ProfAI, Personalized Tutor

Challenge

Designed and implemented ProfAI, an AI-powered personalized learning platform that adapts to each learner's needs. Target users: students seeking tailored educational experiences. Key features include multi-stage assessments, intelligent lesson generation, and real-time sentiment analysis—all built without a traditional database, using a portable JSON data layer.

Tools/ LLM models used

- **GPT-4** – Complex reasoning for lesson generation and assessment logic
- **GPT-3.5-turbo** – Lightweight tasks and conversational responses
- **ElevenLabs API** – Text-to-speech for lifelike lesson delivery
- **Chart.js** – Analytics visualizations
- **React 18.2 + TypeScript + Vite** – Frontend framework
- **Flask 3.0 + Flask-CORS** – Backend API and AI orchestration
- **Rich (Python)** – CLI formatting for debugging and testing
- **JSON Files** – Atomic data storage (no database)

What went well

- Retrieval-Augmented Generation (RAG) pipeline produced high-quality, context-aware lessons
- Real-time sentiment analysis enhanced learner engagement tracking
- Clean separation of frontend/backend enabled rapid iteration and deployment
- Conda environment ensured consistent dependencies
- Animated analytics visualizations added clarity and polish

Challenges

- Maintaining performance and scalability with file-based JSON storage
- Ensuring RAG-generated code was being shown

Timeline

0–3h: Defined scope, set up repository, outlined architecture
3–8h: Built Flask backend with core AI engine and RAG pipeline integrated sentiment analysis
8–16h: Developed React frontend with state management and API integration
16–20h:
20–24h: Analytics visualizations final testing, debugging, and deployment prep