

EduTutor AI: Personalized Learning with Generative AI and LMS Integration

Introduction:

Team ID : NM2025TMID06791

Team Size : 4

Team Leader : PREMA P

Team member : SASITHA S

Team member : PRIYA C

Team member : NATHIYA G

Project description:

EduTutor AI is an AI-powered personalized education platform that revolutionizes the way students learn and educators assess progress. It provides dynamic quiz generation, student evaluation, Google Classroom integration, and real-time feedback—all powered by IBM Watsonx and Granite foundation models. Designed with modular architecture, this platform streamlines personalized education and enhances learning outcomes for students across academic levels.

Scenario 1: Personalized Learning Experience

A student logs into EduTutor AI and synchronizes their courses using their Google Classroom credentials. The platform analyzes course data, generates quizzes on key topics using the Granite LLM, and assesses responses for instant feedback—creating a highly personalized and engaging learning journey.

Scenario 2: Educator Dashboard & Performance Insights

Educators can log in to view real-time quiz performance of all students. The dashboard highlights quiz history, scores, last topics attempted, and insights fetched from the

Pinecone vector database. This empowers teachers to monitor learning progress and personalize their instruction based on data.

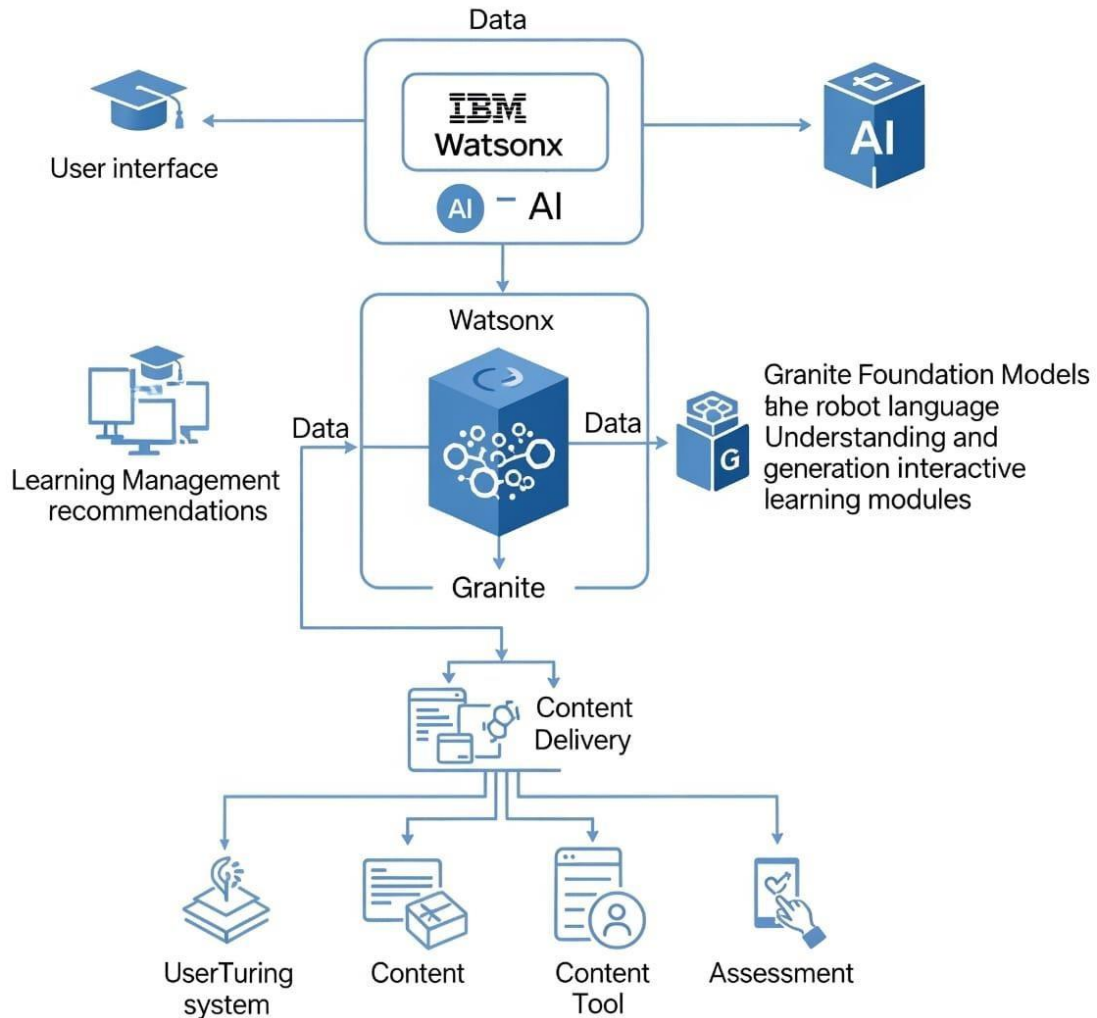
Scenario 3: Diagnostic Testing and Adaptive Quizzing

Upon registration, students undergo a diagnostic test generated by IBM Watsonx models. Based on the results, the platform adapts quiz difficulty and topic relevance, ensuring students are challenged at the right level.

Scenario 4: Google Classroom Integration

EduTutor AI syncs courses directly from Google Classroom, allowing seamless access to student data, class names, and subjects. This enables automatic quiz topic generation and helps maintain consistent alignment with the academic curriculum.

EduTutor AI



projectflow

1. **UserInput:**
Students login using credentials or Google Classroom and request a quiz by selecting topic and difficulty.
2. **AIQuiz Generation:**
Watsonx+Granite models generate MCQs, stored temporarily without answers in the frontend and with answers in the backend

3. **UserQuizSubmission:**
Students submit answers via UI. The backend evaluates the answers, scores the quiz, and stores it in Pinecone DB. But some errors could not be built the frontend part of it
4. **FeedbackLoop:**
5.
 1. Educators access this data in the dashboard.

Milestone 1: Requirements Specification

- **fastapi**
- **uvicorn**
- **langchain_ibm**
- **pinecone**
- **streamlit**
- **google-auth-oauthlib**
- **google-api-python-client**
- **python-dotenv**

Installation:

pip install -r requirements.txt

Requirements

- **fastapi**

- `uvicorn`
- `langchain_ibm`
- `pinecone`
- `streamlit`
- `google-auth-oauthlib`
- `google-api-python-client`
- `python-dotenv`

Installation:

`pip install -r requirements.txt`

Milestone 2: Initialization of Environment Variables

Create a `.env` file with:

`env`

`WATSONX_MODEL_ID=granite-13b-instruct-v2`

`WATSONX_API_KEY=your_ibm_watsonx_api_key`

`WATSONX_ENDPOINT=https://us-south.ml.cloud.ibm.com`

`WATSONX_PROJECT_ID=your_project_id`

`PINECONE_API_KEY=your_pinecone_api_key`

`PINECONE_INDEX_NAME=edututor`

Initialization of Environment Variables

Create a `.env` file with:

env

```
WATSONX_MODEL_ID=granite-13b-instruct-v2
WATSONX_API_KEY=your_ibm_watsonx_api_key
WATSONX_ENDPOINT=https://us-south.ml.cloud.ibm.com
WATSONX_PROJECT_ID=your_project_id
PINECONE_API_KEY=your_pinecone_api_key
PINECONE_INDEX_NAME=edututor
```

Milestone3:AIIntegrationwithIBMWatsonx

- **ModelSetup:**Granitemodelisloadedvia`langchain_ibm.WatsonxLLM`.
- **PromptTemplate:**Dynamicallygeneratesquizquestionsusing LangChain's PromptTemplate.
- **QuizParsing:**WatsonxoutputisparsedintostructuredJSONfordisplay and evaluation.

GoogleClassroomSync

- Uses`google-auth-oauthlib`and`google-api-python-client`.
- Userlogs in via Google.

Milestone5:PineconeVectorDBIntegration

- Storeseachuser'sprofilewithembeddings.
- Quizmetadata(score,topic,date)isupdatedaftersubmission.
- Allowededucatorstofetchstudentdataandanalyze progress.

Milestone6:StreamlitFrontendUI

- **Student Panel:**
 - **Login(Manual or Google)**
 - **Dashboard**
 - **TakeQuiz**
 - **Quiz History**
- **Educator Panel:**
 - **Dashboard(all student analytics)**

Milestone 7: functional verification

Modular AI-Powered Architecture

- **FastAPI Backend**
Handles student/educator login, quiz generation, answer evaluation, classroom sync, and metadata updates.

User

POST /user/register Register User

Quiz

POST /quiz/generate Generate Quiz Endpoint

Google Auth

GET /auth/login Google Login

GET /auth/callback Google Auth Callback

Quiz Submission

POST /quiz/submit Submit Quiz

Educator

GET /educator/student/{user_id}/quiz-history Get Student Quiz History

- **Watsonx + Granite Models**
Generates MCQs dynamically from topic input.
Provides instruction-tuned inference via
LangChain Watsonx integration.

[Upgrade](#)
Rohan Patil's Account
Frankfurt

Train, deploy, validate, and govern AI models responsibly.

Customize my journey

[-]

AI

Chat and build prompts with foundation models

Start chatting...

Open Prompt Lab

AI

Build an AI agent to automate tasks

with Agent Lab

AI

Tune a foundation model with labeled data

with Tuning Studio

Discover

Developer access

Project or space

Project ID

Edu tutor

fc5db437-02d8-4bfd-adc8-f16c2fc1393e

watsonx.ai URL

https://eu-de.ml.cloud.ibm.com

Used to call watsonx.ai APIs such as LLM inferencing, embedding, training, and chatting.

Create API key

Manage IBM Cloud API keys

Developer hub

New watsonx Developer Hub to start coding fast.

Make your first API request to inference a foundation model in watsonx.ai. Find the right foundation models and code libraries for your AI applications.

- PineconeVectorDB**
stores user profile embeddings, quiz history metadata, and similarity search for adaptive learning.

Indexes

Create index

Search indexes

Sort by last viewed

Filter by

Showing 1 index

edututor

...

Connect

Host: https://edututor-0cpwldt.svc.aped-4627-b74a.pinecone.io

Cloud: AWS • Region: us-east-1 • Type: Dense • Capacity mode: Serverless • Dimension: 2048 • Model: llama-text-embed-v2

BROWSER
METRICS
NAMESPACES (1)
CONFIGURATION

Records

Search
List/Fetch
Add a record

Namespace
(Default)

Search by
Text

Text
Example text

Top K
10

Search

+ Filter
+ Rerank

Showing 1 hit

1


ID: user123
last_quiz_id: "602af2fb-582e-450c-95b4-289dc0c7230c"
last_score: 2
last_topic: "Photosynthesis"
last_total: 19
last_updated: "2025-04-12T11:36:46.987775"

SCORE
0.0087

...

- StreamlitFrontend**
provides dashboards for both students and
educatorswithrole-basedUI,quizsubmission forms,
and OAuth-based login.

Deploy


EduTutor AI Login

Select Role

student

Enter User ID

Login

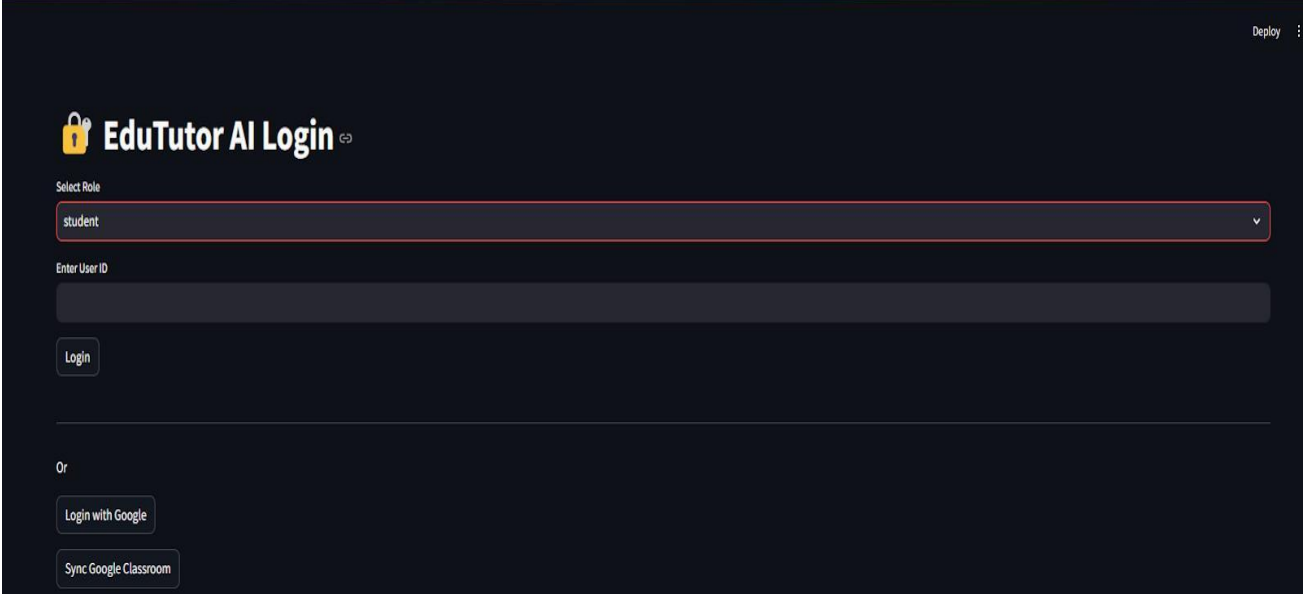
Or

Login with Google

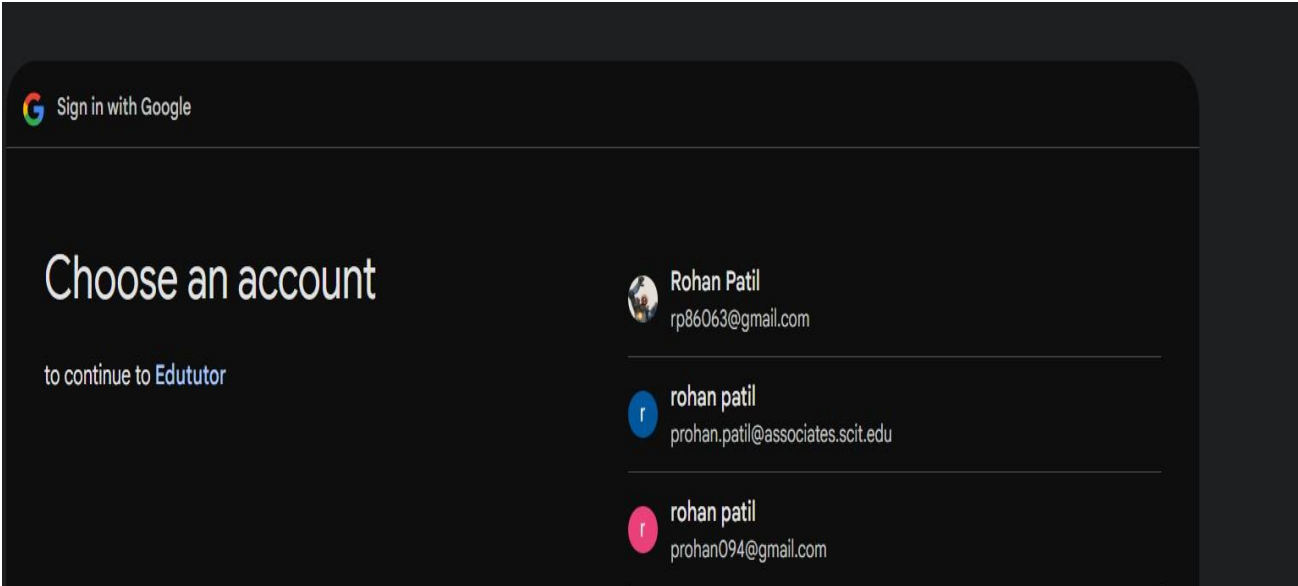
Sync Google Classroom

ProjectFlow:

1. **UserInput:**
Students log in using credentials or Google Classroom and request a quiz by selecting topic and difficulty.



The login screen for EduTutor AI features a dark blue background. At the top right is a 'Deploy' button. The main heading is 'EduTutor AI Login' with a lock icon. Below this, there's a 'Select Role' dropdown menu currently showing 'student'. Underneath is a text input field for 'Enter User ID' and a 'Login' button. A horizontal line separates this from the 'Or' section, which contains 'Login with Google' and 'Sync Google Classroom' buttons.



This screen shows the Google account selection interface. It has a 'Sign in with Google' header. The main text says 'Choose an account' followed by 'to continue to Edututor'. On the right, three account options are listed: 'Rohan Patil' with email 'rp86063@gmail.com', 'rohan patil' with email 'prohan.patil@associates.scit.edu', and 'rohan patil' with email 'prohan094@gmail.com'. Each option has a small circular profile picture icon.

2. AIQuiz Generation:

Watsonx+GranitemodelsgenerateMCQs,storedtemporarilywithoutanswersin the frontend and with answers in the backend.

localhost:8501

EduTutor Navigation

Select a page

- Dashboard
- Take Quiz
- Quiz History

Take a Quiz

Enter Topic
PhotoSynthesis

Difficulty
easy

Number of Questions
1 5 10

Generate Quiz

Quiz generated. Answer the questions below!

Q2. The primary pigment involved in photosynthesis is...

- ☒ Chlorophyll a
- ☐ Chlorophyll b
- ☐ Carotene
- ☐ Xanthophyll

Q3. What is the main function of the stroma in plant cells during photosynthesis?

- ☒ It is the site of light-dependent reactions.
- ☐ It is the site of light-independent reactions (Calvin cycle).
- ☐ It stores excess glucose produced during photosynthesis.
- ☐ It is the site of cell division.

Q4. During photosynthesis, which gas is released as a byproduct?

- ☒ Oxygen
- ☐ Carbon dioxide
- ☐ Nitrogen
- ☐ Hydrogen

Q5. What is the role of water during the light-dependent reactions of photosynthesis?

- ☒ It provides electrons for the electron transport chain.
- ☐ It splits into hydrogen and oxygen, releasing oxygen as a byproduct.
- ☐ It is used to produce glucose through the Calvin cycle.

3. UserQuizSubmission:

Students submit answers via UI. The backend evaluates the answers, scores the quiz, and stores it in PineconeDB. But some errors could not build the frontend part of it

Showing 1 hit

1

ID: user123

last_quiz_id: "02af2fb-582e-450c-95b4-289dc0c7230c"

last_topic: "Photosynthesis"

SCORE

0.0087

last_topic: "Photosynthesis"

last_total: 19

last_updated: "2025-04-12T11:36:46.987775"

4. **FeedbackLoop:**
Educators access this data in the dashboard.