

Smart Quizzer AI – Adaptive AI-Based Quiz Generator

An intelligent platform for personalized learning through AI-powered quizzes

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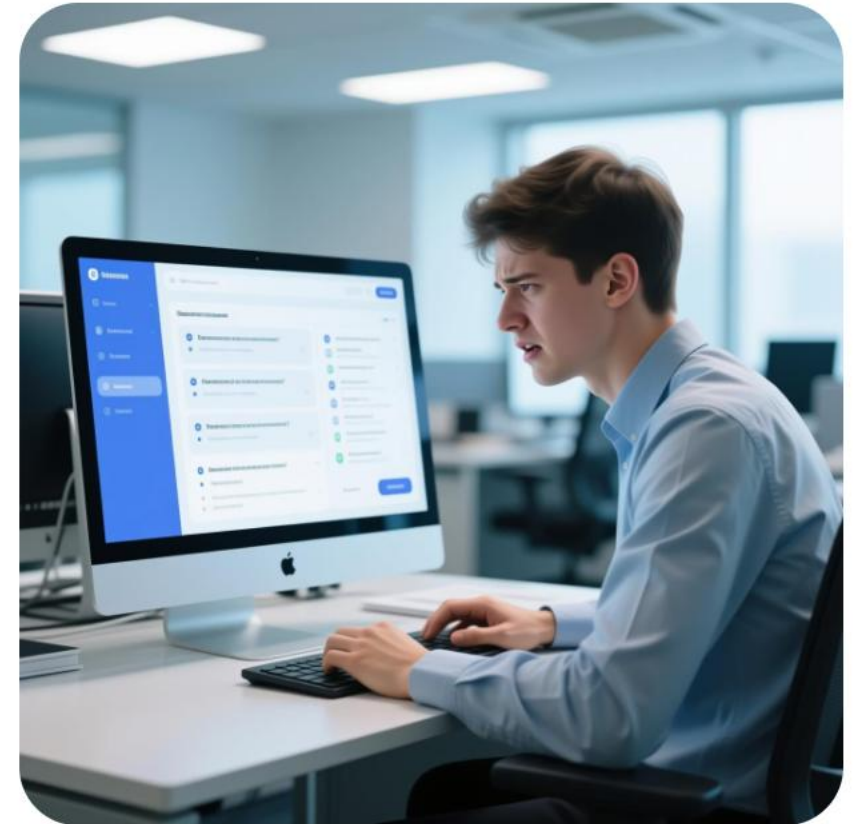
Introduction

Smart Quizzer AI is an **AI**-powered, **adaptive** quiz generation system designed to revolutionize learning. It dynamically creates questions directly from educational content, ensuring relevance and depth. The system features **real-time** difficulty adjustment, tailoring challenges to individual performance. Users benefit from immediate feedback and comprehensive progress tracking, making it an ideal tool for students, teachers, and self-learners seeking personalized and effective study methods.



Problem Statement

- Traditional quiz tools are static and non-personalized.
- Everyone faces the same difficulty regardless of skill.
- Manual quiz creation is time-consuming.
- No real-time analytics or adaptive behavior.
- Limited feedback and engagement.



Objectives



Develop AI-driven question generation system



Implement adaptive learning and quiz engine



Provide real-time feedback and analytics



Support topic-based and personalized quiz creation



Create engaging and dynamic user interface

Modules Overview



User & Profile Management



AI Question Generation



Adaptive Quiz Engine



Leaderboard & Analytics



Content Ingestion & Parsing



Difficulty Classification

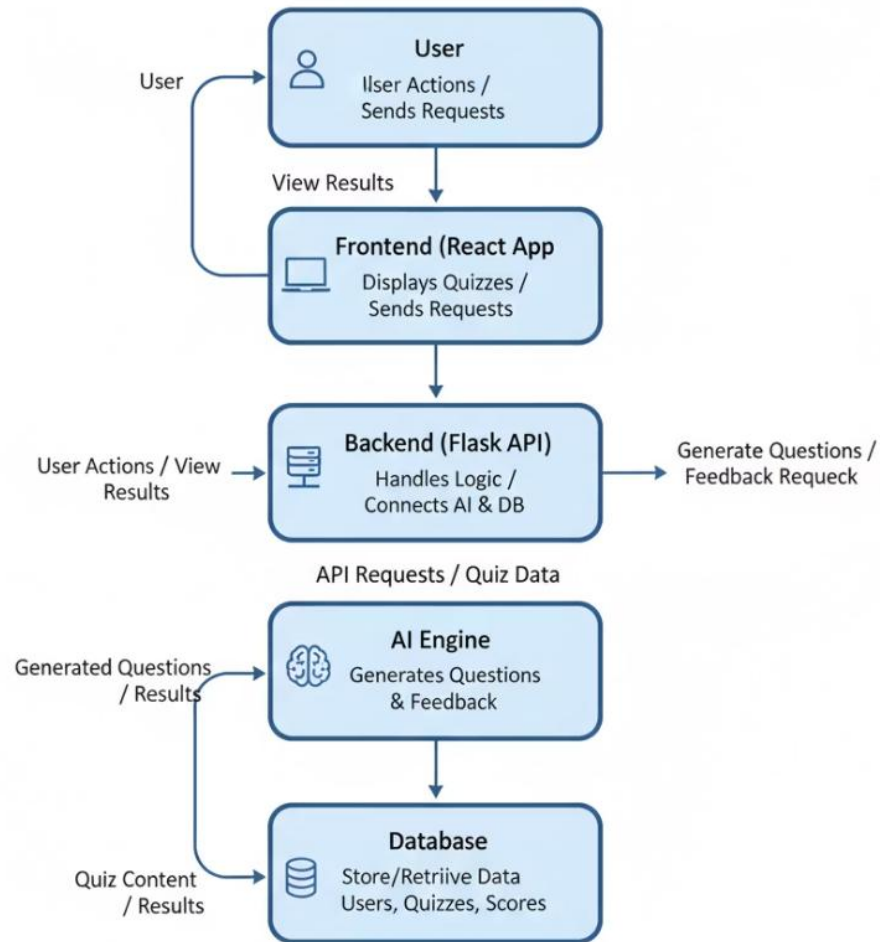


Answer Evaluation & Feedback

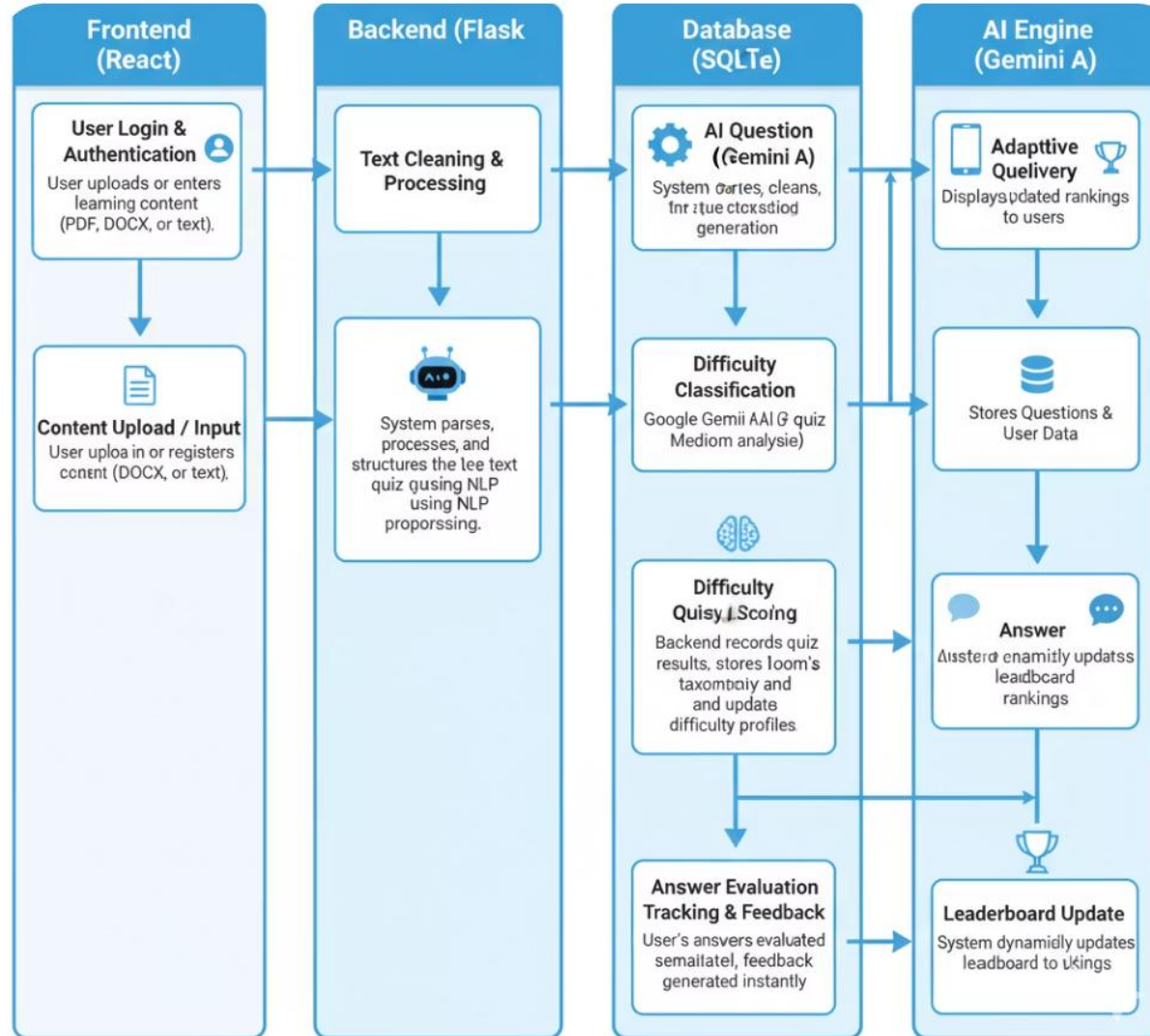


Admin Dashboard

Architecture Diagram



Workflow / Data Flow






Adaptive Quiz Engine

Real-time difficulty adjustment based on user accuracy, correct answers lead to harder questions, wrong answers lead to easier questions, uses Bloom's taxonomy and semantic complexity analysis, learner performance history affects future quizzes

What is $15 + 7 - 3$ equal to?

☒ A) 19
☐ B) 25
☐ C) 15
☐ D) 22


  **Excellent!**


 **Explanation:** First, add $15 + 7 = 22$. Then, subtract 3 from 22, which equals 19.

1/3
Progress

33.3%
Score


12s
Time Taken


 **Adaptive Learning Insights**


Next Difficulty: EASY Streak:  1 correct


Confidence: 50%

Reason: maintaining level

 Back to Dashboard ←

 Flag Question

 Feedback

 Next Question →

Answer Evaluation & Feedback

Example Question & Answer

Question: How does Smart Quizzer AI check for answer correctness?

Your Answer: It uses natural language processing, specifically sentence transformers, to determine how close my answer is to the expected one.

Checks correctness using NLP (Sentence Transformers).

Accepts near-correct answers (semantic similarity $\geq 80\%$).

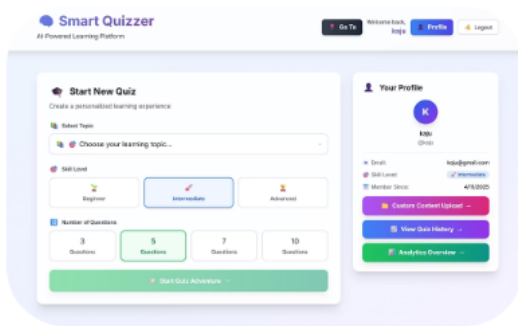
System Feedback

Feedback: Excellent! Your answer demonstrates a strong understanding of the underlying technology. The semantic similarity to the ideal answer is 95%.

Provides instant feedback and explanation.

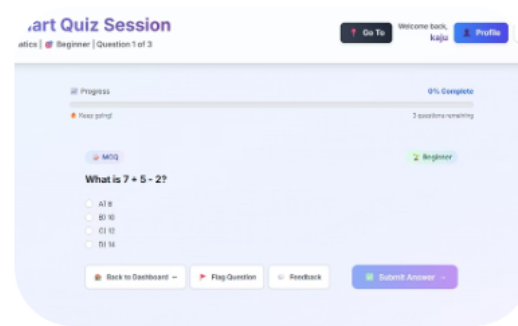
Updates user progress record dynamically.

User Interface (Frontend Features)



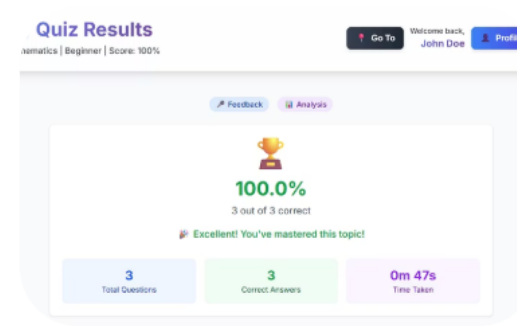
Dashboard

Tracks performance
and badges



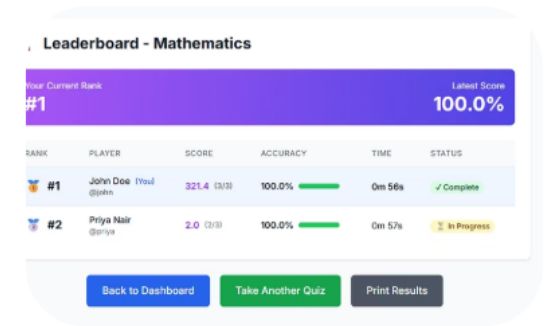
Quiz Page

Adaptive questions,
timer, hints



Results Page

Detailed feedback



Leaderboard

Real-time ranking

Admin Dashboard



Manage Users & Roles

Oversee user accounts and assign administrative or learner roles.



Review Flagged Questions

Address user-reported issues and maintain question quality.



Access Feedback & Statistics

Gain insights from user feedback and system performance data.



Monitor Leaderboard & Activity

Track global user rankings and system engagement metrics.



Admin Dashboard

Manage users, moderate content, and monitor platform health

Logged in as
System Administrator
Administrator

Logout



Overview



Users



Leaderboard



Moderation



Feedback

Auto-refresh



On

Total Users

12

4 active today



Total Quizzes

423

Avg Score: 69.8%




Questions Generated

4250



Leaderboard & Gamification

Real-time leaderboard updates after every quiz, rankings based on correct answers and time, achievements and badges encourage competition, performance-based scoring

 **Admin Dashboard**

Manage users, moderate content, and monitor platform health

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Leaderboard

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Feedback

Auto-refresh ☒ On

 **Global Leaderboard**

Live Updates ON Last updated: 8:49:57 pm

Refresh


Search by username or email...

Filter by topic...




Search

Recent Activity

User Statistics

 **Performance Leaderboard (12 users ranked)**

Showing each user's most recent quiz attempt, ranked by: 1) Correct Answers (higher is better), 2) Time Taken (faster is better)

RANK	USER	TOPIC	CORRECT ANSWERS	ACCURACY	TIME TAKEN	SUBMITTED AT
 #1	meera Meera Joshi	Mathematics	12/15	80%	11m 0s	3/11/2025 10:12:31 am
 #2	deepak Deepak Gupta	Computer Science	10/15	66.7%	13m 0s	3/11/2025 8:34:42 am
 #3	sneha Sneha Reddy	Geography	9/13	69.2%	19m 0s	2/11/2025 9:31:41 pm
#4	ravi Ravi Kumar	Mathematics	9/13	69.2%	19m 0s	31/10/2025 4:51:11 am
#5	admin1 System Administrator	Computer Science	8/13	61.5%	25m 0s	3/11/2025 11:35:41 am
#6	arjun Arjun Mehta	Chemistry	7/9	77.8%	20m 0s	2/11/2025 1:11:41 am

Achievements & Badges



Perfect Score

Achieved 100% accuracy on a quiz.



Fast Thinker

Completed a quiz quickly and accurately.



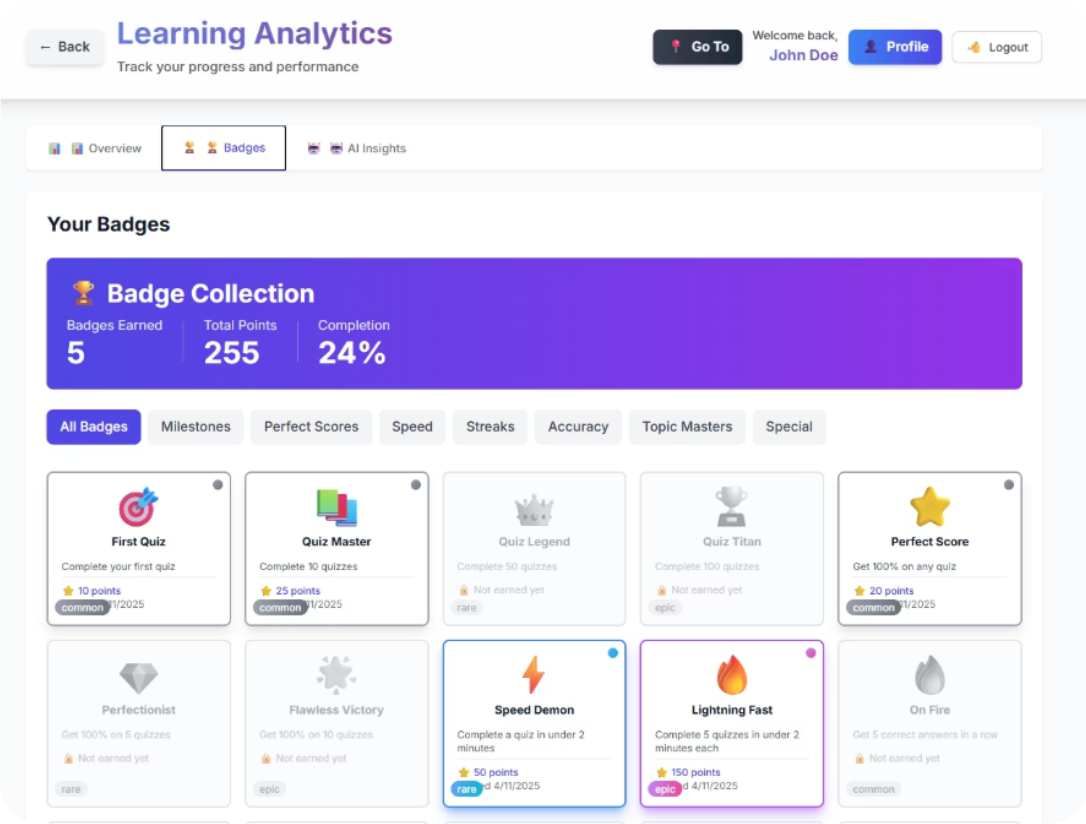
Streak Master

Answered multiple questions correctly in a row.



Quiz Master

Completed a significant number of quizzes.



Technology Stack



Frontend

- React 18
- TypeScript
- Tailwind CSS
- React Router
- Axios



Database

- SQLite (development)
- PostgreSQL (optional)



Backend

- Flask
- SQLAlchemy
- Flask-JWT
- Gemini AI
- Sentence Transformers

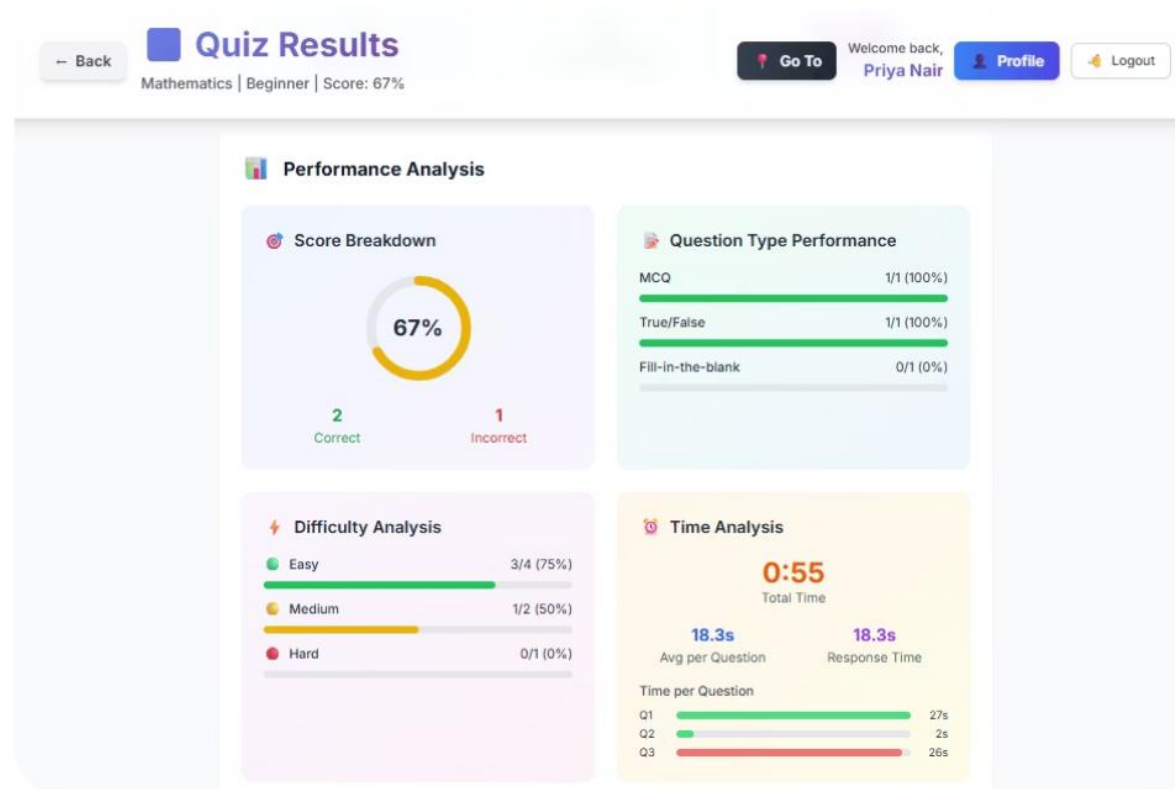


Tools

- Docker
- pdfplumber
- python-docx
- BeautifulSoup4
- NLTK

Analytics & Results

Smart Quizzer AI provides comprehensive **visual analytics** to track user progress and accuracy. Our intuitive dashboard displays **graphs, charts, and trends** showing a user's **improvement over time**, their difficulty progression, and learning curve. This data-driven approach allows for personalized **recommendations for weak areas**, ensuring an optimized learning path.



Future Enhancements

Voice-Based Quizzes

Integrate advanced speech recognition for interactive verbal responses.



Multilingual Generation

Expand question generation to support multiple languages for global reach.



Mobile App Version

Develop a dedicated mobile application for on-the-go learning.



Live Multiplayer Quizzes

Enable real-time competitive quizzes among users to enhance engagement.



AI Study Recommendations

Offer personalized study paths and content based on performance data.



Conclusion



AI

Smart Quizzer AI provides personalized, adaptive, and efficient learning. It intelligently bridges AI with education. Real-time analytics, adaptive quizzes, and engaging UI ensure effective learning. Ready for academic and enterprise use.

Adaptive Learning Made Smarter with AI





Thank You

Empowering Learners with AI

GitHub: github.com/BatchuMamatha/Smart-Quizzer-AI