AI Study Assistant

Full-Stack MERN + Gemini

1. Introduction

- The **AI Study Assistant** is a full-stack MERN project built to enhance student learning.
- It uses the **Gemini AI API** to generate study material summaries and interactive quizzes from student-provided notes.
- Students can **log in**, enter their notes, and instantly receive **AI-generated summaries and quizzes**.
- All study sessions are **saved in the system**, allowing students to review and retake quizzes later for effective revision.
- The project demonstrates how **AI and MERN stack** can be combined to create practical, real-world educational applications.

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2. Learning Outcomes

✅ Understand MERN stack integration

✅ Learn React state management using Redux Toolkit

✅ Implement authentication with JWT

✅ Explore MongoDB schema design

✅ Experience how AI can enhance learning

3. Project Overview

· The project helps students by:

- Generating summaries of study topics

- Creating practice quizzes

- Allowing students to attempt quizzes interactively

- Keeping history of sessions for revision

4. Tech Stack

- Frontend: React.js, Redux Toolkit, React-Redux, Axios, CSS

- Backend: Node.js, Express.js, MongoDB, Mongoose, dotenv, bcrypt, JWT, @google/generative-ai

- AI: Gemini API for summarization and quiz generation

5. System Workflow

- 1. User Login/Register

- 2. Start a Study Session

- 3. AI generates summary + quiz

- 4. Student attempts quiz

- 5. Results are shown

- 6. History is available for review

6. Database Models

- User: { name, email, password }

- StudySession: { user, summary, quiz[{question, options, correct}]}

7. Hands-On Setup

👉 Backend Setup:

- mkdir backend && cd backend

- npm init -y

- npm install express mongoose dotenv cors bcryptjs jsonwebtoken @google/generative-ai

- Create file: index.js

- Run: node server.js

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👉 Frontend Setup:

- npx create-react-app frontend

- cd frontend

- npm install axios react-router-dom react-redux @reduxjs/toolkit

- npm start

8. Demo Flow

- 1. Login/Register

- 2. Enter topic → AI generates notes + quiz

- 3. Attempt quiz & submit answers

- 4. Instant feedback

- 5. Review & retake quizzes in History