Full Stack Development with MERN

Project Documentation: Edu-Tutor AI

1. Introduction

• Project Title: Edu-Tutor AI

• Team Members:
- Ravi Chandra – AI Model Integration & UI Design

2. Project Overview

• Purpose:
Edu-Tutor AI is an AI-powered virtual tutor designed to assist students by answering questions, explaining concepts, and providing personalized learning support across various academic subjects.

• Features:
- Conversational AI assistant
- Subject-specific query answering
- Live deployment via Gradio interface
- Voice/Text input capabilities
- Dark mode & profile info (planned enhancement)

3. Architecture

• Frontend:
Built using Gradio's Python interface for rapid prototyping and deployment.

• Backend:
The backend uses Python to integrate with the ibm-granite/granite-3.3-2b-instruct language model via Hugging Face Transformers API.

• Database:
No database integration currently. (Can be extended with MongoDB for storing user sessions or performance metrics)

4. Setup Instructions

• Prerequisites:
- Python 3.9+
- Hugging Face Transformers
- Torch
- Gradio

• Installation:
pip install gradio transformers torch

• Environment:
Ensure you have a Hugging Face access token added in your script to load the IBM Granite model.

5. Folder Structure

• Client (Gradio Frontend):
- main.py – Gradio interface with input/output and theme options

• Server (Model Logic):
- Integrated in main.py with calls to IBM Granite via transformers

6. Running the Application

python main.py
(Or run in Google Colab or Jupyter notebook)

7. API Documentation

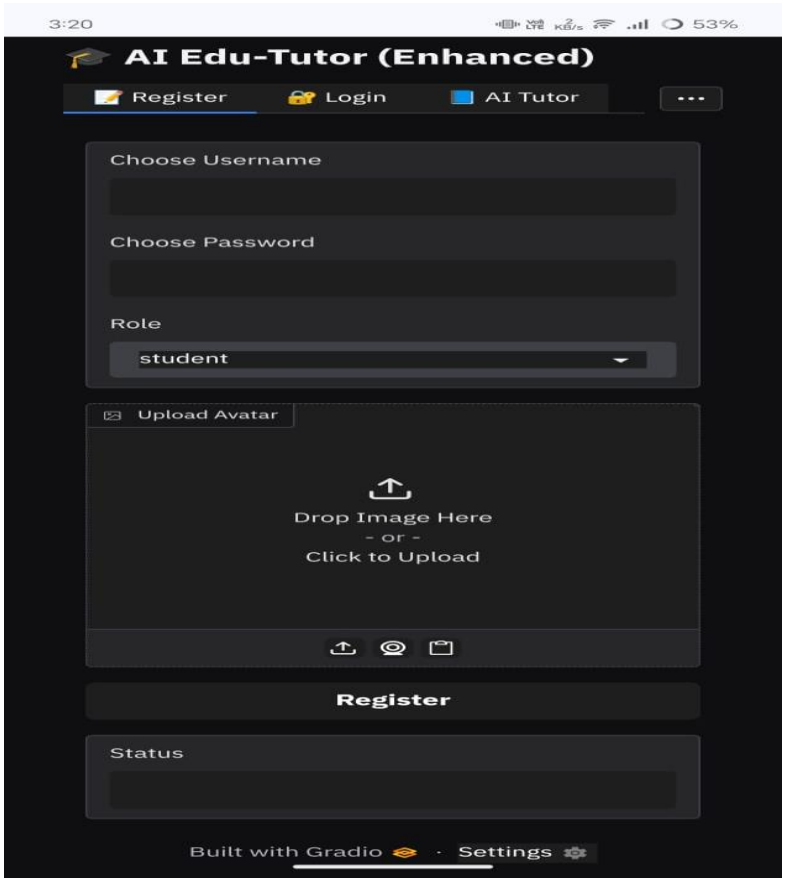
The app does not expose traditional REST APIs. Instead, it serves an interactive UI via Gradio. Input and output are handled in real-time.

8. Authentication

Currently no authentication.
For production:
- OAuth/Google login can be added
- Session tokens for user history tracking

9. User Interface

Screenshot Preview:



10. Testing

• Manual testing via the Gradio interface
• Future scope includes:
  - Unit tests for logic
  - Integration tests for UI and model

11. Screenshots or Demo

Live Demo Link:
https://95d75e822517e93f63.gradio.live/

12. Known Issues

• No persistent session or chat history
• Model may generate irrelevant responses for highly technical queries
• Limited multi-turn dialogue context

13. Future Enhancements

• Add user avatars and profiles
• Export progress to file (PDF/CSV)
• Enable user-uploaded content and document-based Q&A
• Add support for multiple languages
• Integrate database for storing learning metrics