🧠 Project Title

AI-Powered Interactive Learning Assistant for Classroom Engagement

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📝 Project Description

This project aims to develop a **Generative AI-powered interactive learning assistant** that enhances classroom engagement and supports both **students and educators**. The assistant uses advanced AI models to **personalize learning**, **generate content**, and **facilitate multimodal interaction** (text, speech, and visuals) in real-time.

🚀 Core Features

👨‍🎓 For Students:

- **Personalized learning assistance** based on lecture materials and individual progress.
- **Question answering** from uploaded content (PDFs, lecture notes, images, or speech).
- **Summarization** of lengthy lectures or chapters.
- **Visual aids** generated using image models to improve concept clarity.
- **Audio explanations** for accessible and inclusive learning.

👩‍🏫 For Teachers:

- **Automatic lesson plan generation** based on class topics and grade levels.
- **Quiz and worksheet generation** for formative assessment.
- **Student query analysis** to summarize doubts and tailor future lessons.
- **Multimodal content generation** (e.g., summaries + diagrams + TTS) for classroom delivery.

🧠 AI Technologies Used

- **LLMs (e.g., Mistral 7B / Claude Sonnet 3.5)** for summarization, QA, lesson planning.
- **Stable Diffusion** for generating educational visuals.
- **Whisper / Silero** for speech-to-text (voice input).
- **TTS models (e.g., Coqui.ai / Bark / Tortoise)** for audio output.
- **Intent classifier** to reject irrelevant or inappropriate queries.
- **Web scraping/search integration** for external information retrieval (optional fallback).

⚙️ Optimization & Deployment

- **OpenVINO Toolkit** used to convert and optimize AI models for Intel® CPU, GPU, and NPU.
- Ensures **low-latency**, **efficient inference**, and supports **on-device/offline use**.
- Built with a modular architecture for easy switching between cloud (Claude Sonnet) and local (Mistral 7B) models.

🎯 Demo Goals

- Real-time interaction showcasing:
    - Student asking questions via text or voice
    - System responding with relevant text, visual, and/or audio output
    - Teacher generating a lesson plan or quiz on demand
- Benchmark comparisons of inference time (pre- vs post-OpenVINO optimization)