**SocraI Advanced Tutor Synopsis**

**Abstract**:

The SocrAI Advanced Tutor is a single-file web application that brings the Socratic method into an AI-driven learning environment. It uses a FastAPI backend for reasoning and interaction management, paired with a Streamlit frontend that provides an intuitive, chat-style interface. The system engages learners in critical dialogues on complex philosophical or ethical topics, guiding them toward deeper reasoning rather than supplying direct answers.`

**Introduction:**

SocrAI Advanced Tutor (v2) is an AI-powered platform that emulates the Socratic method of learning. It engages learners through reflective, question-driven dialogues instead of providing direct answers. Users can select different philosophical personas and dialogue styles to personalize the experience. The system tracks reasoning, detects potential fallacies, and extracts key concepts to enhance critical thinking. Its Streamlit frontend and FastAPI backend provide an interactive, scalable, and insightful learning environment**.**

**Design:**

1. Socratic Dialogue Generation: The AI, powered by OpenAI’s GPT models, analyzes the student’s claim and responds exclusively with open-ended, context-aware questions. It uses personas (e.g., Socrates, Plato, Modern Philosopher, AI Ethicist) and Socratic modes (Gentle, Challenging, Philosophical) to adapt tone and questioning style.

2. Reasoning Trace Mapping: Each dialogue turn is logged as a reasoning trace, including detected logical issues or fallacies, confidence estimation (0–100), interpretation, and follow-up questions. This enables visualization of reasoning flow and argument consistency. 3. Fallacy & Confidence Detection: The backend detects common logical fallacies and estimates how confident the AI is in the soundness of a student’s reasoning. Results are presented transparently to foster self-assessment.

4. Feedback & Summary System: At the end of a session, the AI summarizes the student’s reasoning progress, identifies logical flaws, and generates a 'Reasoning Consistency Score.' The feedback is constructive and growth-oriented.

5. Concept Mastery Tracking: The tutor automatically extracts key terms and abstract concepts from student input to track conceptual engagement and progress over time.

6. Visualization & Export: Interactive tools include a reasoning map (via streamlit-agraph) to visualize dialogue flow, and session export features in JSON or text format for study or review.

**Outcomes:**

* Learners develop critical thinking and analytical skills through guided questioning.
* Students gain the ability to identify assumptions, contradictions, and logical fallacies in their reasoning.
* Enhanced understanding of philosophical concepts, ethics, and abstract principles.
* Personalized learning through selectable persona and dialogue styles.
* Visual and textual reasoning trace enables reflection and progress tracking.
* Concept mastery tracking helps students monitor their growth over multiple sessions.