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SkillSync AI

Smart Resume Analysis and Skill Gap Detection System

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Abstract— Resume filtering is a crucial step in contemporary hiring practice since most companies receive many resumes against relatively few openings. Screening of resumes by hand can be laborious and subjective, and the candidates themselves often do not know about the requirements for the positions they apply to. This gap between actual industry standards and the resumes of candidates is a major issue addressed in this project by means of a SkillSync AI. The process utilizes AI and NLP methodologies to analyze the resume and gather important information about skills, educational background, and experience. The gathered skills are compared with the job description by applying similarity techniques like TF-IDF and cosine similarity. On this basis, the system detects any skill gaps and generates a score that denotes the compatibility of the individual to the job position. It is worth mentioning that the proposed model generates personal recommendations, learning opportunities, and improvement areas for individuals to improve their employability prospects.

Keywords: *Artificial Intelligence (AI), Natural Language Processing (NLP), SkillSync AI, Resume Analysis, Skill Gap Detection, TF-IDF, Cosine Similarity, Recruitment Automation, Skill Matching, Career Guidance.*

I. INTRODUCTION

Resume analysis is a big part of the recruitment process because organizations often receive hundreds of resumes for a single job position. Recruiters have difficulty manually screening resumes in a limited time. Traditional methods for candidate selection are time-consuming, error-prone, inconsistent, and biased.

Resume screening is difficult because of the following factors:

- A large number of applications
- Process of manual evaluation
- Candidate skill awareness deficit
- Long recruitment process

Modern recruiting systems produce a massive amount of textual data in the form of resumes and job descriptions. using Artificial Intelligence and Natural Language Processing techniques to efficiently process this data and extract meaningful insights.

A SkillSync AI is included in this project to help users:

- Resume analysis automation
- Extraction of technical skills
- Skills & Job Requirements
- Identify skills gaps
- Suggestions for improving employability.

II. LITERATURE REVIEW

There are few research studies on AI-based recruitment systems and resume analysis techniques.

A. Resume Parsing using NLP

Natural Language Processing techniques are used to extract structured information from resumes such as skills, education, and work experience.

B. Machine Learning Resume Matcher

Machine learning algorithms and similarity techniques are used to match resumes with job descriptions and find the best candidates.

C. Skill Gap Recognition Systems

Modern recruitment tools analyze the candidate profiles and identify the missing competencies required for specific job roles.

D. AI-Powered Recruitment Automation

AI-based systems automate candidate screening and ranking, reducing the workload of recruiters and improving efficiency.

III. PROBLEM STATEMENT

Traditional resume screening systems face several challenges, including:

- Manual and time-consuming evaluation
- Human bias during recruitment
- Difficulty in analyzing large numbers of resumes
- Lack of personalized career guidance
- Inability to identify skill gaps accurately

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Because of these limitations, many candidates struggle to understand industry requirements and improve their profiles effectively.

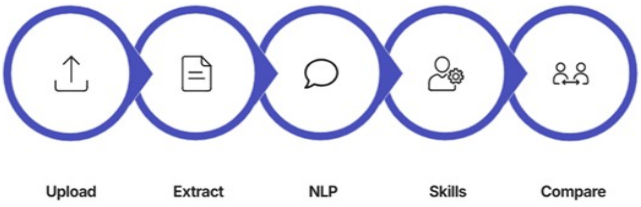
IV. Proposed System

The proposed system is an SkillSync AI that automates resume analysis and offers smart recommendations.

1 System Architecture

The system has a three-tier structure:

- **Frontend:** This is the user interface for uploading resumes and displaying results.
- **Backend:** This handles resume processing, NLP analysis, and skill matching.
- **Database:** This stores resumes, job descriptions, and extracted skills.



2 AI and NLP Analysis

The system uses AI and NLP techniques to:

- Extract text from resumes
- Identify technical skills
- Process job descriptions
- Calculate similarity scores
- Detect skill gaps

3 System Features

- Resume upload and parsing
- Skill extraction
- Job description analysis
- Match score calculation
- Skill gap identification
- Personalized recommendations
- Learning path suggestions

4 System Modules

1. Resume Upload Module

- Upload resumes in PDF format
- Validate uploaded files

2. Resume Parsing Module

- Extract text from resumes
- Convert unstructured data into a structured format

3. Skill Extraction Module

- Identify technical skills from resumes
- Match skills with predefined databases

4. Job Description Processing Module

- Extract required skills from job roles
- Prepare data for comparison

5. Skill Matching Module

- Compare resume skills with job requirements
- Calculate match score

6. Skill Gap Identification Module

- Detect missing skills
- Analyze candidate weaknesses

7. Recommendation Module

- Suggest skills to improve
- Provide career guidance

8. Result & Report Module

- Display match score
- Show skill gaps and recommendations

V. Implementation

The system is developed using modern technologies:

- **Frontend:** HTML, CSS, JavaScript
- **Backend:** Python, Flask
- **Database:** SQLite / MySQL
- **Libraries:** NLTK, Scikit-learn, PyPDF2

When people upload their resumes in PDF format, the system uses special tools to pull out the important information. Then, it compares this information to job descriptions using some complex math to see how well they match. This math is called TF-IDF and cosine similarity, and it helps figure out how similar the resume is to the job.

The output includes:

- Match percentage
- Extracted skills
- Missing skills
- Improvement recommendations

VI. Results and Discussion

The developed system was tested with sample resumes and job descriptions, producing effective results.

Key Outcomes

- Accurate resume analysis
- Efficient skill extraction
- Proper match score calculation
- Clear identification of missing skills
- Personalized learning recommendations

Benefits

- Reduces recruiter workload
- Saves time in recruitment
- Helps candidates improve employability
- Provides data-driven career insights
- Limitations

The system performance depends on:

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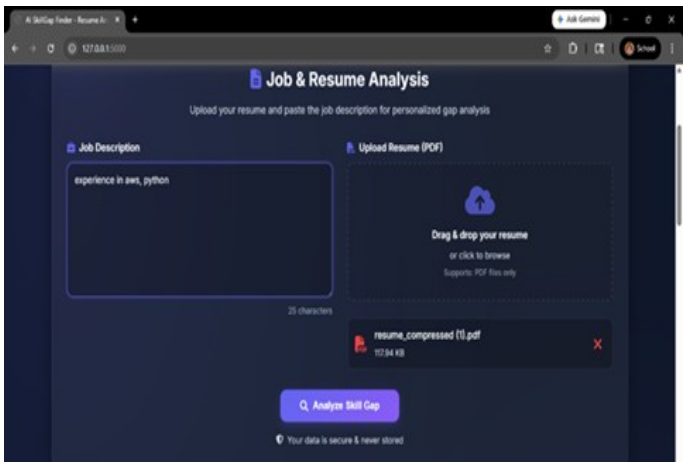
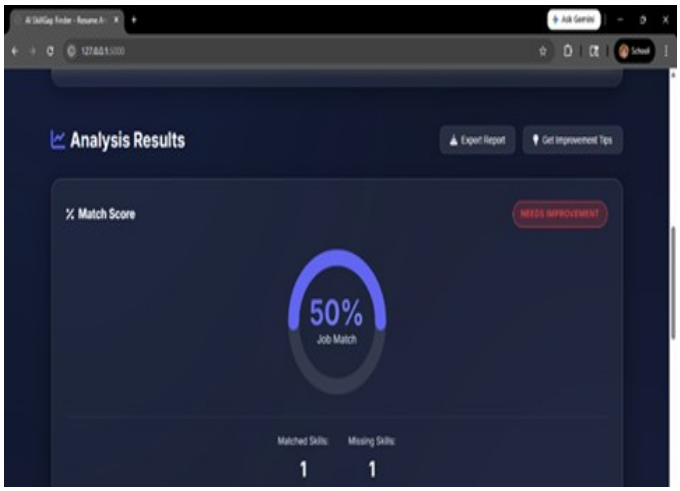
- Quality of resume data
- Accuracy of job descriptions
- Completeness of skill database.





VII. Conclusion

The SkillSync AI provides a smart and efficient solution for modern recruitment challenges. By integrating Artificial Intelligence and Natural Language Processing, the system automates resume screening, extracts relevant skills, and identifies skill gaps effectively. This project is a big help in making the recruitment process easier and less time-consuming. It also assists candidates in getting a better understanding of the skills they need to have for the job they want. By giving users personalized suggestions and learning recommendations, they can make their resumes more attractive and boost their chances of getting selected. This way, they can focus on improving the skills that really matter for their dream job.

VIII. Future Work

Future enhancements of the project may include:

- Integration with online job portals
- Real-time resume ranking system
- Advanced Deep Learning models
- LinkedIn and GitHub profile analysis
- AI chatbot for career guidance

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