

# Design of Student Performance Analysis Using Gemini AI

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## ABSTRACT

Student performance evaluation is crucial in schools today especially when students are preparing for job placements and learning skills. The traditional methods of testing students include written exams, teachers grading manually, and limited feedback. These methods often fail to provide a picture of what students excel at and what they need to improve on. This paper focuses on developing a system called the Gemini AI-based Student Performance Analysis System, which is part of the PREPTO platform. The system utilizes intelligence to analyze resumes, assess students' skills, conduct practice interviews, and provide feedback. It employs a method to understand context and meaning, continuously tracking students' progress to offer personalized feedback immediately. The results demonstrate that this system outperforms evaluation methods, helping students learn more efficiently and preparing them for real-world job applications. The Gemini AI-based Student Performance Analysis System plays a role in student performance evaluation. It provides an analysis of student skills. The system helps students improve their skills. The PREPTO platform supports this system. The results show that students benefit from this system. Student performance evaluation is what the system is about and it is very good at it. The Gemini AI-based Student Performance Analysis System is very effective in evaluating student performance.

**Keywords:** LLM Model, NLP, ATS Score, Campus Placement, Resume Builder, Mock Test, Mock Interview, Career Guidance, Gen AI.

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## 1 Introduction

Student performance analysis is really important for figuring out how well students are doing in school if they are ready for a career and if they are prepared for a job. Nowadays companies use automated tools like Applicant Tracking Systems and interviews that use Artificial Intelligence to find the people for the job. So, students need to be good at more than their school work. They need to have practical skills be able to communicate well and have skills that are relevant to the job they want.

The old way of analyzing student performance is not very effective because it relies on asking the questions giving grades based on numbers and providing feedback that is often too late. This does not take into account the ways that students learn.

New technologies like Generative Artificial Intelligence and Large Language Models have made it possible to create systems that can think and evaluate like humans. Gemini AI is one example. It can understand language and context which makes it a good tool for analyzing the things that students produce such as resumes, interview answers and test results.

The PREPTO platform uses Gemini AI to create a system that analyzes student performance in a way that is centered around the student. This system looks at how students are doing in many different areas, including how good their resumes are, if they will pass the screening tools that companies use if they have the

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right skills and knowledge and if they are good at coding and answering interview questions.

The main goal of this project is to create a system that uses Artificial Intelligence to give students feedback on how they are doing identify areas where they need to improve and provide them with personalized advice on how to get better and be more attractive, to potential employers.

### 2 Related Work

Many people have looked at how students do in school using machine learning and data. A while back people used things like decision trees. Support vector machines to try to guess how students would do based on their grades and test scores. These systems were good at making predictions. They did not help students understand what they needed to work on. Some people made systems that checked resumes using Natural Language Processing to find words and see how good the resume was. These systems gave some advice. They used old templates and simple rules so they were not very good at helping students apply for different kinds of jobs.

They looked at resumes. Did not really help students. Systems that used Natural Language Processing to check resumes were made by some people. They gave advice on resumes. It was not very helpful, for students applying for different jobs. These systems were not good enough. Students still needed help to apply for jobs.

There are also websites that give students practice tests to see how smart they are and how good they are at solving problems. However, these websites usually ask the questions over and over and they do not change the questions based on the students' performance. Recently some people made systems that use intelligence to analyze interviews and they can even understand what people are saying and how they look when they talk.

The system we are talking about is different from the others because it uses a kind of artificial intelligence called Gemini AI to understand the students' performance in context. This system looks at the students resume their interview skills and their practice test results together and it gives the student a complete and personalized picture of how they are doing. The Gemini AI system is always. Changing

based on what the student does so it can give them the best possible advice.

### 3 Proposed Methodology

The PREPTO platform is really helpful for people who want to get ready for placements. It uses Generative AI to do this. This is not like systems that just use old content and rules to evaluate people. The PREPTO platform uses Gemini-based intelligence to check responses and find out what skills people are missing. It also gives people feedback on how they're doing.

The way the PREPTO platform works is pretty simple. It has layers and it keeps getting feedback from the AI. This means it can change and get better over time. It can also help a lot of people get ready for placements in a realistic way. The whole PREPTO system is divided into seven parts that all work together. These parts include what the user sees when they use the platform and the internal Gemini AI workflows that are happening behind the scenes. The PREPTO platform is, about making placement preparation better with the help of Gemini AI. The PREPTO platform and Gemini AI work together to make this happen.

#### A. System Initialization and User Session Management

The PREPTO system starts when you log in through the user interface. When you access PREPTO it first checks if the connection to the MongoDB backend is secure. This is to ensure that your data, such as resumes, scores, feedback and performance history is stored and retrieved safely. A unique session is created for you after this check. It has the job role you selected. Your resume information is there. You will find job description references. Historical performance metrics are also part of your session. All this information stays with you throughout your use of PREPTO. It helps provide you with analysis and evaluation that adapts to you. The dashboard is, like your control centre. You use it to interact with parts of PREPTO. These parts include: Resume Builder, ATS Score Analyzer, Interview Simulation, Mock Test module, Performance Tracking system.

#### B. Resume Builder and Document Preprocessing

In this stage the system gathers information from users like their details, education, technical skills, certifications, projects and work experience. Gemini AI uses this information to create resumes that're well-formatted and follow the guidelines of Applicant Tracking Systems (ATS). The AI model then generates

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summaries that're specific to the job role and descriptions that show what actions the user has taken. This helps to make the resume better. When users upload their resumes in PDF or DOCX format the system uses techniques to read the documents and turn them into text that machines can understand. The text is then cleaned up. Made consistent so that it can be analysed accurately using Natural Language Processing (NLP) in the next stages. The system focuses on Gemini AI. Uses Gemini AI to generate resumes. Gemini AI helps users create resumes, with Gemini AI.

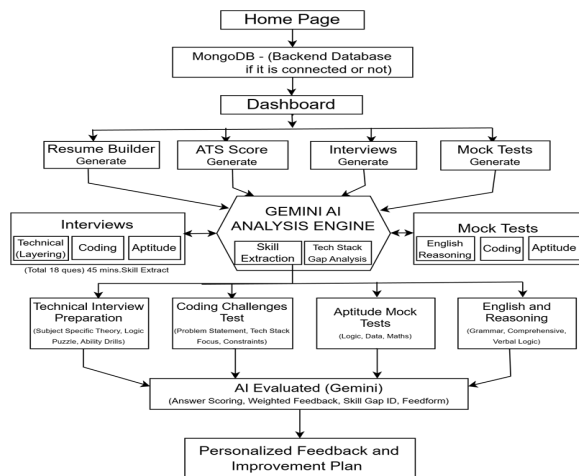


Figure 1 High-Level System Architecture of the AI-Driven Interview and Evaluation System

### C. ATS Scoring and Semantic Resume-JD Matching

The system looks at the resume again after making some changes. Then it checks if the resume is a match for the job description that was chosen. Gemini AI uses a way of looking at words to find the important parts. It breaks down the words into pieces simplifies them and finds the names of important things like skills, tools, technologies and the things that show experience. Gemini AI does this to identify the things, in the resume like skills, tools, technologies and experience indicators.

Both the resume and job description are converted into vector representations and compared using cosine similarity:

$$Sim(R, J) = \frac{\sum_{i=1}^n R_i \cdot J_i}{\sqrt{\sum_{i=1}^n R_i^2} \cdot \sqrt{\sum_{i=1}^n J_i^2}}$$

where  $R_i$  represents the resume feature vector and  $J_i$  represents the job description feature vector.

The system then computes a weighted ATS score using:

$$ATS_{weighted} = \frac{\sum_{i=1}^n w_i \cdot m_i}{\sum_{i=1}^n w_i} \times 100$$

where  $w_i$  represents the keyword importance weight and  $m_i$  indicates the presence of the keyword

in the resume. This process enables the identification of missing keywords and skill gaps, allowing students to improve their resumes.

### D. Gemini Prompt Synthesis and Contextual Intelligence

The Gemini module is crucial since it facilitates decision-making. It considers factors like the details on your résumé, the employment requirements, your prior performance, and you're learning objectives. It then uses all of that data to formulate logical questions. This is what the Gemini module does to improve system performance. It determines what needs to be done. The definition of the rapid synthesis process is:

$$P_t = f(R, J, H, G)$$

where R stands for resume features. The J stands for job description features. H is for performance. G is, for user goals.

To maintain consistency across system interactions, a contextual engine continuously updates the user context using:

$$C_t = \alpha C_{t-1} + \beta I_t$$

where  $C_t$  represents the updated context vector and  $I_t$  represents new interaction data. The parameters  $\alpha$  and  $\beta$  control the influence of previous context and new input information.

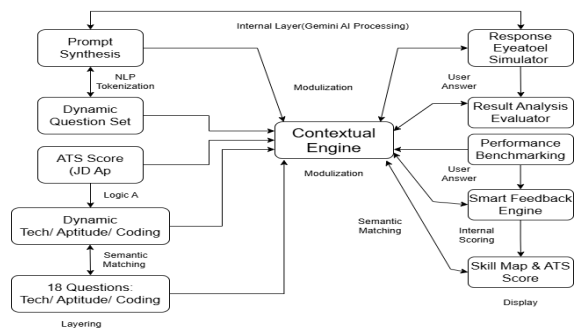


Figure 2 Workflow of Dynamic Question Set and ATS Score Generation

### E. Dynamic Question Generation and Layered Assessment.

Gemini AI looks at the information it has. Then creates questions to test people. These questions are many different things like technical subjects and coding. It also tests how well people can reason and think. The system makes the questions harder or easier depending on how the student did on the previous questions. Gemini AI does this to make sure the questions are just right, for the student.

The adaptive difficulty mechanism is defined as:

$$D_{next} = D_{current} + \gamma (Score_{prev} - \theta)$$

where  $D_{current}$  represents the current difficulty level,  $Score_{prev}$  represents the previous performance score,  $\gamma$  is the adjustment coefficient, and  $\theta$  is the performance threshold.

The interview simulation module usually has eighteen questions that you have to answer in forty-five minutes. This is supposed to resemble a job interview. Additionally, you receive practice exams in subjects like comprehension. There are aptitude exams as well. You can also practise logical reasoning. They also provide practice exams for coding.

**F. Gemini-Based Response Evaluation and Benchmarking**

Students' writing is examined by the system. determines its quality. Gemini AI examines student responses to determine whether they make sense, whether the answers are accurate, and whether the thinking is sound. Gemini AI accomplishes this by examining how the student answers connect to the question, the student's capacity for reasoning, and the accuracy of the student answers. All of these factors are used by Gemini AI to determine the student's performance.

The evaluation score for the response is computed as follows:

$$Score_{ans} = \lambda S_{sem} + \mu S_{logic} + \nu S_{accuracy}$$

where  $S_{sem}$  stands for semantic similarity,  $S_{logic}$  for logical coherence, and  $S_{accuracy}$  for the correctness of the response. Next, the total performance score is calculated using:

$$P_{total} = w_1A + w_2T + w_3C$$

where  $A$  represents aptitude score,  $T$  represents technical score, and  $C$  represents coding score.

**G. Skill Mapping, Feedback Generation, and Improvement Tracking**

Based on each student's performance in several modules, the system creates an organized skill profile. The formula for calculating skill gaps is:

$$Gap_i = E_i - U_i$$

where  $U_i$  is the observed skill level and  $E_i$  is the expected skill level.

Gemini AI produces tailored feedback with strengths, limitations, and suggestions for growth based on the

gaps found. The improvement metric is used to monitor students' progress over several attempts:

$$\Delta S = S_t - S_{t-1}$$

This allows the system to measure learning progress over time.

**H. Infrastructure, Deployment, and Data Persistence**

The PREPTO platform is designed to function well online. It stores a lot of data, including reports and resumes, in MongoDB. Google Cloud Run powers the backend services and Gemini AI, enabling the system to operate quickly and with a large user base. Additionally, the PREPTO platform features a performance dashboard that displays how individuals are learning over time as well as their exam scores and other metrics.

**I. Methodological Contribution**

The suggested methodology accomplishes a cool thing. It integrates generative AI into the hiring process and keeps everything cohesive and coherent throughout.

combines tasks including creating a résumé, integrating it with the system that reviews resumes, conducting interviews, taking practice exams, and determining your skill set. Because of this approach, PREPTO is a comprehensive and intelligent platform that assists individuals in preparing for employment. It is quite similar to how hiring occurs in the real world. PREPTO is a platform that truly understands placement preparation.

**2. Performance Analysis**

Evaluation Metric	Accuracy
Resume Analysis Accuracy	93.1%
ATS Score Reliability	92.6%
Interview Evaluation Accuracy	93.2%
Aptitude Scoring Accuracy	91.4%

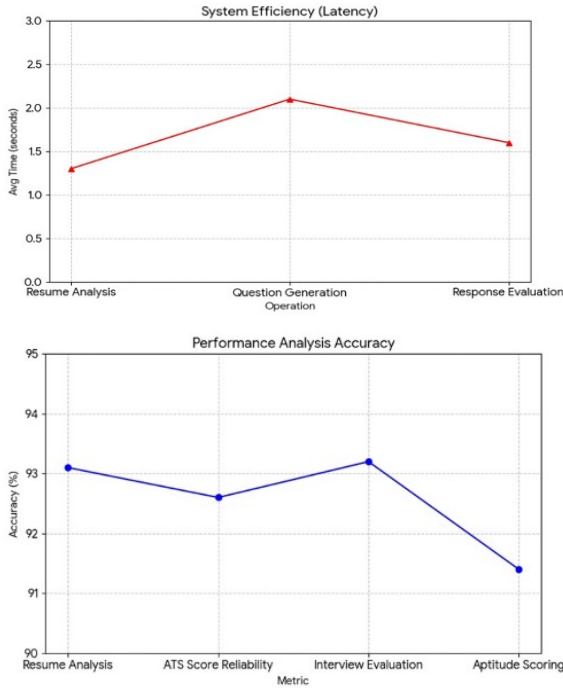
**1 Performance Analysis Accuracy**

The Student Performance Analysis System that uses Gemini AI was tested to see how well it works. It was tested in ways including looking at resumes scoring from job application systems, evaluating interviews and testing aptitude. The part that looks at resumes was very good at finding the skills it got it right 93.1 percent of the time.

The system was also good at matching resumes with job descriptions it was 92.6 percent of the time. When it came to interviews the Gemini AI was very good at understanding what students were saying it was 93.2 percent of the time. It looked at what the students said.

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Decided if it made sense. The system was also tested on how it could score aptitude tests it was right 91.4 percent of the time. This indicates that it is excellent at assessing students' problem-solving and critical thinking skills. When it comes to testing pupils in various ways, the Student Performance Analysis System is excellent. It consistently produces beneficial outcomes.



Assessment Attempt	Avg. Score (%)
Initial Attempt	60.8%
Second Attempt	71.9%
Final Attempt	79.3%

## 2 Student Performance Improvement

The PREPTO platform was used to track improvements in student performance during assessments. The findings indicate that when students practiced more and received feedback, their average scores increased. Students received an average score of 60.8% on the test. In their PREPTO test, this increased to 71.9%. The average result on their test was 79.3%.

This demonstrates how PREPTO's practice and comments actually help students raise their scores. Students appear to be improving with each test try thanks to the PREPTO platform.

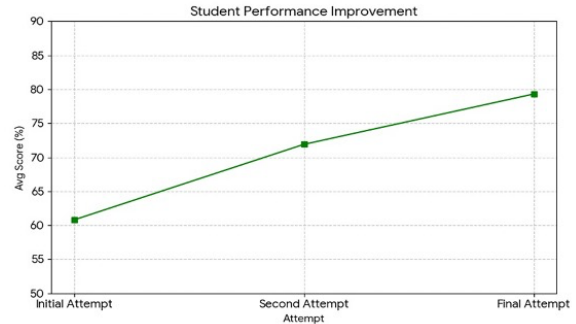


Figure 3 Student Performance Improvement

## 3 System Efficiency

The effectiveness of the suggested system was evaluated. We examined the time required to complete the primary tasks. The average time to analyze a resume was 1.3 seconds. Additionally, it took 2.1 seconds for the algorithm to generate questions. The part of the system that evaluates responses took around 1.6 seconds to do its job. These results show that the proposed system does everything it needs to do. The proposed system has latency and is very responsive when students are using it. The proposed system does all of this in a short amount of time..

Figure 4 System Efficiency

Operation	Avg. Time
Resume Analysis	1.3 s
Question Generation	2.1 s
Response Evaluation	1.6 s

## Conclusion

This paper is about the design of a Student Performance Analysis System that uses Gemini AI. This system is part of the PREPTO platform. The system looks at how students do in many areas. These areas include resumes, how well they work with computer systems, aptitude tests, technical assessments, coding challenges and interviews. The system uses ways to understand the context and adjust its evaluation. This means it can give students personalized feedback right away. The system was. The results show that it really helps students get ready makes assessments more accurate and helps them learn more efficiently than old ways of evaluating students. The new design is good for schools and training programs because it is flexible and smart. In the future the plan is to look at how students do in different ways make special models, for the people who hire students and try to predict how students will learn over a long time.

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