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AN INTELLIGENT AI-BASED FRAMEWORK FOR STUDENT TRAINING AND PLACEMENT READINESS ASSESSMENT

Pallavi.T.M[1] Manjunath.S[2],

MCA 2nd Year [1],Head of the Department[2] Department of Computer Science and Applications [1,2]

S.E.A College of Science, Commerce and Arts, Autonomous

pallavigowda8453@mail.com[1], manjus.reddy@mail.com[2]

Abstract

The increasing competition in the employment sector requires students to develop technical skills, communication abilities, interview skills, and professional readiness beyond academic performance. Conventional placement preparation methods often handle training, assessments, mock interviews, resume evaluation, and career guidance separately, making continuous and personalized evaluation difficult. To address this limitation, this paper presents AI-TPRS (AI-Powered Training and Placement Readiness System), an integrated web-based platform designed to support students throughout the placement preparation process. The proposed system integrates course-based learning, aptitude and technical assessments, AI-powered mock interviews, resume analysis, career-readiness evaluation, and placement-readiness scoring. The system is developed using Python Flask for backend processing, MySQL for data management, and Google Gemini AI for intelligent functions such as interview question generation, answer evaluation, resume analysis, and career insights. Student performance from different activities is combined to calculate an overall

readiness score and classify students as Ready, Training, or Not Eligible. The system also provides an administrative environment for managing students, courses, assessments, resumes, reports, certificates, and placement settings. Experimental evaluation demonstrated that the major modules function correctly and communicate effectively, providing a centralized and data-driven approach to placement preparation. The proposed system helps students identify skill gaps, monitor their progress, receive personalized feedback, and improve their overall placement readiness.

Keywords: Artificial Intelligence, Generative AI, Placement Readiness, Student Assessment, Mock Interview, Resume Analysis, Career Readiness, Google Gemini, Flask, MySQL.

Introduction

The rapid transformation of the employment landscape has increased the importance of technical skills, communication abilities, problem-solving capabilities, and overall career preparedness among students. Academic performance alone is often insufficient to determine whether a student is prepared to meet the requirements of modern recruitment processes. Students need continuous training, practical assessments, interview practice, resume development, and personalized guidance to identify their strengths and areas requiring improvement. However, conventional placement preparation systems generally provide these activities as separate processes and often depend on manual evaluation, making continuous and personalized assessment difficult.

Recent developments in Artificial Intelligence (AI) and Generative AI provide opportunities to improve student training and career preparation. AI can assist in generating assessment and interview questions, evaluating responses, analyzing resumes, identifying skill gaps, and providing personalized recommendations. Generative AI models can further support interactive learning and evaluation by producing context-aware feedback based on

student inputs. However, an effective placement preparation platform requires these capabilities to be integrated with structured learning, assessments, performance tracking, and placement-readiness evaluation within a single system.

To address these challenges, this research proposes AI-TPRS (AI-Powered Training and Placement Readiness System), an intelligent web-based platform designed to support students throughout the placement preparation process. The proposed system integrates course-based learning, aptitude and technical assessments, AI-powered mock interviews, resume analysis, career-readiness evaluation, and placement-readiness assessment. The system uses Python Flask for backend processing, MySQL for data management, and Google Gemini AI for intelligent functions such as interview question generation, answer evaluation, resume analysis, and career insights. Student performance from different activities is combined to determine an overall placement-readiness status.

The system also provides an administrative environment for managing students, courses, assessments, interview configurations, resumes, reports, certificates, and evaluation settings.

This enables administrators to monitor student performance and maintain consistent placement-related information. By integrating training, assessment, AI-based evaluation, and performance analytics, AI-TPRS aims to provide a centralized and personalized approach to placement preparation, helping students understand their current readiness, identify areas for improvement, and prepare more effectively for recruitment processes.

Litecture Review

Artificial Intelligence (AI) is increasingly being applied in education to provide personalized learning, automated assessment, and continuous feedback. Recent systematic research has shown that AI-based personalized learning can support individual student needs and improve learning and assessment practices. A systematic review published in 2025

analyzed 125 studies and identified significant opportunities for AI to enhance personalized learning while also highlighting challenges related to implementation and responsible use. Generative AI has further expanded these possibilities; a systematic review of 19 empirical studies found that Generative AI is being explored for educational assessment, feedback, and learning support, while emphasizing the need for appropriate evaluation and responsible implementation.

AI-based assessment has also been investigated for evaluating open-ended student responses and providing faster feedback. Research reviews indicate that automated assessment can reduce the time required for manual evaluation and support consistent feedback. At the same time, AI-based educational systems may face challenges such as inaccurate outputs, over-reliance on AI, privacy concerns, and the need for human oversight. Recent research therefore emphasizes that AI should complement structured educational processes rather than completely replace human judgment.

Although existing studies demonstrate the usefulness of AI for personalized learning, assessment, feedback, and career-related support, these functionalities are often implemented as separate solutions. The proposed AI-TPRS (AI-Powered Training and Placement Readiness System) addresses this gap by integrating course-based training, aptitude and technical assessments, AI-powered mock interviews, resume analysis, career-readiness evaluation, and placement-readiness scoring within a single platform. The system uses Google Gemini AI for question generation, answer evaluation, resume analysis, and career insights, while Python Flask and MySQL manage application processing and student performance data. This integrated approach aims to provide students with continuous evaluation, personalized improvement insights, and a comprehensive measure of their placement readiness.

Problem Statement

The increasing competition in the job market requires students to develop technical skills, communication abilities, interview skills, and professional resumes along with academic knowledge. However, existing placement preparation methods are often fragmented, with training, assessments, mock interviews, resume evaluation, and career guidance handled separately. This makes it difficult for students to continuously monitor their performance and identify areas for improvement.

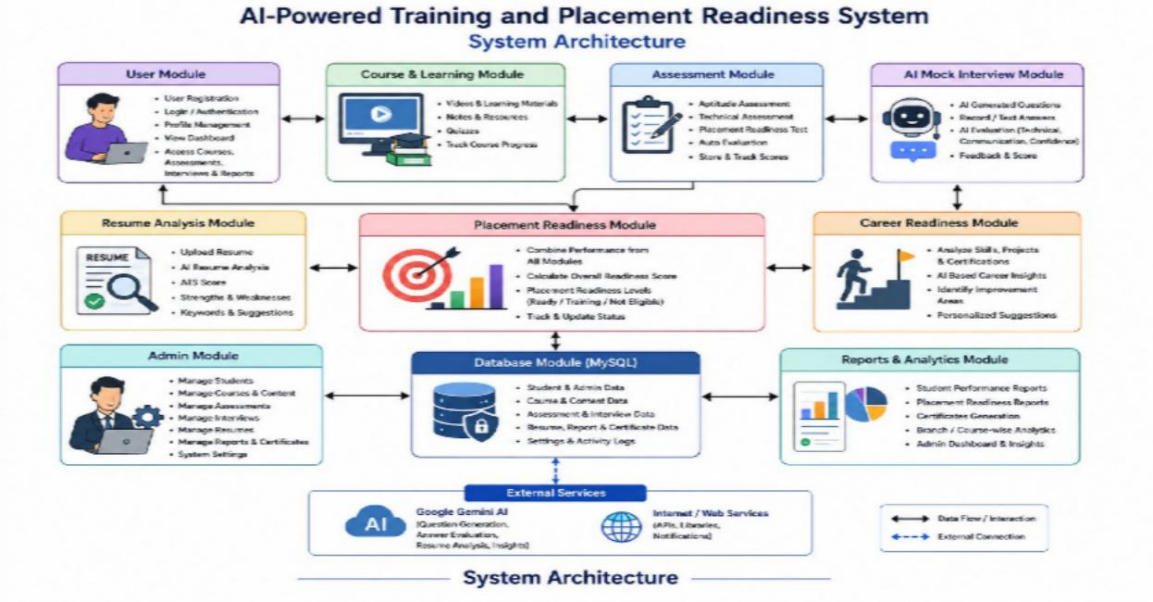
Therefore, there is a need for an integrated and intelligent placement preparation system that can evaluate student performance, provide personalized feedback, and determine overall placement readiness. The proposed AI-TPRS (AI-Powered Training and Placement Readiness System) addresses this need by integrating training, assessments, AI-powered mock interviews, resume analysis, career evaluation, and placement-readiness scoring into a single platform. The system also provides administrators with centralized tools for managing students, courses, assessments, reports, certificates, and placement criteria.

System Architecture

The proposed AI-Powered Training and Placement Readiness System (AI-TPRS) consists of multiple integrated modules that work together to provide a complete platform for student placement preparation. The User Module allows students to register, log in, manage their profiles, access courses, and monitor their performance. The Course and Learning Module provides videos, notes, and quizzes to help students develop the required technical and professional skills. The Assessment Module conducts aptitude, technical, and placement-readiness assessments and records the results. The AI Mock Interview Module uses Google Gemini AI to generate interview questions, evaluate student responses, and provide feedback on technical knowledge, communication, and confidence. The Resume Analysis Module evaluates student resumes and provides ATS scores, strengths, missing sections, keywords,

and improvement suggestions. The Career Readiness Module analyzes student profile, projects, certifications, and assessment performance to provide AI-based career insights. The Placement Readiness Module combines performance from courses, assessments, mock interviews, resume analysis, and career evaluation to calculate the overall readiness score and classify students.

Figure 1:System Architecture



Ready, Training, or Not Eligible. The Admin Module enables administrators to manage students, courses, assessments, interview configurations, resumes, reports, certificates, and system settings. The Reports and Analytics Module provides performance statistics, student reports, certificates, and administrative analytics. Finally, the Database Module, implemented using MySQL, securely stores user information, course progress, assessment results, interview records, resumes, reports, certificates, settings, and activity logs. This integrated architecture combines web technologies, database management, and Generative AI to provide a centralized, intelligent, and systematic approach to student training and placement readiness.

Modules

The proposed AI-Powered Training and Placement Readiness System (AI-TPRS) is divided into several interconnected modules to provide a structured and intelligent placement preparation environment. Each module performs a specific function while sharing data with other modules to continuously evaluate and improve the student's placement readiness.

User Module

- User registration and login
- Profile, skills, projects, and certification management
- Access to courses, assessments, interviews, and reports

Course and Learning Module

- Provides videos and learning notes
- Conducts course quizzes
- Tracks module and course progress

Assessment Module

- Conducts aptitude, technical, and placement assessments
- Evaluates student responses
- Stores assessment scores

AI Mock Interview Module

- Generates interview questions using Gemini AI
- Evaluates technical and HR responses
- Provides interview scores and feedback

Resume Analysis Module

- Analyzes student resumes using AI
- Generates ATS score and identifies missing sections
- Provides resume improvement suggestions

Career Readiness Module

- Analyzes skills, projects, certifications, and assessments
- Generates AI-based career insights
- Identifies areas for improvement

Placement Readiness Module

- Calculates overall placement readiness score
- Combines course, assessment, interview, resume, and career performance
- Classifies students as Ready, Training, or Not Eligible

Admin Module

- Manages students and courses
- Manages assessments and mock interview settings
- Manages resumes, reports, certificates, and system settings

Reports and Analytics Module

- Displays student performance and placement statistics
- Generates reports and certificates
- Provides branch-wise and performance-based analytics

Methodology

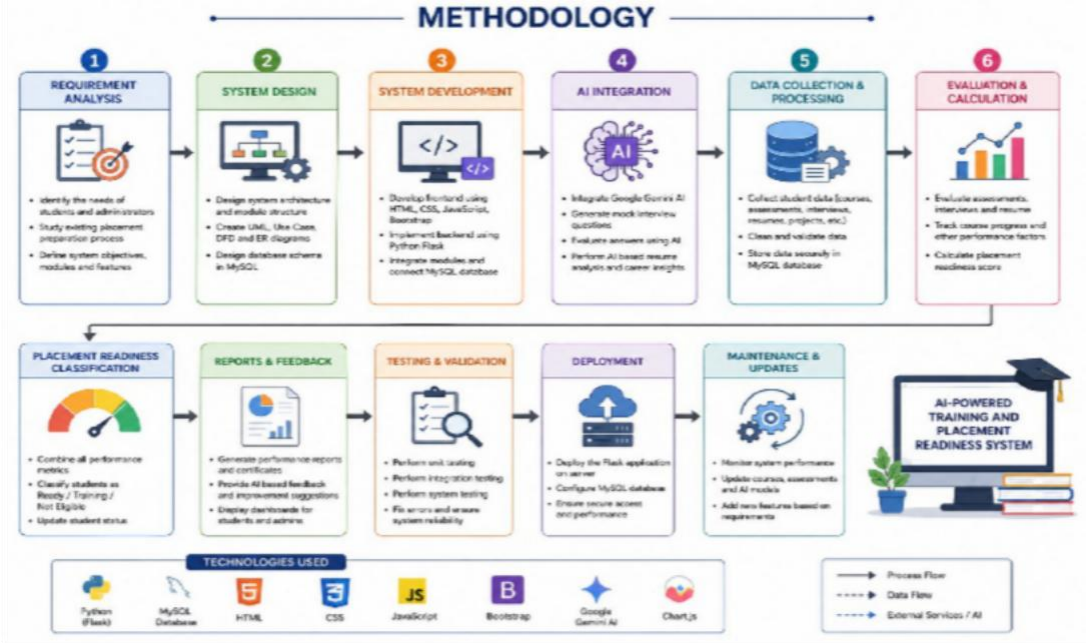
The methodology of the AI-Powered Training and Placement Readiness System (AI TPRS) follows a structured approach to provide effective, intelligent, and data-driven placement preparation. Initially, student information such as profile details, skills, projects, certifications, course progress, assessment results, mock interview performance, and resume information is collected through the system. The collected data is securely stored in the MySQL database and serves as the foundation for evaluating student performance. The system then provides structured training through courses, videos, notes, and quizzes, followed by aptitude, technical, and placement-readiness assessments. The AI module uses

Google Gemini to generate mock interview questions, evaluate student responses, analyze resumes, and provide career-readiness insights. The collected performance information is then processed by the placement-readiness engine to calculate an overall score and classify students as Ready, Training, or Not Eligible. Finally, the system generates performance reports, certificates, feedback, and analytics for students and administrators. This methodology provides a centralized and intelligent approach to continuous student evaluation and placement preparation.

Step 1 — Data Collection

- Student profile, skills, projects, and certifications are collected.
- Course progress, assessment results, interview responses, and resume information are recorded.

Figure 2 :Methodology



Step 2 — Training and Assessment

- Students complete videos, notes, and quizzes.
- Aptitude, technical, and placement-readiness assessments are conducted.

Step 3 — AI-Based Evaluation

- Gemini AI generates mock interview questions.
- Student responses are evaluated for technical knowledge, communication, and confidence.
- Resumes and career-readiness information are analyzed using AI.

Step 4 — Placement Readiness Calculation

- Performance data from different modules is combined.
- Overall readiness score is calculated.
- Students are classified as Ready, Training, or Not Eligible.

Step 5 — Reports and Feedback

- Performance reports and certificates are generated.
- Personalized feedback and improvement recommendations are provided.
- Administrators can monitor student performance through analytics.

Step 6 — Deployment and Maintenance

- The Flask application is integrated with MySQL and deployed for use.
- Courses, assessments, AI configurations, reports, and placement criteria can be updated when required.

Results and Analysis

The developed AI-Powered Training and Placement Readiness System (AI-TPRS) was tested to evaluate its functionality, reliability, and effectiveness in supporting student placement preparation. The experimental results showed that the system successfully integrates training, assessments, AI-based mock interviews, resume analysis, career evaluation, and placement-readiness calculation into a single platform.

- Students can register, log in, manage their profiles, and access the available training resources.

- Course videos, notes, and quizzes are successfully completed and reflected in the student's progress.
- Aptitude, technical, and placement-readiness assessments are conducted and scores are stored successfully.
- Gemini AI successfully generates mock interview questions and evaluates student responses.
- AI-based resume analysis provides ATS scores, strengths, missing sections, keywords, and suggestions.
- Career-readiness analysis provides personalized insights based on student information and performance.
- The placement-readiness engine successfully combines multiple performance factors to calculate the overall score.
- Students are classified into Ready, Training, or Not Eligible based on configured placement criteria.
- Reports and certificates can be generated based on student eligibility.
- Administrators can manage students, courses, assessments, resumes, reports, certificates, and placement settings.
- The system successfully stores and retrieves student and performance data using MySQL.
- Testing confirmed that the major modules communicate correctly and operate without critical functional errors.

Advantages

- Provides a centralized platform for complete placement preparation.
- Uses Generative AI for automated interview evaluation and personalized insights.
- Reduces the need for manual evaluation of interviews and resumes.

- Provides continuous monitoring of student learning and performance.
- Calculates placement readiness using multiple performance factors.
- Helps students identify their strengths and areas for improvement.
- Provides structured courses, assessments, and mock interview practice.
- Enables administrators to efficiently manage students and placement activities.
- Generates performance reports and certificates automatically.
- Improves transparency and data-driven decision-making in placement preparation.

Disadvantages

- AI-based evaluation may sometimes produce inaccurate or inconsistent results.
- The quality of AI feedback depends on the quality of the student's input and profile data.
- The system requires an internet connection for Gemini AI-based features.
- AI API usage may be subject to usage limits and service availability.
- The current system depends on predefined placement criteria and scoring methods.
- Continuous maintenance is required for updating courses, assessments, and AI configurations.
- Large-scale deployment may require additional server and database resources.

Applications

- College Training and Placement Departments – Monitor and evaluate student placement readiness.
- Educational Institutions – Provide structured training and assessment programs.
- Students – Practice interviews, improve resumes, and track career readiness.
- Placement Preparation Programs – Conduct aptitude and technical assessments.
- Career Guidance Centers – Provide personalized career insights and improvement recommendations.

- Recruitment Training Platforms – Evaluate technical and communication skills through mock interviews.
- Skill Development Programs – Monitor learning progress and competency development.
- Institutional Placement Analytics – Analyze student performance and placement-readiness trends.

Future Scope

The AI-Powered Training and Placement Readiness System (AI-TPRS) can be further enhanced with advanced technologies and additional features to improve its accuracy, scalability, and usefulness.

- Advanced AI Evaluation: Integrate improved Generative AI and Natural Language

Processing techniques for more accurate interview and communication assessment.

- Voice and Facial Analysis: Analyze speech patterns, pronunciation, confidence, and facial expressions during mock interviews.
- Personalized Learning: Recommend courses, assessments, and learning materials based on individual student performance.
- Real-Time Job Recommendations: Integrate job and placement APIs to recommend suitable opportunities based on student skills and readiness.
- Advanced Resume Matching: Match student resumes with job descriptions and provide job-specific improvement suggestions.
- Predictive Placement Analytics: Use historical student performance and placement data to predict placement probability and identify at-risk students.
- Mobile Application: Develop Android and iOS applications to provide placement preparation services through mobile devices.

- Cloud Deployment: Deploy the system on cloud platforms to support a larger number of students and institutions.
- Advanced Analytics: Introduce more detailed dashboards for analyzing department-wise, course-wise, and batch-wise placement performance.
- Multilingual Support: Provide AI-based training and feedback in multiple languages to improve accessibility.

Outcomes

- Integrated Placement Preparation: The system can unify the courses, assessments, mock interviews with AI, resume analysis, career-readiness evaluation, and placement-readiness assessment modules.
- Automated AI-Based Evaluation: Google Gemini AI can be utilized to automatically generate mock interview questions, evaluate candidates' answers, resumes, and provide career-related feedback, thus minimizing human input.
- Performance Tracking: Student performance can be tracked in terms of course progress, assessment results, mock interview performance, and other placement-readiness factors.
- Personalized Feedback: Students can receive automated feedback and suggestions based on their performance, resume, skills, projects, certifications, and career-readiness level.
- Placement Eligibility Estimation: By combining the performance in different modules, the system can estimate the placement-readiness score and level (Ready, Training, Not Eligible).
- Enhanced Administration: The administration can benefit from the system by managing students, courses, assessments, interview setup, resumes, reports, certificates, and placements in one place.

- Automated Reports and Certificates: The system can automatically generate reports and issue certificates based on students' eligibility and performance, thus minimizing the paperwork for the administration. Pasted text Pasted text.
- Successful Modules Interoperability: It was found that most of the described modules can be successfully integrated into one system without significant compatibility and functional issues, thus providing an effective solution for student placement preparation. Pasted text

Conclusion

The AI-Powered Training and Placement Readiness System (AI-TPRS) provides an integrated platform for improving and evaluating student placement readiness. The system combines structured courses, assessments, AI-powered mock interviews, resume analysis, career-readiness evaluation, and placement-readiness scoring within a single application.

The integration of Python Flask, MySQL, and Google Gemini AI enables the system to automate several placement preparation and evaluation activities. Students can continuously monitor their progress, identify areas for improvement, practice interviews, analyze their resumes, and receive personalized feedback. The placement-readiness engine combines performance from multiple modules to provide a systematic classification of students as Ready, Training, or Not Eligible.

The system also provides administrators with centralized tools for managing students, courses, assessments, interviews, resumes, reports, certificates, and placement settings. The experimental testing demonstrated that the major system modules function correctly and communicate effectively. Overall, AI-TPRS provides a practical, intelligent, and data-driven approach to placement preparation and can serve as a foundation for future AI-based career development systems.

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