

MENTORIX

An Autonomous Agentic AI System for Personalized Learning

CAPSTONE PROJECT IDEA

by Himanshu Kumar Singh

| Why This Idea?



Business Scope

Extensible model solving
an obvious, scalable
problem.



Gen-AI Fit

Perfect use case for LLMs:
Adaptation, Tone &
Generation.



Comprehensive

Applies all class concepts:
Full-stack + Advanced AI.



Long-Term

Viable product beyond
the course duration.

The Problem: One Size Fits None

Current State

Traditional education relies on **fixed structures** and uniform pacing.

Teachers cannot maintain continuous, real-time cognitive models for 40+ students simultaneously.

Existing "adaptive" tools only adjust scheduling, not the **pedagogy** (how it's taught).

The Consequence

Cognitive Overload: Fast content overwhelms struggling students.

Stagnation: Slow content bores advanced students.

Result: Disengagement and wide variability in Class X outcomes.

The Solution: Mentorix

Autonomous & Agentic

Mentorix is a multi-agent system that continuously models learner cognition.

It doesn't just change *when* you learn, but **how** you learn:

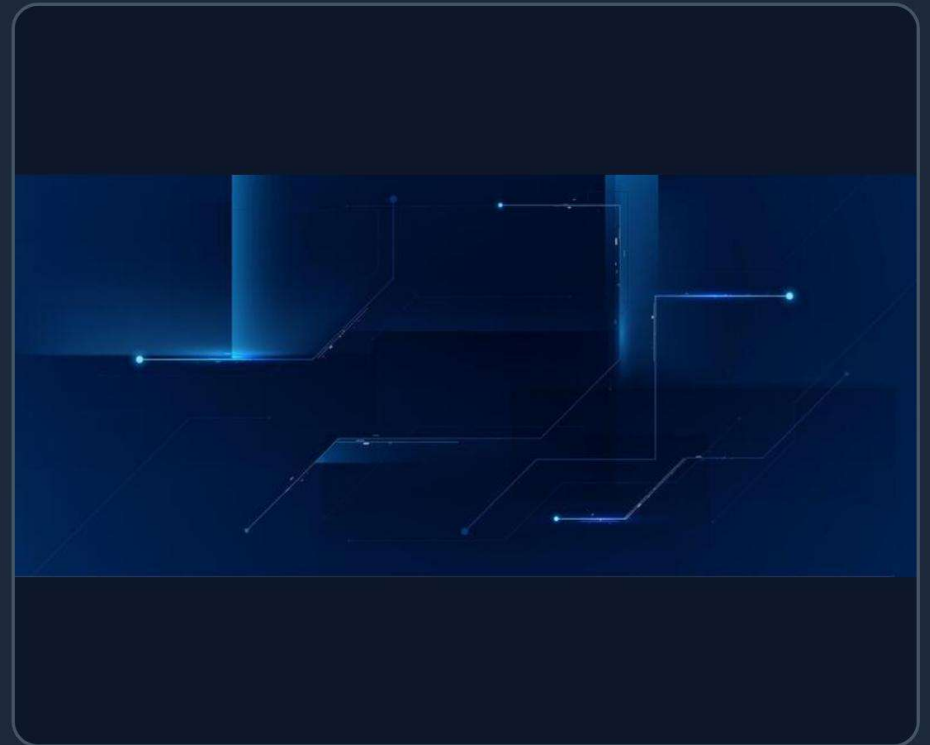
- Adjusts instructional tone & vocabulary.
- Modifies example density based on error rates.
- Autonomous scheduling & follow-ups.

Goal: A personal tutor that evolves with you.



High-Level Architecture

- 1. User Interface:** React/Next.js frontend for student interaction.
- 2. Orchestration Engine:** Code-controlled state machine managing agent workflows.
- 3. Multi-Agent System:** Specialized agents for Planning, Content, and Analytics.
- 4. Knowledge Layer:** RAG pipeline grounding generation in curriculum (NCERT).
- 5. Memory:** Short-term (Session) and Long-term (Cognitive Profile) storage.



| Core Agents & Responsibilities



Planner Agent

Analyzes diagnostic data to create long-term trajectories and weekly adaptive schedules. Balances coverage vs. mastery.



Content Agent

Retrieves grounded content and "transpiles" it into the student's optimal learning style (Visual, Socratic, or Direct).



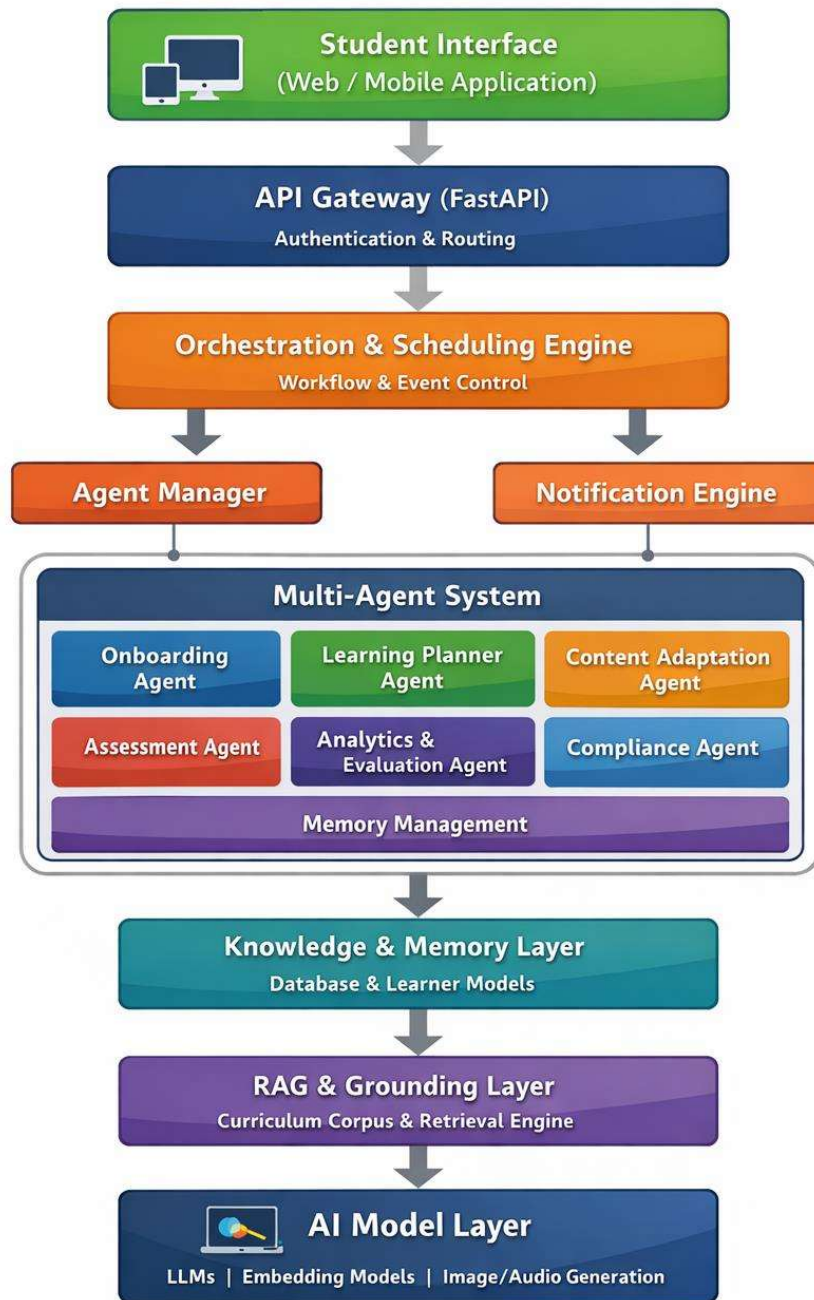
Analytics Agent

Monitors forgetting curves, detects misconceptions, and triggers immediate interventions or revisions.

| The Learning Loop



Mentorix: High-Level Architecture (Block View)



Market Scope & Social Impact



23 Lakh

Students appear for Class X Maths annually.

Democratization

Mentorix enables high-quality, personalized tuition at zero marginal cost.

Offline Capable





Designed to support local LLM deployment for rural/offline accessibility.

| 30-Day Execution Plan





Timeline	Phase	Key Deliverables
Week 1	Design & DB	Agent definition, DB Schema (Postgres), Repo setup.
Week 2	Core Infra	FastAPI Backend, RAG Pipeline (FAISS), PDF Ingestion.
Week 3	Agent Logic	Planner, Content & Analytics Agents, Memory System.
Week 4	UI & Launch	React Frontend, Integration, Hosted Demo.

| Technology Stack

Backend & AI

-  Python & FastAPI
-  OpenAI / Local LLMs
-  FAISS (Vector Store)
-  Celery (Async Tasks)

Frontend & Data

-  React / Next.js
-  PostgreSQL
-  Redis (Caching)
-  Vercel / Cloud Deploy

The background of the slide features a large, stylized brain outline in a glowing purple/pink neon-like color. Inside the brain, there are faint, glowing circular patterns. At the bottom right of the brain, there is a small, glowing blue and white icon that resembles a keyhole or a plug.

MENTORIX

Education that evolves with you.

Questions?

Thank you for your attention.