

AI Agent Project Documentation

📄 SECTION 1: BASIC DETAILS

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AI Agent Title / Use Case: AI Learning Assistant to Help Students Understand Concepts in Simple Words

Why I Used Gemini Instead of ChatGPT:

I had originally intended to utilize the OpenAI ChatGPT API, but my free trial credits were limited to web app usage of ChatGPT (not for API usage). OpenAI now charges a paid billing plan to access the API. To maintain the cost-free nature of the project, I have moved to Google Gemini API, which has a free tier, good performance, and accommodates structured prompts like ChatGPT.

📄 SECTION 2: PROBLEM FRAMING

1.1 What Problem Does Your AI Agent Solve?

Students find it difficult to comprehend advanced scientific and technical knowledge. This AI Agent assists in explaining such knowledge using simple, student-friendly terms, which makes learning quicker and simpler.

1.2 Why Is This Agent Useful?

It serves as a personal tutor, deconstructing hard concepts into easy ones, and gives clear, succinct explanations. This enables students to revise quickly without reading lengthy textbooks.

1.3 Who Is the Target User?

- Students revising for examination
- Students studying science concepts in school
- Anyone requiring rapid, simplified answers

1.4 What Not to Include?

- No solving math complicatedly (focused on conceptual knowledge)
- No diagrams or multimedia in this iteration (text-only for the time being)

📄 SECTION 3: 4-LAYER PROMPT DESIGN

3.1 INPUT UNDERSTANDING

Prompt: You are an AI tutor. Precisely capture the user's intention and represent it in one sentence.

Responsible for determining what the user actually desires.

Example Input: Can you tell me Newton's 2nd law in simple terms?

Example Output: The user is looking for a plain description of Newton's 2nd law of motion.

3.2 STATE TRACKER

Memory is traced by adding each interaction to a Python list.

This allows the agent to recall the conversation history for future context.

3.3 TASK PLANNER

Prompt: Plan step-by-step how to best respond to the user's intent.

The agent plans ahead of response (definition → simplify → provide example).

3.4 OUTPUT GENERATOR

Prompt: You are a friendly AI tutor. Answer the following question in simple words.

The output is student-friendly, concise, and avoids jargon.

Example Input: What is photosynthesis?

Example Output: Imagine plants as tiny food factories! Photosynthesis is how they make their food. They use sunlight, water, and air (carbon dioxide) to create sugar (their food) and release oxygen (the air we breathe). It's like magic, but it's science!

🔗 SECTION 4: CHATGPT EXPLORATION LOG

| Attempt # | Prompt Variant | What Happened | What You Changed | Why You Changed It |
|-----------|---|--|--|-------------------------------------|
| 1 | Used ChatGPT's original 4-layer prompts | Couldn't run due to API quota issues | Switched to Gemini API | To make the project free & runnable |
| 2 | First Gemini prompt: Explain this concept | Responses were too formal | Added "in simple words, like teaching a student" | To make it more student-friendly |
| 3 | Removed extra context in prompts | Gemini started giving very concise replies | Kept the "friendly AI tutor" role description | To maintain consistency in tone |

🔗 SECTION 5: OUTPUT TESTS

Test 1:

Input: Explain Newton's 2nd law in simple words

Output: Hey there! Newton's 2nd Law is all about how force, mass, and acceleration are related. Basically:

The harder you push something (more force), the faster it speeds up (more acceleration). And, the heavier something is (more mass), the harder it is to speed up.

So, a big truck needs a much bigger push than a toy car to speed up at the same rate!

Test 2:

Input: Tell me something about energy

Output: Hi there! Energy is like the ability to do stuff! Think of it as the power that makes things happen. It can be in lots of forms, like light from the sun, heat from a fire, the movement of a car, or even the food you eat which gives you energy to play! Energy can change from one form to another, but it never disappears – it just changes shape.

Test 3:

Input: (Empty)

Output: Please provide the question you would like me to answer. I'm ready to help! 📝

📝 SECTION 6: REFLECTION

6.1 Hardest Part: It was difficult switching from ChatGPT to Gemini since I had to re-write API logic and switch model names (gemini-pro vs gemini-1.5-flash).

6.2 Most Enjoyable Part: Designing the 4-layer prompt system was like creating a mini AI teacher.

6.3 What to Improve: I would like to include context memory and diagrams for improved explanations.

6.4 What I Learned: Prompt design can make a huge difference. Small wording adjustments drastically enhance responses.

6.5 Feeling Stuck: I was stuck with OpenAI quota errors but managed it by changing to Gemini.

📝 SECTION 7: HACK VALUE

- Included a simple memory system (chat history).
- Crafted prompts to act like an individual tutor.
- Changed to a different LLM (Gemini) to maintain the project free.