Project Overview

Title: AI Personal Tutor – Personalized, Adaptive Learning for Every Student

Problem Statement
Education platforms often deliver **one-size-fits-all** content that fails to match the learner's pace and prior knowledge. Meanwhile, private tutoring is expensive and unavailable to most students globally. This project aims to solve both problems with a scalable AI-powered tutor that adapts in real-time.

Solution
An **AI Personal Tutor** that uses a dynamic curriculum engine, multimodal content generation, and interactive assessment—all tailored to each learner's current skill level, cognitive preferences, and engagement behavior.

Related Applications

Application	Description
Khan Academy	Offers personalized learning with thousands of videos and solutions for almost each department.
Socratic by Google	Uses AI to explain student-uploaded problems, but is limited to text/image input.
Duolingo	Implements gamified adaptive learning but is domain-limited to language learning.
Ai-Tutor	A web application where a student can add a course and start learning modules od course but it lacks showing skills gained at a time by a student.

Research Papers

1. Knowledge Graph-Enhanced Retrieval-Augmented Generation (KG-RAG)

Title: *How to Build an Adaptive AI Tutor for Any Course Using Knowledge Graph-Enhanced Retrieval-Augmented Generation (KG-RAG)*
Authors: Dong et al., November 2023
Summary:

- Proposes integrating **structured knowledge graphs** into **LLM outputs** using a KG-enhanced RAG architecture.
- Demonstrated a **35% improvement** in learner outcomes in a controlled study with 76 students.

Link: https://arxiv.org/abs/2311.17696

2. Intelligent Tutoring Robots (ITR)

Title: *Artificial Intelligence in Intelligent Tutoring Robots: A Systematic Review and Design Guidelines*
Authors: Yang & Zhang, February 2019
Summary:

- Systematic review of **AI-driven robot tutors**, outlining a cognitive architecture based on the **perception–planning–action** model.
- Offers **design principles** and implementation guidance for robotic ITS development.

Link: https://www.researchgate.net/publication/333231642