

# AI-Powered Notes App

## About the Project

The **AI-Powered Notes App** is a modern note-taking tool that combines the simplicity of Google Keep with the intelligence of ChatGPT. Built with the **MERN stack + Tailwind CSS**, it enables users to create, organize, and enhance their notes using real AI features such as summarization, rewriting, expansion, action extraction, and translation.

Unlike simple demos, this project is designed with **real-world constraints** in mind: it integrates directly with the **OpenAI API** while implementing token management, caching, and rate limiting to ensure usage remains **predictable and cost-efficient**.

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## Key Functionalities

### Authentication & Notes

- Secure user registration & login with JWT
- Full CRUD for notes (title, content, tags, colors, pinning)
- Search by title/tags and quick filters for tags & pinned notes
- Responsive two-column layout with modern UI

### AI Integration with OpenAI

- Connected to **real OpenAI APIs (gpt-4o-mini)** for text enhancement
  - Supported AI actions: Summarize, Rewrite, Expand, Extract To-Dos, Translate
  - **Lite vs Detailed Modes** → user can choose shorter/cheaper vs. richer responses
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## How I Optimized OpenAI Integration

To ensure the app is **cost-effective and production-ready**, I implemented multiple safeguards around OpenAI usage:

- **Input truncation** → automatically clips long notes so oversized inputs don't inflate token usage.
- **Output caps** → responses are limited to a safe token range (200–600), preventing runaway completions.
- **Caching** → repeated requests with identical input return cached AI results instead of triggering new API calls.
- **Rate limiting** → restricts request frequency per user/IP to keep usage predictable and safe.
- **Lite vs Detailed modes** → allows end users to control cost/detail balance themselves.

These choices demonstrate **real-world engineering judgment**: I didn't just integrate OpenAI — I designed around its limitations and costs to make the app sustainable.

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### Why This Project Stands Out

This project shows:

- **Real-world API integration** with OpenAI (not mock demos only).
  - **Cost-aware design** that addresses API billing, tokens, and limits.
  - **Full-stack delivery** with secure authentication, note management, and AI augmentation.
  - **Product thinking** — a tool that is both technically solid and practical for real users.
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