AI STUDY BUDDY

WHAT IS IT?

AI Study Buddy is an intelligent agent designed to facilitate personalized learning by providing accurate responses, conceptual guidance, and adaptive study support.

Initial State

- This defines the state when the AI Study Buddy starts interacting with a user.
- Student profile is either created or loaded (name, academic level, preferred subjects).
- No questions or tasks have been given yet.
- Learning history may be empty or partially filled if it's a returning user.
- Time of session is logged (morning/evening, weekday/weekend).
- User's current mood or focus level might be undefined (can be inferred from early interactions).

Action Success Functions

- These determine how the AI knows whether an action it performed was successful.
- Correct Answer Provided: AI gives the right explanation and the user confirms it helped.
- Engagement Triggered: User continues the conversation, asks follow-up questions.
- Task Completion: Student finishes a suggested quiz or assignment.
- Positive Feedback: User reacts positively (thumbs up, thank you, or rating).

Transition Model

- This describes how the AI expects the state to change after it performs an action.
- After Explaining a Topic: State updates with "topic understood" or logs confusion if user asks again.
- After Quiz/Practice: Knowledge graph updates → strengths/weaknesses adjusted.
- After Reminder Sent: Session scheduled or acknowledged → progress timeline updates.
- After Idle Time Detected: AI prompts with motivational message → engagement reattempted.
- After Wrong Answer Feedback: Adjust teaching method (simpler explanation, analogy, or video).

Goal Test

- This tells the AI if the user has achieved the learning goal.
- Student correctly answers quiz questions or applies concepts independently.
- Student completes a study plan or scheduled milestone.
- Feedback like "I get it now!" or "That helped!" is logged.
- Engagement metrics are satisfied (e.g., studied 45 mins/day for 5 days).
- Confidence level or self-assessment by the student improves.

Path Cost Function

- Evaluates the "cost" or "efficiency" of the learning path taken.
- Time Spent vs. Outcome: Shorter time to grasp concept → lower cost.
- Number of Interactions: Fewer back-and-forths for the same learning → better path.
- Engagement Drop: If student loses interest midway, it's a high-cost path.
- Confusion Rate: More confusion before clarity → higher cost.
- Memory Load: If too much info is given at once and forgotten → less efficient.

PEAS

P – Performance Measure

These define what success looks like for the AI Study Buddy.

- **Answer accuracy → It should provide correct explanations.**
- **Improved learning → It should help students understand better.**
- **Speed → It should respond quickly.**
- **Engagement → Keeps students interested and learning regularly.**
- **Feedback → Good reviews or ratings from users.**

E – Environment

- Students at different academic levels
- Online classrooms, home, libraries
- Learning platforms (Google Classroom, Moodle, etc.)
- Study materials (textbooks, notes, videos)
- Devices like smartphones, tablets, laptops
- It interacts in places like homes, classrooms, or online platforms.

A – Actuators

- Text response on screen
- Voice output (if voice assistant is used)
- Suggestion pop-ups or reminders
- Highlighting important points or resources
- Adaptive quizzes and practice questions
- Displays answers to students
- Speaks answers if it has voice support
- Sends reminders or tips

S – Sensors

- User's typed or spoken questions
- Clicks, input patterns, and interaction data
- Voice recognition (if applicable)
- Learning history and progress tracking
- Time of usage and subject preferences
- User input (typed questions or voice queries)
- Interaction history (what the student has learned so far)