Vol. 1, Issue 10 | Oct 2026 | Open Access — Research Paper

AI RESUME ANALYZER AND JOB MATCHING PORTAL

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Under the Guidance of Mrs. Rucha Thakre | Academic Year: 2026–27

***Abstract*—**The increasing use of online recruitment platforms has created a need for efficient methods of comparing resumes with job requirements. This paper presents the development of an AI Resume Analyzer and Job Matching Portal using Python and Streamlit. The system accepts resume text or a text-based PDF resume and a job description. It extracts predefined skills using whole-word keyword matching, identifies matching and missing skills, and calculates a job-match percentage based on the detected skills in the job description. The application also includes input validation and basic handling of PDF text extraction. During development, a partial-match test identified seven required skills, of which five were found in the resume and two were missing, resulting in a match percentage of approximately 71.4%. This result demonstrates the scoring procedure for that test case and does not represent real-world recruitment accuracy. The current implementation relies on a predefined skill vocabulary and does not perform semantic understanding or use a trained machine-learning model. The prototype provides a transparent starting point for resume-to-job skill comparison. Future improvements may include optical character recognition, natural language processing, expanded skill vocabularies, and evaluation using a larger dataset.

***Index Terms*—**Resume Analysis, Job Matching, Skill Extraction, Keyword Matching, Python, Streamlit

I. INTRODUCTION

The growth of online recruitment platforms has increased the need for efficient ways to compare candidate resumes with job descriptions. A resume contains information about a candidate's skills, education, experience, and projects, while job descriptions specify the skills and qualifications expected by employers.

Manually comparing resumes with job requirements can be time-consuming. An automated skill-matching system can help users identify relevant skills and recognize requirements that may be missing from their resumes.

This paper presents an AI Resume Analyzer and Job Matching Portal developed using Python and Streamlit. The system extracts predefined skills from resume text and job descriptions, identifies matching and missing skills, and calculates a job-match percentage. The current implementation uses rule-based keyword matching to provide transparent results.

II. LITERATURE REVIEW

Automated resume analysis and job matching have been studied to reduce the time and effort required to compare candidates with job requirements. Guo, Alamudun, and Hammond [1] presented RésuMatcher, a personalized résumé-job matching system that compares information from resumes and job postings to identify relevant opportunities. Their work demonstrates the usefulness of automated techniques for connecting candidate qualifications with job requirements.

Resume information extraction is another important area of research. The RINX system [2] investigates the extraction of useful information and knowledge from resumes. Automated extraction can help organize candidate information and reduce the effort involved in manually reviewing documents.

Information retrieval techniques also provide a foundation for matching text against relevant terms and requirements. Traditional keyword-based methods can identify shared terms between documents, while more advanced natural language processing techniques can consider context and meaning. The effectiveness of a matching system depends on the method used and the quality of the input data.

The proposed AI Resume Analyzer and Job Matching Portal focuses on a simple and transparent approach. It extracts predefined skills from resume text and job descriptions, identifies matched and missing skills, and calculates a match percentage. Unlike systems that require more complex models, the current prototype uses rule-based keyword matching. Its main limitation is that it may not recognize skills expressed using different words or meanings. Future work can explore semantic matching and more extensive evaluation to improve the system.

III. PROPOSED SYSTEM

The proposed AI Resume Analyzer and Job Matching Portal is designed to simplify the process of comparing a candidate's resume with a job description. The system uses Python and Streamlit to provide a simple user interface for entering resume details and analyzing job requirements.

The system accepts resume information as text or through an uploaded text-based PDF file. It extracts the text from the resume and compares it with the job description. A predefined list of skills is used to identify relevant technical and general skills in both inputs.

After extracting the skills, the system identifies matching skills and skills required by the job description that are not found in the resume. It then calculates a job-match percentage based on the number of matched skills and the total number of detected skills in the job description. The results are displayed through the user interface to help users

understand how closely their resume matches the specified requirements.

The main components of the proposed system are resume input, text extraction, skill identification, skill comparison, match percentage calculation, and result display. The current prototype uses rule-based keyword matching and is intended to support resume evaluation rather than make final recruitment decisions.

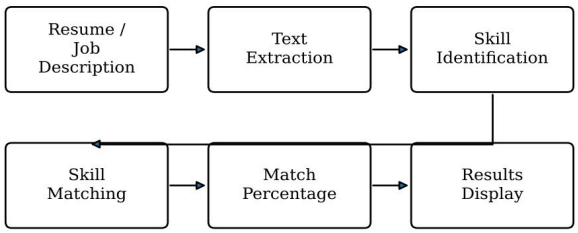


Fig. 1. Architecture of the proposed AI Resume Analyzer and Job Matching Portal.

IV. METHODOLOGY

The proposed system follows a rule-based approach to analyze resumes and compare candidate skills with job requirements. The methodology consists of input collection, text extraction, skill identification, skill matching, and match percentage calculation.

A. Input Collection

The system accepts resume text directly from the user or through an uploaded text-based PDF file. The job description is entered separately to provide the requirements against which the resume is analyzed.

B. Text Extraction and Preprocessing

For uploaded PDF files, the system uses the pypdf library to extract text from the document. The extracted text and job description are converted to lowercase before skill identification. This helps the system recognize predefined skills without being affected by differences in letter case.

C. Skill Identification

A predefined list of skills, including Python, Java, SQL, HTML, CSS, JavaScript, and other selected technologies, is used to identify skills in the resume and job description. Regular expressions with word boundaries are applied to match complete skill terms and reduce incorrect matches within longer words.

D. Skill Matching

The skills detected in the resume are compared with those detected in the job description. Skills present in both sets are classified as matched skills, while skills found in the job description but not in the resume are classified as missing skills.

E. Match Percentage Calculation

The job-match percentage is calculated using the following formula:

Match Percentage = (Number of Matched Skills / Total Number of Skills Detected in the Job Description) × 100

If no skills are detected in the job description, the system assigns a match percentage of zero to avoid division by zero. The resulting percentage and skill comparison are displayed to the user.

The calculated percentage represents keyword overlap between the resume and job description. It should not be interpreted as a measure of a candidate's overall suitability or actual probability of being selected for a job.

V. IMPLEMENTATION

The AI Resume Analyzer and Job Matching Portal was implemented using Python and Streamlit. The development was carried out in Visual Studio Code using Python 3.11.4. The application provides a web-based interface that allows users to enter resume text, upload a text-based PDF resume, and provide a job description for analysis.

A. Technologies Used

Python was used to implement the main processing logic, including skill identification, comparison, and percentage calculation. Streamlit was used to develop the user interface and display the analysis results. The pypdf library was used to extract text from uploaded PDF documents, while Python's regular expression module was used for whole-word skill matching.

B. Application Workflow

The application collects the resume and job description from the user and validates the inputs before processing them. It then identifies predefined skills in both texts, determines the matched and missing skills, and calculates the match percentage. The results are displayed through the Streamlit interface, allowing users to review the comparison.

C. Output Display

The application displays the skills detected in the resume and job description, the matched skills, the missing skills, and the calculated match percentage. These outputs help users identify which required skills are present in their resumes and which may need further attention.

The current implementation uses predefined keywords and rule-based matching. It does not use a trained machine-learning model or semantic language understanding. PDF extraction is limited to text that can be extracted from the uploaded document.

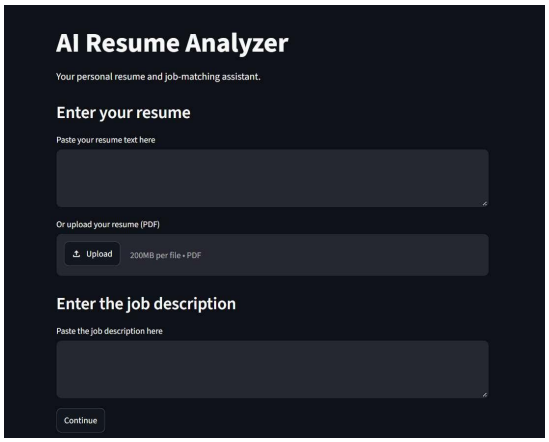


Fig. 2. User interface of the AI Resume Analyzer and Job Matching Portal.

VI. TESTING AND RESULTS

The proposed system was tested to examine its main functions, including skill identification, comparison of resume skills with job requirements, match percentage calculation, input validation, and PDF text extraction. The tests were designed to verify whether the application produced the expected outputs for different input conditions.

During one observed test, the job description contained seven detected skills. The system identified five matched skills and two missing skills, resulting in a match percentage of approximately 71.4%. This result demonstrates the operation of the matching formula for that specific input and does not represent the overall accuracy of the system.

The testing process also considers empty inputs and PDF uploads to assess input validation and document processing. The results should be recorded from actual executions of the application. The system's performance is currently evaluated through functional testing rather than a large-scale dataset or comparison with expert judgments.

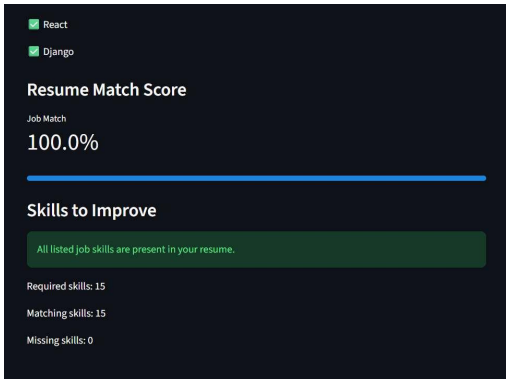


Fig. 3. Match score output of the application (job match 100.0%).



Fig. 4. Skills to improve output of the application (match 33.3%).

TABLE I
TEST CASES

Test ID	Test performed	Expected result	Pass/ Fail
TC1	Enter resume and job description	Skills are detected	Pass
TC2	Compare overlapping skills	Matched skills are displayed	Pass
TC3	Include skills missing from resume	Missing skills are displayed	Pass
TC4	Submit empty input	Validation message appears	Pass
TC5	Upload a text-based PDF	PDF text is extracted	Pass

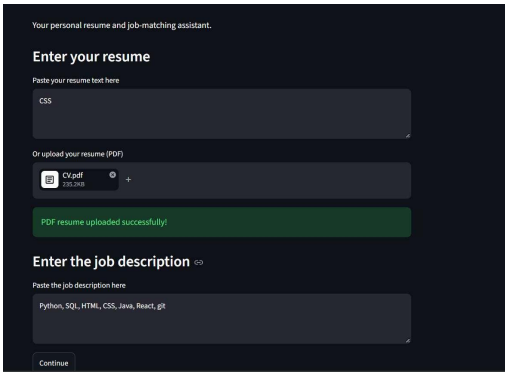


Fig. 5. Resume upload and job description input screen of the application.

VII. DISCUSSION AND LIMITATIONS

The developed AI Resume Analyzer and Job Matching Portal provides a simple approach to comparing resume skills with job requirements. By identifying matched and missing skills and calculating a match percentage, the system helps users understand how their resumes correspond to a particular job description. The use of a web-based interface also makes the analysis process straightforward.

In the observed test case, the system detected seven skills in the job description, of which five were matched with the resume and two were missing. The calculated match percentage was approximately 71.4%. This result illustrates the system's calculation procedure for the tested input. However, it does not establish the accuracy or effectiveness of the system across different resumes and job descriptions.

The current implementation has several limitations. First, it relies on a predefined list of skills, so skills outside the list may not be identified. Second, keyword matching does not

understand the contextual meaning of words or recognize all equivalent skill expressions. Third, the match percentage considers detected skills only and does not evaluate work experience, education, project quality, or other recruitment criteria. Finally, PDF text extraction may not work correctly for scanned documents containing images rather than selectable text.

These limitations provide opportunities for future development. The system could be extended with a larger skill vocabulary, natural language processing, semantic similarity techniques, optical character recognition for scanned documents, and evaluation using a larger collection of resumes and job descriptions.

VIII. CONCLUSION

This paper presented the development of an AI Resume Analyzer and Job Matching Portal using Python and Streamlit. The system compares resume information with job descriptions by identifying predefined skills, displaying matched and missing skills, and calculating a job-match percentage. The prototype demonstrates a straightforward approach to reducing the effort involved in manually comparing resume skills with job requirements.

In the observed test case, five out of seven detected job-description skills matched the resume, resulting in a match percentage of approximately 71.4%. This result demonstrates the calculation performed for that specific input and does not establish the overall accuracy of the system. The current implementation is limited by its predefined skill vocabulary and keyword-based matching approach.

Future improvements may include expanding the skill database, incorporating natural language processing and semantic matching, supporting scanned PDF documents through optical character recognition, and evaluating the system with a larger dataset. These enhancements could help improve the system's coverage and usefulness in resume analysis and job matching.

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