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Placement Preparation Tool & Career Guidance for Students using ML

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Abstract

This innovative project aims to transform the landscape of career guidance and job placement by offering a comprehensive suite of tools designed to empower users in their professional journeys. The first module features a Resume Analyzer that allows users to upload their resumes for thorough analysis using advanced AI algorithms. The system provides detailed feedback and suggestions, enabling users to create more compelling and tailored resumes while recommending job opportunities that align with their skills and qualifications. The second module focuses on enhancing self-introduction skills, crucial for career success, by allowing users to upload self-introduction videos for AI-driven analysis of communication style, body language, and presentation, offering actionable insights for improvement. The third module provides tailored Mock Tests that evaluate users' performance, identify strengths, and generate personalized career recommendations. Newly added features include an Aptitude Test module for assessing cognitive abilities, a Salary Analysis tool for providing insights into potential earnings, and Course Reference links to address users' weaknesses with targeted learning resources. Collectively, this project has the potential to revolutionize career development by equipping individuals with the essential tools, insights, and resources needed to thrive in a competitive job market.

Keywords: CNN, AI , Deep learning, Mock Interview, Test, Job analysis

INTRODUCTION

Finding the right career path and preparing for job opportunities has always been a big challenge for many people. Traditionally, students and job seekers had to rely on career counselors, generic resume templates, or random online resources, which often

didn't provide personalized or actionable advice. Many struggled with creating effective resumes, preparing for interviews, understanding their strengths, or even knowing what courses could help them improve. There was no single platform that offered a complete, personalized career development experience.

Our project aims to solve these problems by offering an all-in-one career guidance and job placement platform powered by AI. We provide a Resume Analyzer that gives personalized feedback to make

resumes more powerful and relevant to the job market. We also introduced a Self-Introduction Video Analyzer to help users improve their communication and presentation skills — something traditional methods often overlooked. In addition, we offer tailored Mock Tests, Aptitude Tests, Salary Analysis, and Course References to guide users toward the right career path and help them grow professionally. With all these tools in one place, users now have everything they need to confidently build their careers.

LITERATURE SURVEY

[1] Chamudini Athukorala; Hirusha Kumarasinghe; Kavishka Dabare, Business Intelligence Assistant for Human Resource Management for IT Companies, 2022 20th International Conference on Advances in ICT for Emerging Regions (ICTer): The advancement in technology is exponential. Moore's law supports this argument, by stating that the computing power doubles every two years. In such a premise, many IT companies have risen to meet the challenges. These companies provide various solutions in various fields of enterprises, pushing the limits of technology. Human resource is considered the most important asset in any organization. In order to utilize this asset beneficially, an organization must have great Human Resource Management practices. This includes practices from recruitment until employee termination. One great employee can offset the work of several regular employees. IT companies strive to acquire and retain such talent. But this is not a simple task. It requires resources including manpower and time. There should be knowledgeable individuals to handle important human resource processes, and many organizations lack these. They do not have enough time or labor to invest in good human resource processes.

Technology: Business Intelligence (BI) systems

Advantages: Enhances HR practices by leveraging BI tools for decision-making.

Disadvantages: Requires significant resources, including manpower and time.

[2] Rasika Ransing; Akshaya Mohan, Screening and Ranking Resumes using Stacked Model 2022 5th International Conference on Electrical, Electronics, Communication, Computer Technologies and Optimization Techniques (ICEECCOT): Talent acquisition is essential for all companies irrespective of the size of their business. As it is next to impossible to look through numerous resumes manually, we have created an automated resume screening application. This system makes use of Machine Learning algorithms such as KNN, Linear SVC, and XGBoost. A two-level stacked model containing all these algorithms is constructed which helps in predicting specific job profiles from a text description accurately. This framework can be valuable for organizations to waitlist competitors and furthermore for the applicants who can check if their resume is very much shaped for the system to recognize right work profiles from it. A ranking system is also implemented, for the companies, featuring the most relevant profiles on the top.[2].

Technology: Machine Learning algorithms (KNN, Linear SVC, XGBoost) in a stacked model

Advantages: Automates the resume screening process, saving time and effort.

Disadvantages: The model's accuracy depends on the quality of the data and resumes provided.

[3] Tumula Mani Harsha; Gangaraju Sai Moukthika; Dudipalli Siva Sai, Automated Resume Screener using Natural Language Processing(NLP), 2023 6th International Conference on Trends in Electronics and Informatics (ICOEI): Resume Screening is the process of evaluating the resume of the job seekers based on a specific requirement. It is used to identify the candidate eligibility for a job by matching all the requirements needed for the offered role with their resume information

Technology: Natural Language Processing (NLP)

Advantages: Efficiently evaluates resumes by matching job requirements with candidate information.

Disadvantages: May struggle with diverse or unstructured resume formats.

[4] Cherry D. Casuat; Enrique D. Festijo, Predicting Students' Employability using Machine Learning Approach, 2023 IEEE 6th International Conference on Engineering Technologies and Applied Sciences (ICETAS): This study aims to apply an approach using machine learning for predicting students' employability. The researchers conducted a case study that involved 27,000 information (3000 observations and 9 features) of students' Mock Job Interview Evaluation Results, On-the Job Training (OJT) Student Performance Rating and General Point Average (GPA) of students enrolled in OJT course of School Year 2015 to School Year 2018. Three learning algorithms were used such as Decision Trees (DT), Random Forest (RF), and Support vector machine (SVM) in order to understand how students get employed. The three algorithms were evaluated through the performance matrix as accuracy measures, precision and recall measures, f1-score and support measures. During the experiments Support Vector machine (SVM) obtained 91.22% in accuracy measures which was significantly better than all of the learning algorithms, DT 85%, RF 84%. The learning curve produced during the experiment displays the training error results which were above the one for validation error while the validation curve displays the testing output where gamma was best at 10 to 100 in gamma 5. This concludes that the model produced with SVM was not underfit and over-fit

Technology: Machine Learning (Decision Trees, Random Forest, Support Vector Machine)

Advantages: Predicts students' employability with high accuracy, aiding educational institutions and students.

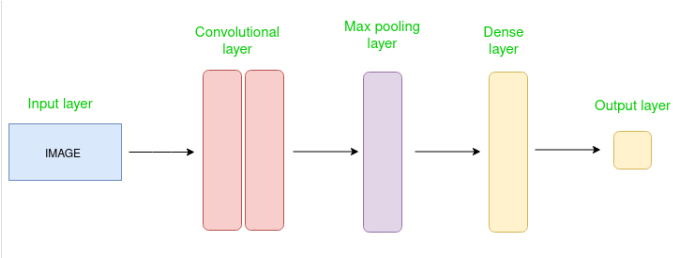
Disadvantages: Model performance can vary depending on the dataset and features used.

METHODOLOGY

`1. Convolutional Neural Network (CNN)

CNN is applied in the Self-Introduction Video Analyzer for image recognition and processing. CNN's ability to recognize patterns in video frames allows the system to evaluate non-verbal cues like facial expressions, gestures, and body language. The network consists of several layers:

- Convolutional Layer: Responsible for detecting patterns like edges and textures in video frames using convolution operations.



Formula:

Feature Map=∑(Input Image∗Filter)+Bias

where ∗denotes convolution.

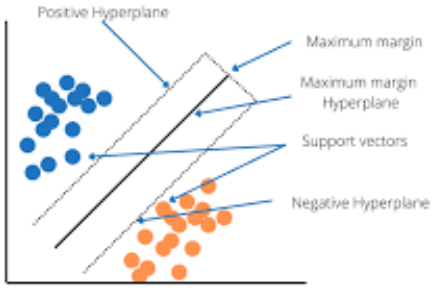
- Pooling Layer: This reduces the dimensionality of the data while preserving the most important information.

- Fully Connected Layer: The final layer classifies the extracted features into different categories such as confident, neutral, or nervous behaviour.

2. Support Vector Machine (SVM)

SVM is used in the Resume Analyzer and Aptitude Test Module to perform classification and regression tasks. SVMhelps in identifying whether a resume meets certain thresholds of quality or if a candidate fits into specific job roles based on skill matching.

The SVM algorithm works by identifying a hyperplane that best separates data into different classes. For instance, in the Resume Analyzer, SVM classifies resumes into "strong" and "weak" categories based on a set of features such as keywords, structure, and readability.



- SVM Objective Function: Minimize:

$$\frac{1}{2}\|\mathbf{w}\|^2 + C\sum_{i=1}^{n}\xi_i$$

Subject to:

$$y_i(\mathbf{w}\cdot\mathbf{x}_i + b) \geq 1 - \xi_i \quad \forall i$$

where:

- **w**is the weight vector,
- C is a regularization parameter,
- ξiis a slack variable that allows for some misclassification.

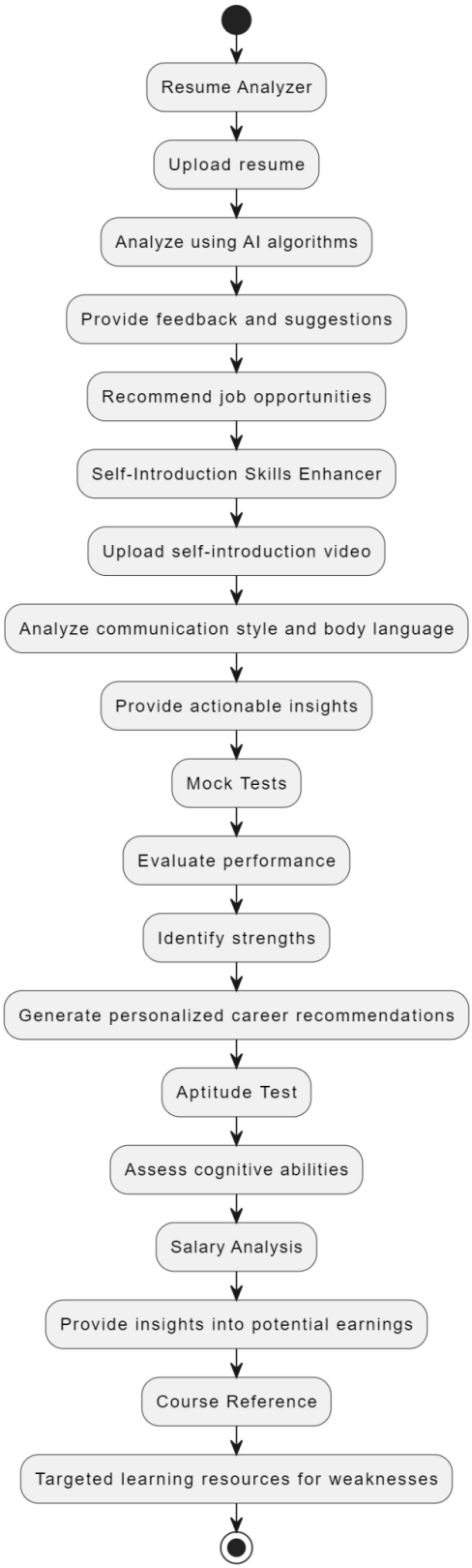
OBJECTIVE

The primary objective of this project is to develop an integrated suite of career guidance and job placement tools that empower individuals in their professional journeys. This includes creating a Resume Analyzer that provides users with detailed feedback and suggestions, enabling them to craft compelling and tailored resumes that effectively showcase their skills and qualifications. Additionally, the project aims to design a Self-Introduction Analyzer that evaluates users' self-introduction videos, offering actionable insights on communication style, body language, and overall presentation to enhance their interview skills.

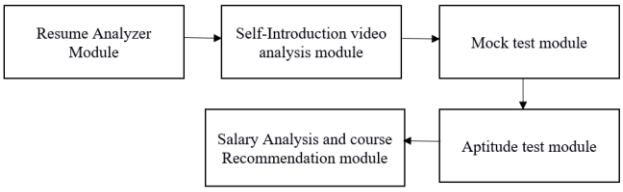
Furthermore, the implementation of a Mock Test module is intended to evaluate users' performance in various assessments, identifying strengths and areas for improvement while generating personalized career recommendations based on their skills and interests. The development of an Aptitude Test module will assess users' cognitive and problem-solving abilities, providing insights into potential career paths that align with their strengths. To support users in setting realistic expectations during their job search, the project will integrate a Salary Analysis feature that offers insights into potential earnings based on their qualifications.

Moreover, Course Reference links will be provided to address users' weaknesses, offering targeted resources that facilitate skill development and improve their employability. Lastly, mechanisms for ongoing feedback collection and system updates will be established to ensure that the tools remain relevant and effective in meeting the evolving needs of users in the competitive job market.

FLOW CHART


Resume Analyzer
Upload resume
Analyze using AI algorithms
Provide feedback and suggestions
Recommend job opportunities
Self-Introduction Skills Enhancer
Upload self-introduction video
Analyze communication style and body language
Provide actionable insights
Mock Tests
Evaluate performance
Identify strengths
Generate personalized career recommendations
Aptitude Test
Assess cognitive abilities
Salary Analysis
Provide insights into potential earnings
Course Reference
Targeted learning resources for weaknesses

ARCHITECTURE DIAGRAM



FUCTIONAL REQUIREMENTS

a) Resume Analyzer Module: Users can upload resumes in various formats (PDF, DOCX).The system analyses the content for grammar, structure, and relevance.It provides feedback and suggestions for improvement.

b) Self-Introduction Analyzer Module: Users can upload self-introduction videos.The system analyses key elements such as body language, tone, and clarity.It generates actionable feedback to enhance presentation skills.

c) Mock Test Module: Users can take various types of mock tests (e.g., multiple-choice, situational judgment).The system evaluates performance and provides results.It generates personalized career recommendations based on test outcomes.

e) Aptitude Test Module: Users can take aptitude tests assessing cognitive and problem-solving abilities.The system evaluates responses and suggests suitable career paths.

f) Salary Analysis Feature: The system provides salary insights based on user qualifications and industry data.Users can compare potential salaries for different roles.

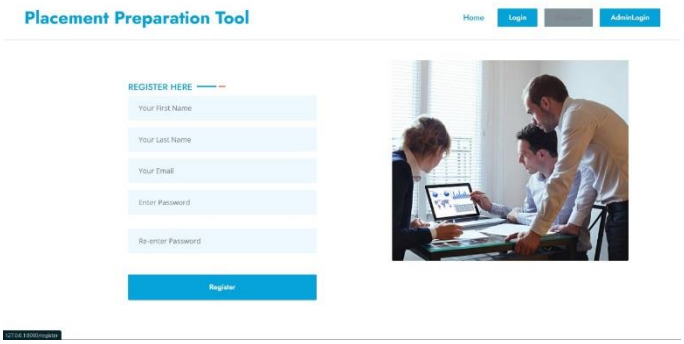
g) Course Reference Links: The system suggests online resources and courses tailored to users' identified weaknesses. Users can access external learning materials directly from the platform.

h) User Account Management: Users can create, edit, and manage their profiles.The system allows users to save their analyses and recommendations for future reference.

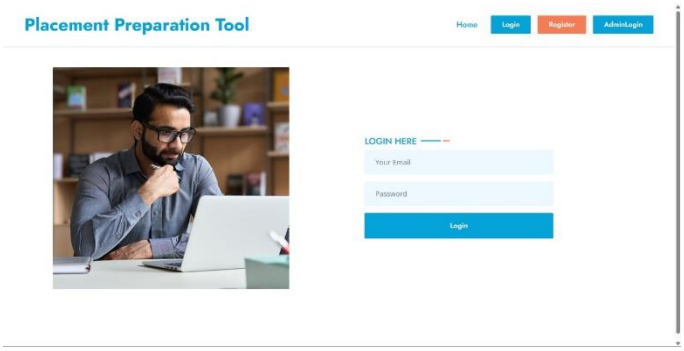
i)Feedback Mechanism: Users can provide feedback on the tool's functionality and suggestions for improvement. The system should allow for ongoing updates based on user input.

RESULTS

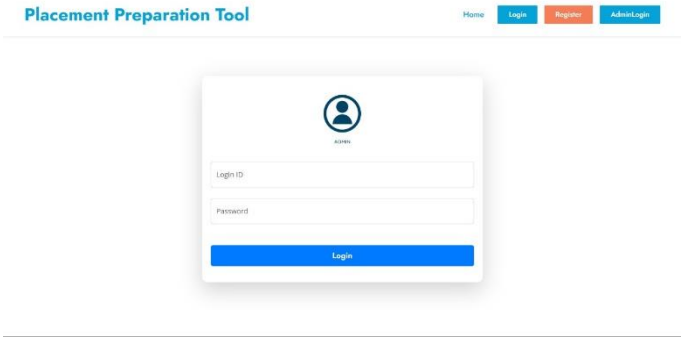
Fig(a): Home Page



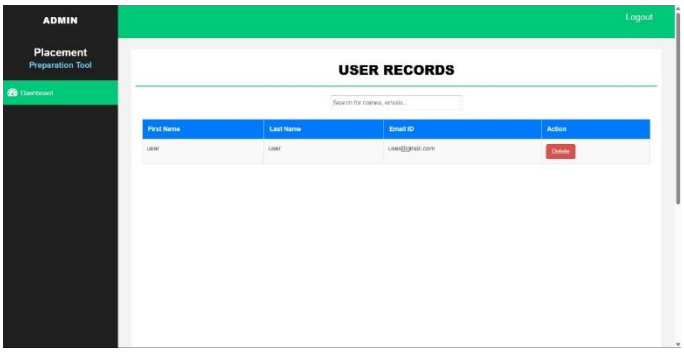
Fig(b): Registration Page



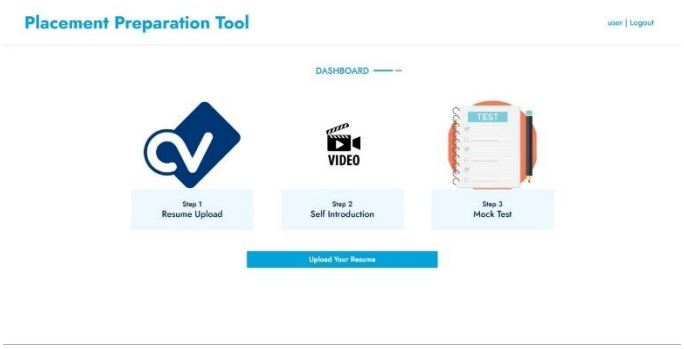
Fig(c): Login Page



Fig(d): Admin Login Page



Fig(e): Admin Dashboard Page



Fig(f): Dashboard Page

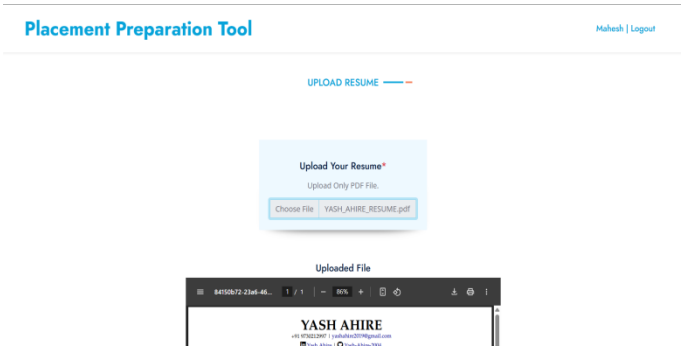


Fig (g). Upload Resume Page

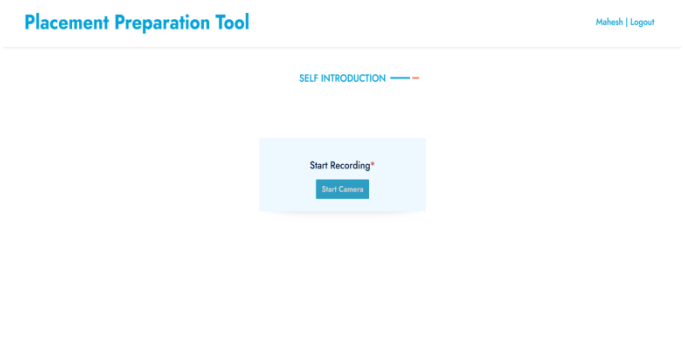


Fig (h). Self-Introduction Video Page

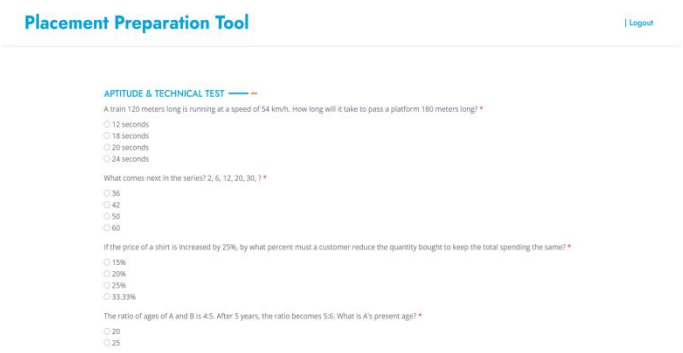


Fig (i). Aptitude & Technical Test Page

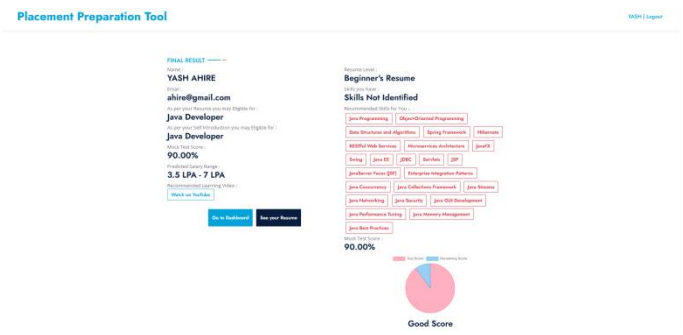
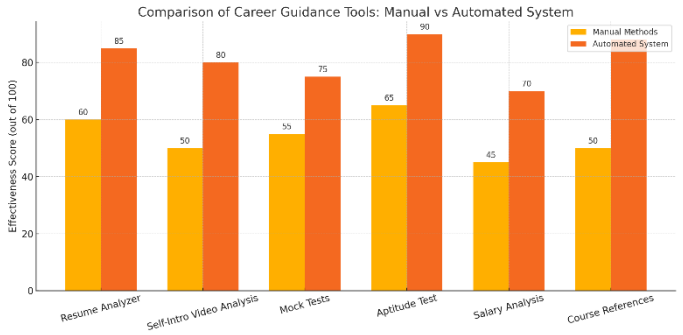
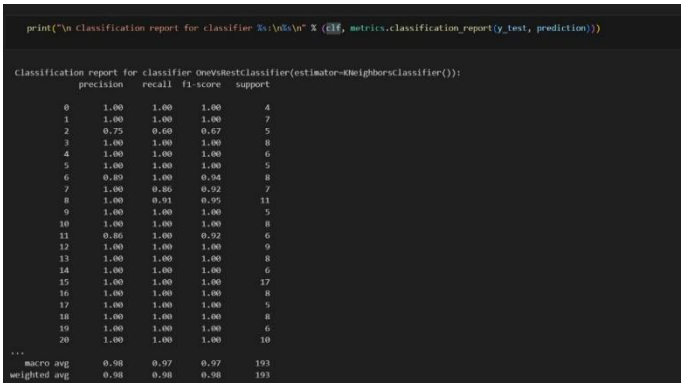


Fig (j). Final Output Page



Fig(g): Comparison bar chart



Fig(h): Precision,Recall, F1-Score & Support Chart

CONCLUSION

In conclusion, this project represents a transformative approach to career guidance and job placement by integrating advanced AI-powered tools into a unified platform. By addressing key challenges such as resume optimization, self-introduction skills, and personalized career recommendations, the system enhances users' employability and provides them with actionable insights for career growth. The inclusion of aptitude assessments, salary analysis, and targeted learning resources ensures that individuals can align their career paths with their strengths, qualifications, and market trends. Ultimately, this platform equips users with the tools necessary to navigate the competitive job market with confidence, maximizing their potential for success.

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