

DATASET'25



PrepX

TEAM NAME: GEARS

PROBLEM STATEMENT:

University exam preparation is often inefficient and stressful. Students struggle to find questions that match their syllabus, exam pattern, and difficulty level. Most existing resources are static, repetitive, and do not adapt to a student's understanding, making it hard to identify weak areas and improve effectively.

SOLUTION:

The system generates exam questions directly from the user's syllabus and exam type for any university subject. It evaluates answers instantly, adjusts question difficulty based on performance, and provides clear analytics to help students track progress and focus on weak areas.

The platform uses an AI-powered exam generator with syllabus-aware question creation and adaptive difficulty logic. It retrieves relevant syllabus content and past exam patterns to generate meaningful questions, evaluates responses, and continuously updates the student's mastery level.

SOLUTION:

The goal is to make exam preparation smarter, personalized, and efficient. By adapting to each student's learning level and providing actionable feedback, the system helps students prepare confidently, reduce unnecessary effort, and improve exam performance.

INNOVATION:

- **Adaptive Questioning:** Question difficulty automatically changes based on student performance, ensuring balanced learning.
- **Syllabus-First Design:** Every question is generated strictly from official syllabus content and exam patterns.
- **Concept Mastery Tracking:** Tracks understanding at the topic level rather than just overall scores.
- **Instant Feedback with Insights:** Provides clear explanations and identifies concept gaps after each answer.

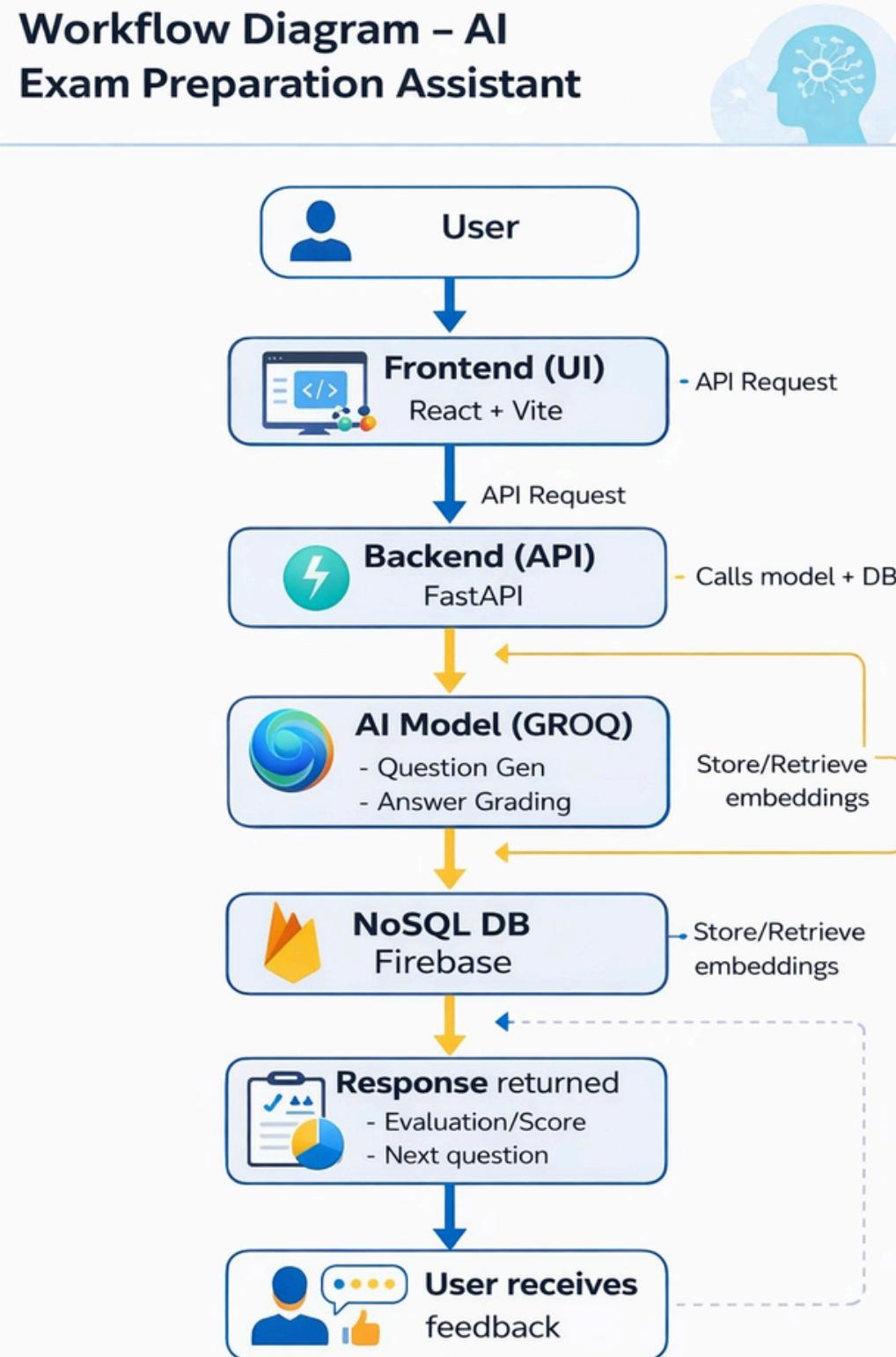
USP:

- **Prototype with Platform Potential** - Designed to evolve into adaptive difficulty, performance insights, and personalized prep paths.
- **LLM-Powered Question Generation Agent** - An AI agent that dynamically generates exam-aligned questions across subjects and difficulty levels
- **Scalable AI Pipeline by Design** - Architecture supports future extensions like adaptive difficulty and performance analytics.
- **Semantic Answer Evaluation Module** - Evaluates student responses using meaning-based analysis rather than rigid answer keys or keyword matching.

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WORK FLOW:

Workflow Diagram – AI
Exam Preparation Assistant



VIT
CHENNAI | 15
VIT CHENNAI



TECH STACK:

- **Backend:** FastAPI (Python 3.10+) powered by Uvicorn, with Pydantic v2 for validation, pdfplumber for PDF/OCR parsing, and Google Gemini AI for intelligent syllabus structuring and adaptive question generation.
- **Frontend:** React 18 + Vite with TypeScript, using React Router v6 for navigation, Context API for state management, and Axios for backend communication.
- **Auth & Storage:** Firebase SDK for authentication and user profiles, with browser LocalStorage for lightweight analytics persistence.

TECH STACK:

- **Design & Performance:** Custom vanilla CSS with dark-mode glassmorphism, micro-animations, and a performance-first UI approach.
- **Intelligence Layer:** Custom Python adaptive engine using difficulty-aware multipliers for real-time mastery adjustment.
- **Architecture:** Clean modular structure—backend split into core, routes, and storage; frontend into components, pages, services, and styles.

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FINAL PRODUCT:

The screenshot displays a user interface for a software application. On the left, a dark sidebar menu titled "MAIN" contains the following items: Dashboard (highlighted with a red rounded rectangle), Create Exam, Practice, ACCOUNT, Settings, and Analytics. At the bottom of the sidebar are two buttons: "Reset Progress" and "Logout".

The main content area features a large dashed rectangular input field with the placeholder text "Upload Your Syllabus" and a "Browse Files" button below it. A file named "OPERATING-SYSTEMS.pdf" is listed within this field, showing a size of 0.68 MB.

At the bottom center of the main area is a large white button labeled "Upload & Process".

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FINAL PRODUCT:

The screenshot shows the PrepX learning platform interface. On the left is a sidebar with the following navigation:

- MAIN**
 - Dashboard** (selected)
 - Create Exam
 - Practice
- ACCOUNT**
 - Settings
 - Analytics

At the bottom of the sidebar are two buttons: "Reset Progress" and "Logout".

The main content area is titled "Dashboard" and features two large cards:

- Introduction** (8 topics)
 - Introduction to OS** (EASY)
 - Functionality of OS
 - OS design issues
 - Structuring methods
 - Abstractions, processes, resources
 - Influence of security, networking, and multimedia
 - [Practice This Topic →](#)
- OS Principles** (MEDIUM)
 - System calls
 - System/Application Call Interface - Protection
 - User/Kernel modes - Interrupts
 - Processes - Structures (Process Control Block, Ready List etc.), Process creation, management in Unix - Threads: User level, kernel level threads and thread models

FINAL PRODUCT:

The screenshot shows a dark-themed user interface for a practice mode assessment. At the top left is a 'Back to Home' button with a back arrow icon. In the center, the text 'Practice Mode' is displayed next to a target icon. On the right is a 'Change Topic' button. Below this, a large central box contains a target icon and the text 'Let's Assess Your Knowledge'. Underneath, it says 'Topic: Introduction to OS'. A message reads 'Before we start practicing, let's determine your current skill level.' Four features are listed in boxes: 'Answer 5 adaptive questions' (document icon), 'Difficulty adjusts based on your answers' (calculator icon), 'Takes only 5-10 minutes' (lightning bolt icon), and 'Get personalized question difficulty' (person icon). At the bottom is a green 'Start Assessment →' button.

← Back to Home

Practice Mode

Change Topic

Let's Assess Your Knowledge

Topic: **Introduction to OS**

Before we start practicing, let's determine your current skill level.

Answer 5 adaptive questions

Difficulty adjusts based on your answers

Takes only 5-10 minutes

Get personalized question difficulty

Start Assessment →

FINAL PRODUCT:

[← Back to Home](#)

🎯 Practice Mode

Question 2 of 5

MEDIUM

The Cloud-Based File System 'DriveHub' uses a combination of caching and replication to optimize performance and ensure data availability. DriveHub's design team is considering implementing a new caching algorithm to improve performance. They are deciding between 'Cache-Ahead' and 'Cache-Just-In-Time' algorithms. In a scenario where DriveHub has 10 million users and 100 million files, which caching algorithm would be more suitable for reducing latency and improving user experience?

A The 'Cache-Ahead' algorithm, which proactively caches frequently accessed files

B The 'Cache-Just-In-Time' algorithm, which caches files only when a user requests them

C A hybrid approach combining both 'Cache-Ahead' and 'Cache-Just-In-Time' algorithms

FINAL PRODUCT:

B The 'Cache-Just-In-Time' algorithm, which caches files only when a user requests them

C A hybrid approach combining both 'Cache-Ahead' and 'Cache-Just-In-Time' algorithms

D Neither 'Cache-Ahead' nor 'Cache-Just-In-Time' algorithm, as DriveHub's existing cache implementation is sufficient

 Correct! Well done!

Explanation:
The 'Cache-Ahead' algorithm is more suitable for reducing latency and improving user experience in this scenario. This is because it proactively caches frequently accessed files, reducing the need for users to wait for files to be loaded. With 10 million users and 100 million files, a 'Cache-Just-In-Time' algorithm would lead to a higher number of cache misses, resulting in increased latency and negatively impacting user experience. A hybrid approach could also be viable, but given the large number of users and files, 'Cache-Ahead' is a more suitable choice.

 Great! Moving to a harder question →

[Next Question →](#)

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← Back to Home

🎯 Practice Mode

Change Topic

💻 Introduction to OS

EASY

At a manufacturing plant, a team of developers is tasked with optimizing the performance of a system that manages the production line's assembly process. The system consists of 10 machines, each with a unique identifier and a processing speed. Machine A has a processing speed of 100 units per second, Machine B has a processing speed of 120 units per second, and Machine C has a processing speed of 90 units per second. The assembly process requires a minimum processing speed of 250 units per second to meet the production demands. The team decides to use a load balancer to distribute the workload among the machines. Which of the following load balancing strategies will ensure that the system meets the minimum processing speed requirement?

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- A Round-Robin Scheduling
- B Least Connection Scheduling
- C Weighted Round-Robin Scheduling
- D Dynamic Load Balancing with Adaptive Threshold

Submit Answer

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PrepX

Dashboard

User joshwady.social@gmail.com

MAIN

- Dashboard
- Create Exam
- Practice

ACCOUNT

- Settings
- Analytics

Welcome back! 🙌

Ready to master your exams with AI?

Upload Syllabus →

Questions Answered: 19

Accuracy Rate: 32%

Current Streak: 1

Time Spent: 1m

Reset Progress

Logout

Create Custom Exams

AI POWERED

Smart Analysis

ADVANCED

Get detailed insights on your performance with AI analysis and recommendations

Practice Mode

UNLIMITED

Practice with unlimited questions generated by our advanced AI system



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PrePX

Dashboard

User joshwady.social@gmail.com

MAIN

- Dashboard
- Create Exam
- Practice

ACCOUNT

- Settings
- Analytics

Topic-Wise Analytics

Analyze your strengths and weaknesses per topic

Sort by: Topic Name

Strength ≥70% accuracy Developing 50-69% accuracy Weakness <50% accuracy

General Subject 1 modules Questions: 19 Accuracy: 32%

Introduction 1 topics Questions: 19 Accuracy: 32%

Introduction to OS Weakness

Reset Progress

Logout

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PrePX

Dashboard

User joshwady.social@gmail.com

MAIN

- Dashboard
- Create Exam
- Practice

ACCOUNT

- Settings
- Analytics

Reset Progress

Logout

General Subject 1 modules

Questions: 19 Accuracy: 32%

Introduction 1 topics

Questions: 19 Accuracy: 32%

Introduction to OS

Weakness

Questions Answered: 19

Correct Answers: 6

Accuracy: 32%

Mastery Level 14.0%

FUTURE SCOPE:

- Support for short answer and descriptive questions.
- Inclusion of image-based and pictorial questions.
- Expansion to all streams and exam types (school, university, competitive exams).
- Personalized study plans based on long-term performance trends.

TEAM MEMBERS:

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