

## Project Title

## Project Documentation

### 1. Introduction

- Project title: EduTutor AI: Personalized Learning
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### 2.]Project Overview

- Purpose:

The purpose of EduTutor AI is to provide personalized learning support using Generative AI with IBM Granite models.

The project helps students with concept explanations, quiz generation, and interactive learning through AI-driven solutions.

It leverages Google Colab for execution with low setup and GitHub for version control.

- Features:

Concept Explainer

Key Point: Simplified learning

Functionality: Generates easy-to-understand explanations for complex topics.

Quiz Generator

Key Point: Interactive practice

Functionality: Creates quizzes based on chosen topics for self-assessment.

AI Integration with IBM Granite

Key Point: Generative AI support

Functionality: Uses Hugging Face Granite models to enhance learning outcomes.

Cloud Deployment

Key Point: Easy accessibility

Functionality: Runs smoothly on Google Colab with GPU support.

GitHub Integration

Key Point: Version control and collaboration

Functionality: Stores and shares project code.

### 3. Architecture

***Frontend (Gradio UI):***

The frontend is built with Gradio, offering an interactive interface for students to access explainers and quizzes.

### ***Backend (Python & IBM Granite):***

Python scripts interact with IBM Granite models on Hugging Face to generate learning content and responses.

### ***Deployment (Google Colab):***

The project is deployed on Google Colab with GPU acceleration for efficiency and low-cost execution.

### ***Version Control (GitHub):***

Project code and files are maintained on GitHub for collaboration and progress tracking.

#### 4. Setup Instructions

##### ***Prerequisites:***

- o Python 3.8 or later
- o Google Colab with T4 GPU enabled
- o Hugging Face account for IBM Granite models
- o GitHub account for version control

##### ***Installation Process:***

- o Access the Naan Mudhalvan Smart Internz Portal and enroll in EduTutor AI.
- o Select IBM Granite model from Hugging Face (e.g., granite-3.2-2b-instruct).
- o Run the notebook in Google Colab, install dependencies, and execute code.
- o Upload the project to GitHub with documentation and source code.

#### 5. Folder Structure

app/ – Contains main project scripts for quiz generation and explainers.

ui/ – Contains Gradio interface code.

notebooks/ – Google Colab notebooks for running the project.

README.md – Documentation of the project.

#### 6. Running the Application

### ***To start the project:***

- Open Google Colab and load the EduTutor AI notebook.
- Enable GPU runtime and install dependencies.
- Run the provided Python code cells to generate explainers and quizzes.
- Open the Gradio link to interact with the application.
- Upload your project files to GitHub for submission.

### 7. API Documentation

The project relies on IBM Granite Hugging Face API models.

### ***APIs used include:***

POST /generate-explainer – Generates concept explanations.

POST /generate-quiz – Creates quizzes based on topics.

GET /project-progress – Tracks project progress on Naan Mudhalvan portal.

### 8. Authentication

The project runs in an open environment for demonstration.

### ***For secure deployment, integrate:***

- Token-based authentication for API access
- GitHub user authentication for collaboration

### 9. User Interface

### ***The interface is simple and student-friendly:***

Sidebar with navigation

Tabs for quizzes and explainers

Real-time AI-generated content

Output preview in Gradio

### 10. Testing

### ***Testing was done in multiple phases:***

Unit Testing: For AI model prompt responses.

Manual Testing: For quiz and explainer generation.

Integration Testing: Google Colab and Hugging Face API connectivity.

Edge Case Handling: Invalid topics, large quiz sizes, missing API keys.

#### 11. Screenshots

(Add screenshots of Colab notebook, Gradio app, and GitHub repo)

#### 12. Known Issues

- Dependent on internet connectivity for API access.
- Limited to IBM Granite model capacity.

#### 13. Future Enhancements

- Add support for more subjects and multimodal learning (PDFs, images).
- Enhance analytics and personalized student feedback.
- Deploy as a standalone web app beyond Google Colab.