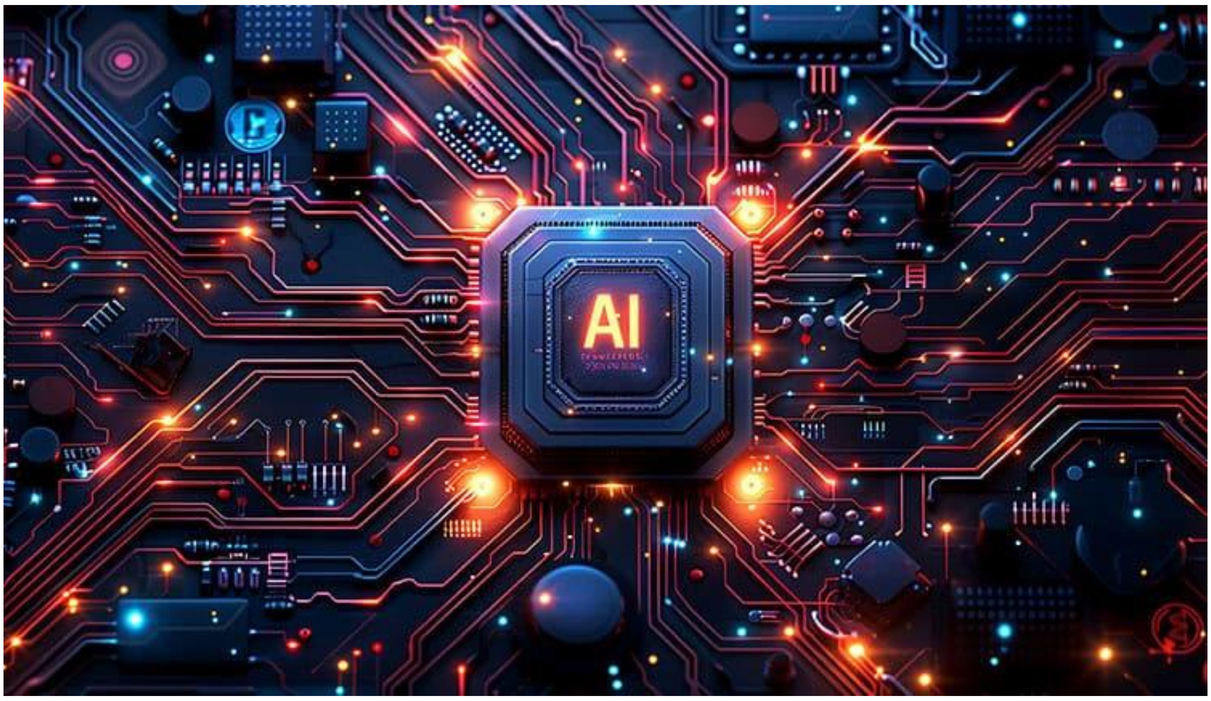
# EduTutor AI: Personalized Learning with Generative AI and LMS Integration



## Project Documentation

### 1. Introduction

*Project title: EduTutor AI – Adaptive Learning Assistant*

Team leader: Malini B

Team members: Gracin Angel J

Anitha C

Santhini N

### 2. Project Overview

*Purpose:*

The purpose of EduTutor AI is to create a smart learning system that adapts quizzes based on each student's knowledge level. By using IBM Watsonx, Pinecone DB, Google Classroom, and Streamlit, the system delivers a personalized education experience.

For students: it provides quizzes that adjust automatically (easy/medium/hard).

For teachers: it gives a dashboard to monitor student progress.

By integrating with Google Classroom, it can fetch assignments and generate relevant quizzes.

*Features:*

- Diagnostic Testing → First test to identify student level.
- Adaptive Quizzing → AI adjusts difficulty based on answers.
- Educator Dashboard → Teacher view of scores, history, progress.
- Google Classroom Integration → Auto fetch assignments & subjects.
- Pinecone Memory → Stores past performance & class data for retrieval.
- Watsonx AI → Generates explanations, quiz questions, and summaries
- Streamlit UI → Simple web interface for both students and teachers.

## 3. Architecture

### Frontend (Streamlit):

- Student quiz page
- Teacher dashboard (progress charts, student performance table)
- Login via Google
- Backend (Python / FastAPI optional):
- Handles AI calls (Watsonx)
- Stores and fetches quiz data
- Connects with Google Classroom API

### LLM Integration (IBM Watsonx):

- Generates quiz questions
- Summarizes assignments
- Provides explanations to students
- Vector DB (Pinecone):
- Stores assignment texts and quiz history as embeddings
- Retrieves relevant content for adaptive learning

## 4. Setup Instructions

### Prerequisites:

- Python 3.9+

- pip & virtual environment
- API Keys: IBM Watsonx, Google Classroom, Pinecone
- Internet access

### Installation Process:

- Clone/download the repository.

### Install dependencies:

- pip install -r requirements.txt
- Create .env file with API keys.

### Run the app:

- streamlit run app.py

## 5. Folder Structure

```
edututor/
 ├─ app.py            # Streamlit frontend
 ├─ src/
 │  ├─ google_sync.py     # Google Classroom fetch
 │  ├─ pipeline.py        # Adaptive quiz + Watsonx logic
 │  ├─ pinecone_client.py  # Pinecone DB integration
 │  ├─ watsonx_client.py   # IBM Watsonx integration
 │  └─ utils.py           # Helper functions
 ├─ requirements.txt
 ├─ .env
 └─ README.md
```

## 6. Running the Application

- Start Streamlit: streamlit run app.py
- Student logs in → diagnostic test starts
- AI evaluates performance → adapts next quiz
- Teacher dashboard shows results & graphs

## 7. API Documentation (Conceptual)

- POST /quiz/start – Start diagnostic test
- POST /quiz/answer – Submit answers & get next question (adaptive)
- GET /teacher/dashboard – View student performance
- GET /classroom/fetch – Fetch Google Classroom assignments
- POST /pinecone/store – Save quiz/assignment data

## 8. Authentication

- Google login for students/teachers
- API keys for Watsonx & Pinecone
- Role-based access: Student vs Teacher

## 9. User Interface

### Student Page:

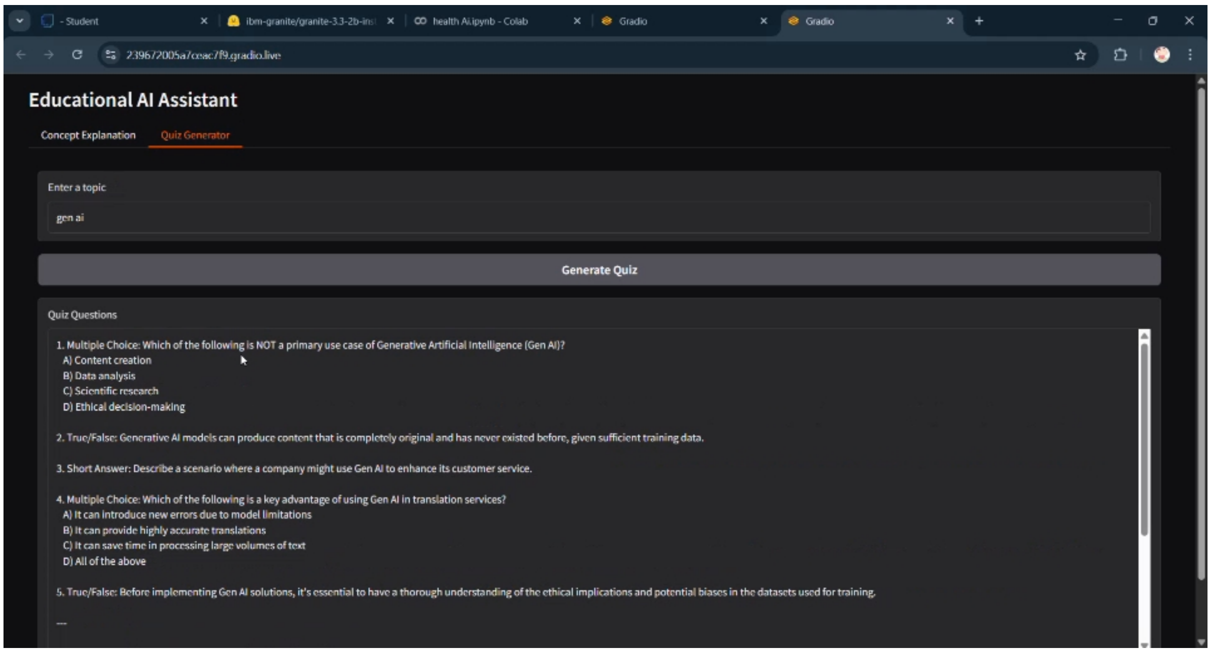
- Quiz window (questions + answers)
- Instant feedback & explanation
- Teacher Dashboard:
- Table of student scores
- Performance graphs
- Recent quiz history

## 10. Testing

- Unit Testing: quiz logic, Pinecone search
- Manual Testing: try different student levels (weak/average/strong)
- Edge Cases: empty answers, invalid API keys

## 11. Screenshots (to add after running)

- Quiz page in Streamlit


- Student
ibm-granite/granite-3.3-2b-ins
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Educational AI Assistant

Enter a topic

gen ai

Quiz Questions

```
1. Multiple Choice: Which of the following is NOT a primary use case of Generative Artificial Intelligence (Gen AI)?
  A) Content creation
  B) Data analysis
  C) Scientific research
  D) Ethical decision-making

2. True/False: Generative AI models can produce content that is completely original and has never existed before, given sufficient training data.

3. Short Answer: Describe a scenario where a company might use Gen AI to enhance its customer service.

4. Multiple Choice: Which of the following is a key advantage of using Gen AI in translation services?
  A) It can introduce new errors due to model limitations
  B) It can provide highly accurate translations
  C) It can save time in processing large volumes of text
  D) All of the above

5. True/False: Before implementing Gen AI solutions, it's essential to have a thorough understanding of the ethical implications and potential biases in the datasets used for training.

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```
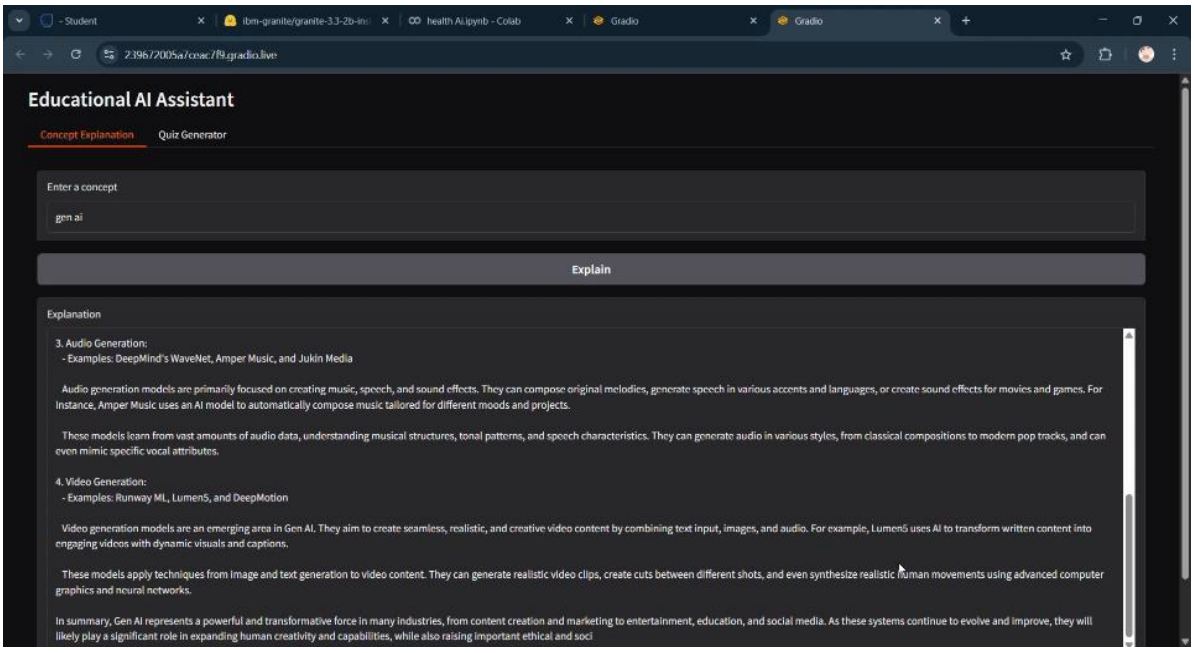

- Teacher dashboard chart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Educational AI Assistant

Enter a concept

gen ai

Explanation

```
3. Audio Generation:
  - Examples: DeepMind's WaveNet, Amper Music, and Jukin Media

  Audio generation models are primarily focused on creating music, speech, and sound effects. They can compose original melodies, generate speech in various accents and languages, or create sound effects for movies and games. For instance, Amper Music uses an AI model to automatically compose music tailored for different moods and projects.

  These models learn from vast amounts of audio data, understanding musical structures, tonal patterns, and speech characteristics. They can generate audio in various styles, from classical compositions to modern pop tracks, and can even mimic specific vocal attributes.

4. Video Generation:
  - Examples: Runway ML, Lumen5, and DeepMotion

  Video generation models are an emerging area in Gen AI. They aim to create seamless, realistic, and creative video content by combining text input, images, and audio. For example, Lumen5 uses AI to transform written content into engaging videos with dynamic visuals and captions.

  These models apply techniques from image and text generation to video content. They can generate realistic video clips, create cuts between different shots, and even synthesize realistic human movements using advanced computer graphics and neural networks.

In summary, Gen AI represents a powerful and transformative force in many industries, from content creation and marketing to entertainment, education, and social media. As these systems continue to evolve and improve, they will likely play a significant role in expanding human creativity and capabilities, while also raising important ethical and soci
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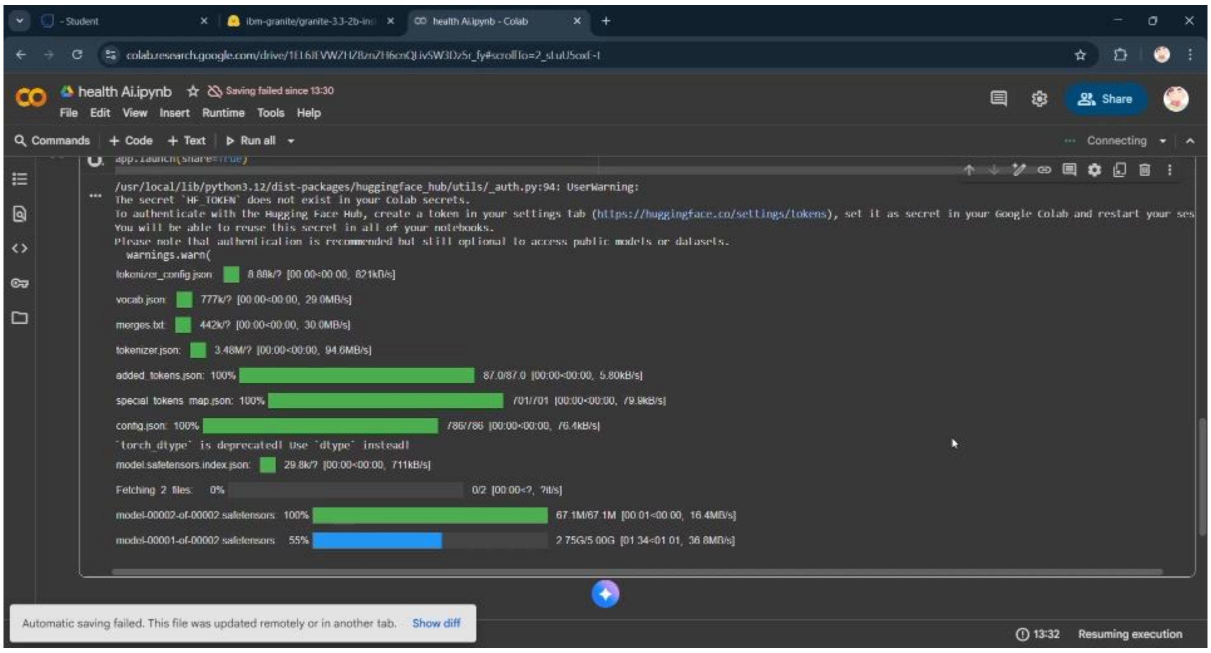
- Running process


```
app.launch(share=True)
/usr/local/lib/python3.12/dist-packages/huggingface_hub/utils/_auth.py:94: UserWarning:
The secret `HF_TOKEN` does not exist in your Colab secrets.
To authenticate with the Hugging Face Hub, create a token in your settings tab (https://huggingface.co/settings/tokens), set it as secret in your Google Colab and restart your ses
You will be able to reuse this secret in all of your notebooks.
Please note that authentication is recommended but still optional to access public models or datasets.
  warnings.warn(
tokenizer_config.json:  8.88k/? [00:00<00:00, 821kB/s]
vocab.json:  777k/? [00:00<00:00, 29.0MB/s]
merges.txt:  442k/? [00:00<00:00, 30.0MB/s]
tokenizer.json:  3.48M/? [00:00<00:00, 94.6MB/s]
added_tokens.json: 100%  87.0/87.0 [00:00<00:00, 5.80kB/s]
special_tokens_map.json: 100%  701/701 [00:00<00:00, 79.9kB/s]
config.json: 100%  786/786 [00:00<00:00, 76.4kB/s]
`torch_dtype` is deprecated! Use `dtype` instead!
model.safetensors.index.json:  29.8k/? [00:00<00:00, 711kB/s]
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model-00002-of-00002.safetensors: 100%  67.1M/67.1M [00:01<00:00, 16.4MB/s]
model-00001-of-00002.safetensors:  55%  2.75G/5.00G [01:34<01:01, 36.8MB/s]
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Saving failed since 13:30
File Edit View Insert Runtime Tools Help
Commands
+ Code
+ Text
Run all
Share
Connecting
Show diff
13:32
Resuming execution

## 12. Known Issues

- Limited to subjects pulled from Google Classroom
- Internet required for Watsonx and Pinecone

## 13. Future Enhancements

- Mobile app version
- Multilingual quiz generation
- Speech-based interaction
- Deeper integration with Google Meet