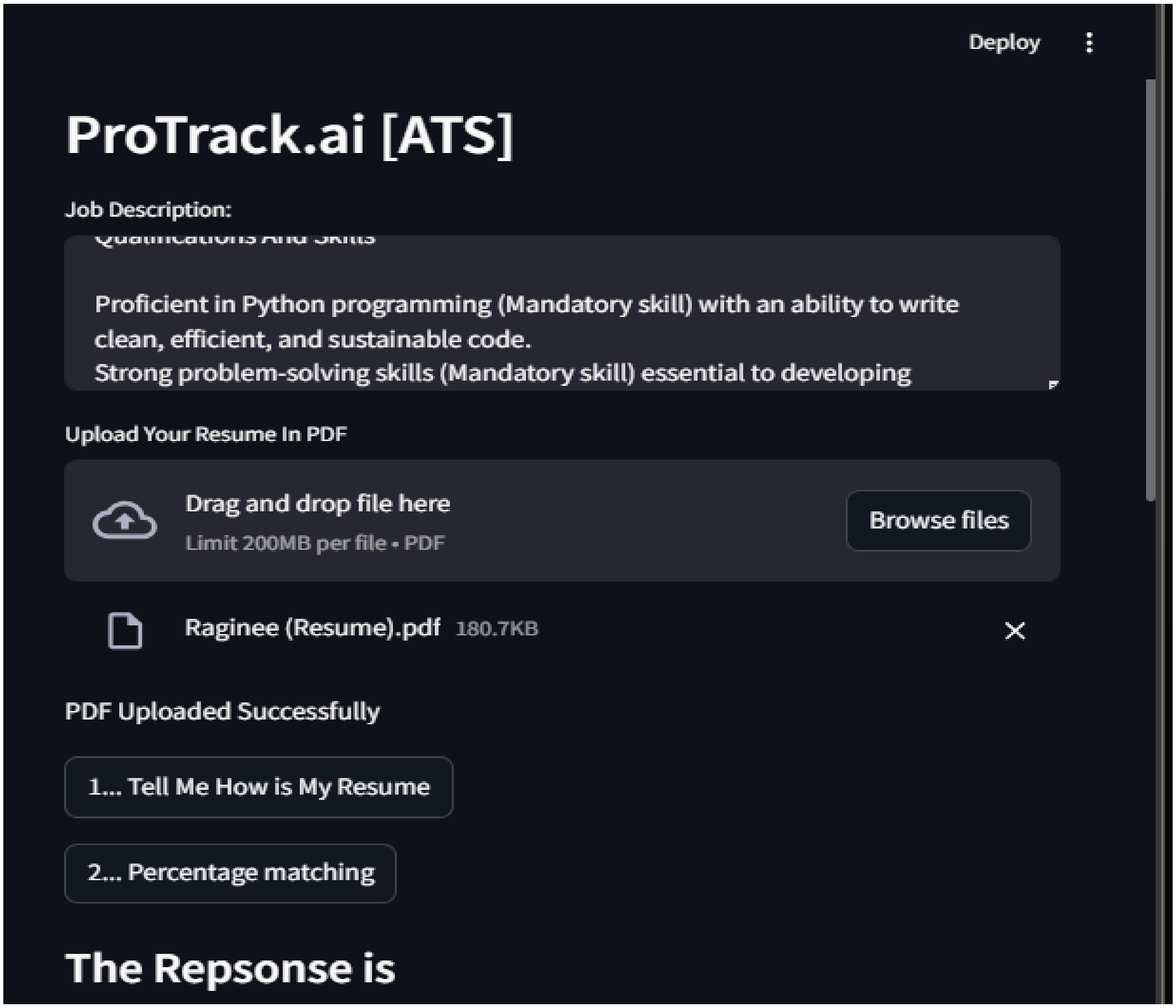
4.3 Interface Design

4.3.1 Screenshots

Upload Page: For submitting resumes and job descriptions.


Deploy
ProTrack.ai [ATS]
Job Description:
Upload Your Resume In PDF
Drag and drop file here
Limit 200MB per file • PDF
Browse files
1... Tell Me How is My Resume
2... Percentage matching
ProTrack created by **Raginee Darade**

- **Results Page**: Displays match percentage and detailed evaluation.



ProTrack.ai [ATS]

Job Description:

Qualifications And Skills

Proficient in Python programming (Mandatory skill) with an ability to write clean, efficient, and sustainable code.
Strong problem-solving skills (Mandatory skill) essential to developing

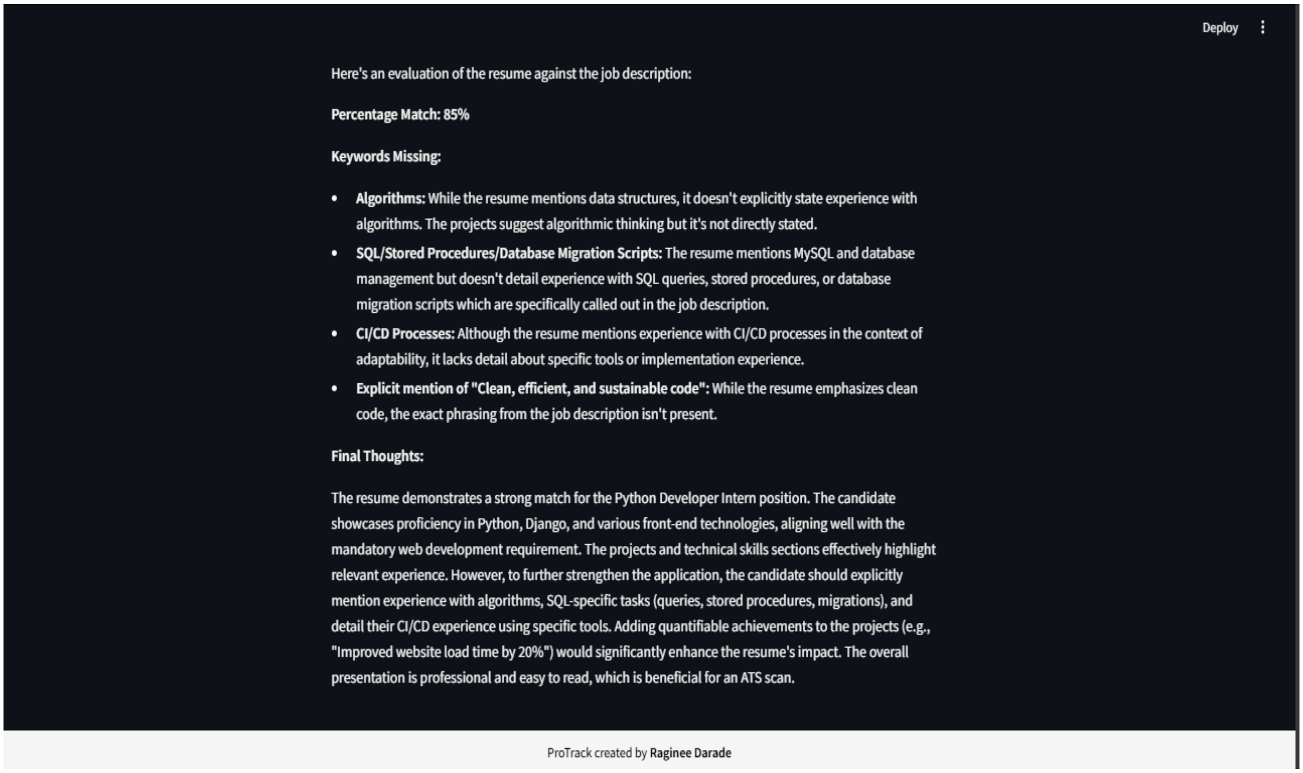
Upload Your Resume In PDF

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

Raginee (Resume).pdf 180.7KB

PDF Uploaded Successfully

The Repsonse is



Here's an evaluation of the resume against the job description:

Percentage Match: 85%

Keywords Missing:

- **Algorithms:** While the resume mentions data structures, it doesn't explicitly state experience with algorithms. The projects suggest algorithmic thinking but it's not directly stated.
- **SQL/Stored Procedures/Database Migration Scripts:** The resume mentions MySQL and database management but doesn't detail experience with SQL queries, stored procedures, or database migration scripts which are specifically called out in the job description.
- **CI/CD Processes:** Although the resume mentions experience with CI/CD processes in the context of adaptability, it lacks detail about specific tools or implementation experience.
- **Explicit mention of "Clean, efficient, and sustainable code":** While the resume emphasizes clean code, the exact phrasing from the job description isn't present.

Final Thoughts:

The resume demonstrates a strong match for the Python Developer Intern position. The candidate showcases proficiency in Python, Django, and various front-end technologies, aligning well with the mandatory web development requirement. The projects and technical skills sections effectively highlight relevant experience. However, to further strengthen the application, the candidate should explicitly mention experience with algorithms, SQL-specific tasks (queries, stored procedures, migrations), and detail their CI/CD experience using specific tools. Adding quantifiable achievements to the projects (e.g., "Improved website load time by 20%") would significantly enhance the resume's impact. The overall presentation is professional and easy to read, which is beneficial for an ATS scan.

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5. Implementation

5.1 Language and Database System Used for Implementation

Programming Language:

The project is implemented using **Python**, which provides robust libraries and frameworks to process and evaluate resumes efficiently.

Database System:

- **Storage:** Temporary data storage mechanisms are used for uploaded files and generated reports.
-
- **Libraries Used for File Handling:**

    - **PIL** and **Pdf2Image**: For converting and handling PDF files.
    - **os** and **io**: For file system interactions.

5.2 Features of Language and Database Used

1. **Python Features**:

    - Extensive libraries for text processing and automation.
    - Integration with APIs for generating insights and reports.
    - Simple syntax and scalability for web-based systems.

2. **Database Features**:
3.
    - Efficient temporary storage and retrieval of data.
    - Security features to ensure privacy for uploaded resumes and job descriptions.

5.3 Description of Third-Party Tools Used

1. **Google Generative AI API**:

    - Used for advanced analysis and generating keyword insights.

2. **Streamlit**:

    - A lightweight framework for building the interactive user interface.

3. **External Tools**:

- **Peppler**: For enhancing the evaluation capabilities.
- **Virtual Environment**: Ensures dependencies are isolated and managed.

6. Testing

Testing plays a critical role in ensuring the accuracy, reliability, and performance of the **ProTrack.ai [ATS]** system. This section outlines the testing methodologies and results obtained during the evaluation phase.

6.1 White Box Testing

This testing focuses on the internal logic, algorithms, and code execution paths.

Example Test Cases:

1. **Resume Parsing Functionality**:
   - **Objective:** Ensure resumes are parsed accurately.
   - **Input:** A valid PDF resume.
   - **Expected Output:** Extracted text content is complete and error-free.
   - **Result:** Pass.
2. **Keyword Matching Algorithm**:
   - **Objective:** Validate the keyword extraction and matching process.
   - **Input:** Resume content and job description.
   - **Expected Output:** Correct percentage match and missing keywords identified.
   - **Result:** Pass.

6.2 Black Box Testing

This testing evaluates the system's functionality without considering its internal implementation.

6.2.1 Interface Testing:

- **Test Case 1: File Format Validation**
  - **Objective:** Ensure only PDF files are accepted for upload.
  - **Input:** A DOCX file.
  - **Expected Output:** Error message prompting a PDF upload.
  - **Result:** Pass.

- **Test Case 2: User Input Validation**
  - **Objective:** Check if empty job descriptions are handled.
  - **Input:** No text in the job description field.
  - **Expected Output:** Error message asking the user to provide input.
  - **Result:** Pass.

6.3 Performance Testing

- **Objective:** Measure the system's response time and scalability.
- **Test Scenario:** Simultaneous upload of 10 resumes by different users.
- **Expected Outcome:** All resumes processed within 10–15 seconds.
- **Result:** Pass.

6.4 Security Testing

- **Objective:** Ensure user data, including resumes and job descriptions, are secure.
- **Test Scenario:** Attempt to access uploaded resumes directly via the server.
- **Expected Outcome:** Unauthorized access prevented.
- **Result:** Pass.

7. Conclusion

The **ProTrack.ai [ATS]** system effectively addresses the challenges faced in the recruitment process by automating resume evaluation against job descriptions. It provides an efficient, unbiased, and user-friendly solution to streamline candidate screening.

Key Achievements

1. **Automation of Evaluation**: The system eliminates manual effort by automating the process of matching resumes with job descriptions.
2. **Accuracy and Insights**: With its keyword matching algorithm, the system provides precise results, highlighting strengths, weaknesses, and missing keywords in resumes.
3. **Scalability and Performance**: The system is capable of handling multiple users simultaneously while ensuring quick response times.
4. **Enhanced User Experience**: By offering a straightforward interface, the system is accessible to both technical and non-technical users.