Introduction

Project title : EduTutor AI: Personalized Learning with Generative AI and LMS Integration

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Project Description: EduTutor AI

1. Project Overview

EduTutor AI is an AI-powered personalized study assistant that helps students learn any topic in multiple ways — step-by-step explanations, quick revision notes, visual analogies, real-life examples, quizzes, and challenges. The app uses LLMs (Large Language Models) with a simple Gradio-based UI to provide interactive, customized learning experiences.

2. Purpose

The purpose of EduTutor AI is to make learning more accessible, engaging, and adaptive by using AI to explain concepts in different formats. Students can explore topics in a way that matches their learning style and level of understanding

3. Objectives

Provide step-by-step explanations for complex concepts.

Generate quick revision notes for last-minute studying.

Offer visual analogies and real-life examples for deeper understanding.

Create quiz-style questions for self-assessment.

Challenge students with critical thinking tasks.

Ensure the system is easy to use and requires no technical expertise.

4. Scope

Covers multiple subjects like physics, math, computer science, biology, and general topics.

Supports various learning modes (Explanation, Quiz, Notes, Real-life Application).

Works locally or in the cloud using Gradio.

Can be extended to include speech input/output, user authentication, progress tracking, and multi-language support.

5. Key Features

Multi-mode learning: Step-by-step, notes, analogies, examples, quizzes, challenges.

Random topic generator: Surprise me button picks a concept at random.

AI Creativity Slider: Adjust the response style (concise → creative).

Dropdown selection: Choose learning style easily.

Interactive UI with Gradio.

6. Benefits

Personalizes learning according to student needs.

Saves time by generating instant study material.

Encourages active learning through quizzes and challenges.

Makes difficult topics easier to grasp using analogies and real-world examples.

Can be used for self-study or as a teaching aid.

7. Technology Stack

Frontend / UI: Gradio

Backend / AI Engine: Hugging Face Transformers, PyTorch

Model: IBM Granite (LLM) / AutoModelForCausalLM

Language: Python

Other Libraries: Random, Torch

8. Resource Forecasting (Functionality)

Compute: GPU preferred for faster response, CPU possible with longer wait.

Memory: ~8GB RAM recommended (LLM processing).

Storage: ~2–3 GB (model weights + dependencies).

Users: Lightweight app, good for small-to-medium scale (classrooms, individuals).

9. Architecture

[User Interface (Gradio)]

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[EduTutor AI Logic]

- Concept input
- Random concept picker
- Theme selection
- AI creativity slider

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[AI Model (HuggingFace Transformers + PyTorch)]

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[Response Generator]

10. Setup Instructions

Prerequisites

Python 3.8+

pip (latest version)

GPU with CUDA (optional, recommended)

Installation Process

```
# Clone the project
git clone https://github.com/yourusername/edututor-ai.git
cd edututor-ai

# Create virtual environment
python -m venv venv
source venv/bin/activate   # (Linux/Mac)
venv\Scripts\activate      # (Windows)

# Install dependencies
pip install -r requirements.txt
```

11. Folder Structure

```
EduTutor_AI/
├── app.py              # Main application file
├── requirements.txt    # Dependencies
├── README.md           # Documentation
├── models/             # Pretrained models (downloaded automatically)
├── ui/                 # UI-related components
├── utils/              # Helper functions
```

12. Running the Application

python app.py

The app will start on http://127.0.0.1:7860

Users can enter topics, choose a style, and interact with EduTutor AI.

13. API Documentation

generate_response(prompt, temperature) → Returns AI-generated output.

random_concept() → Returns a random concept from the predefined list.

tutor_response(concept, theme, temperature) → Main logic for handling user requests.

14. Authentication

Current version: No authentication (open access).

Future: Add user login, Google OAuth, and progress tracking.

15. User Interface

Textbox: Enter topic or concept.

Button: Surprise me with a concept.

Dropdown: Select learning style.

Slider: Adjust creativity level.

Output Box: Displays AI-generated response.

16. Known Issues

Large model size may cause slow response on CPU.

Limited domain knowledge (depends on model).

No built-in persistence (user progress not saved).

17. Future Enhancements

User dashboard with progress tracking.

Voice input & output for accessibility.

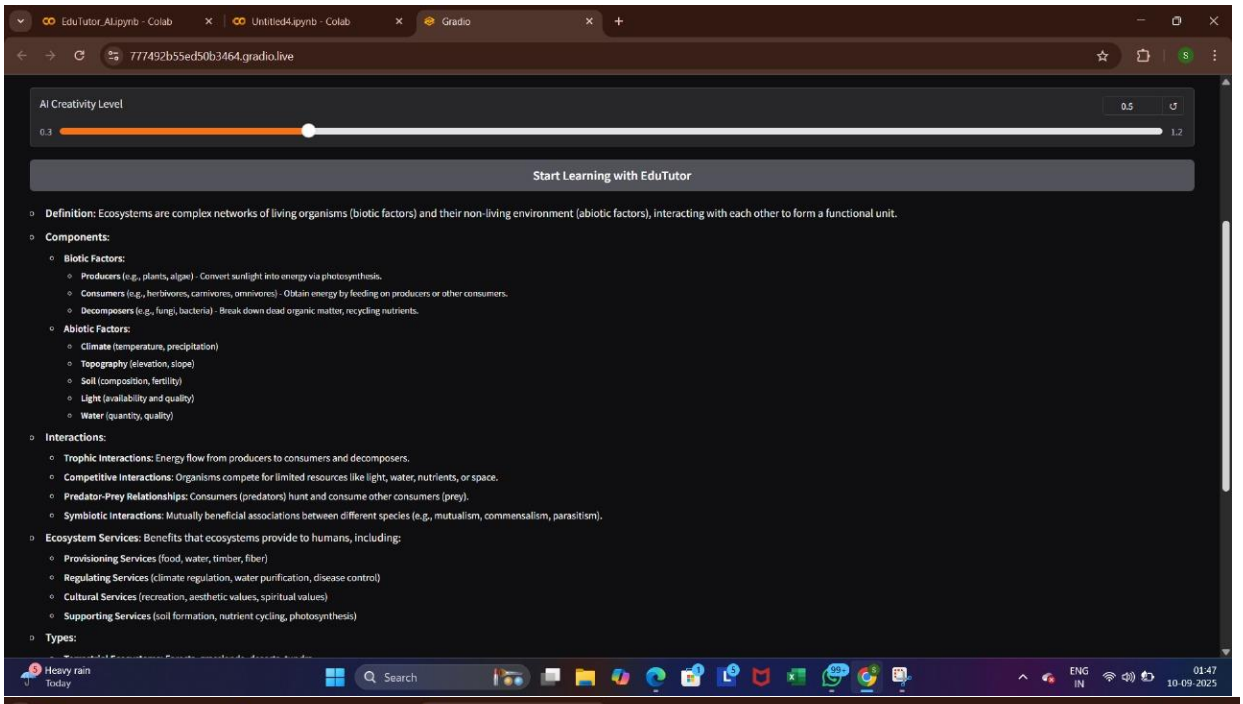
Multi-language support.

Mobile app integration.

Teacher mode with lesson planning.

User authentication & profiles.

Optimized inference with smaller, faster models.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Untitled4.ipynb - Colab
Gradio
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AI Creativity Level
0.5
0.3
1.2
Start Learning with EduTutor
Definition: Ecosystems are complex networks of living organisms (biotic factors) and their non-living environment (abiotic factors), interacting with each other to form a functional unit.
Components:
Biotic Factors:
Producers (e.g., plants, algae) - Convert sunlight into energy via photosynthesis.
Consumers (e.g., herbivores, carnivores, omnivores) - Obtain energy by feeding on producers or other consumers.
Decomposers (e.g., fungi, bacteria) - Break down dead organic matter, recycling nutrients.
Abiotic Factors:
Climate (temperature, precipitation)
Topography (elevation, slope)
Soil (composition, fertility)
Light (availability and quality)
Water (quantity, quality)
Interactions:
Trophic Interactions: Energy flow from producers to consumers and decomposers.
Competitive Interactions: Organisms compete for limited resources like light, water, nutrients, or space.
Predator-Prey Relationships: Consumers (predators) hunt and consume other consumers (prey).
Symbiotic Interactions: Mutually beneficial associations between different species (e.g., mutualism, commensalism, parasitism).
Ecosystem Services: Benefits that ecosystems provide to humans, including:
Provisioning Services (food, water, timber, fiber)
Regulating Services (climate regulation, water purification, disease control)
Cultural Services (recreation, aesthetic values, spiritual values)
Supporting Services (soil formation, nutrient cycling, photosynthesis)
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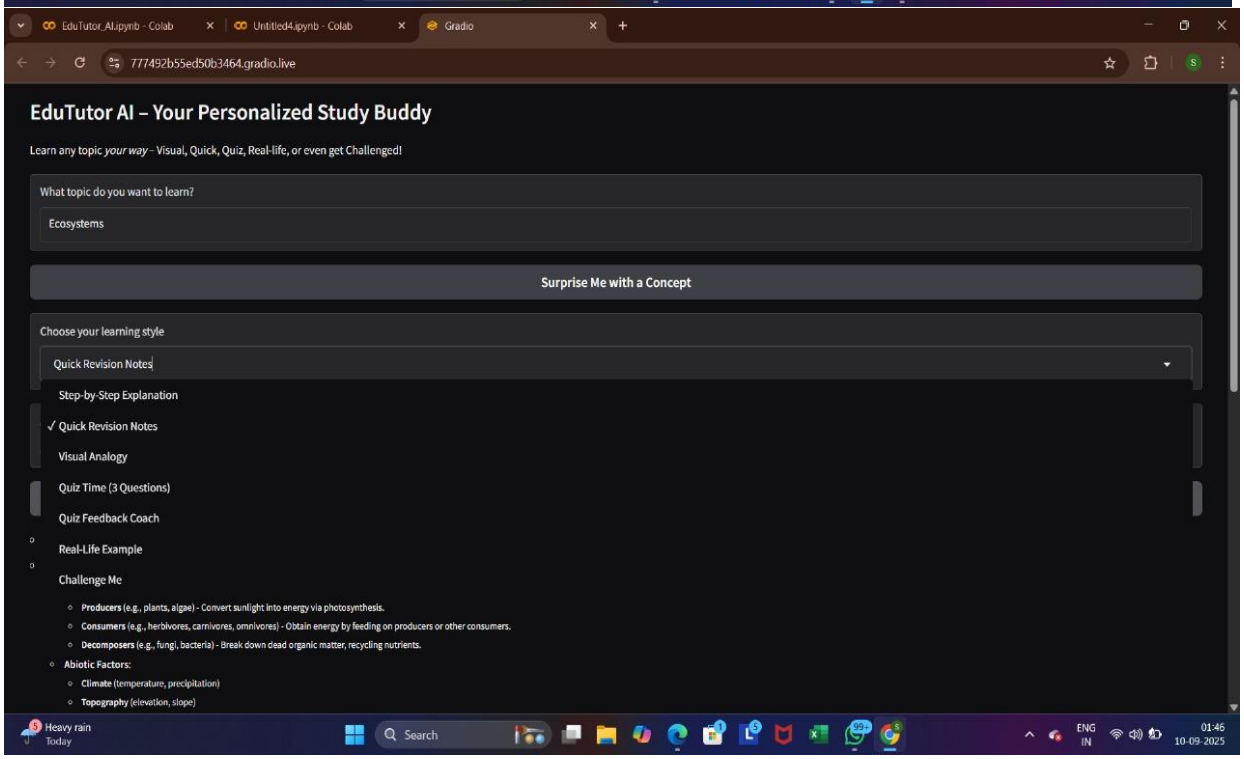
EduTutor_AI.ipynb - Colab
Untitled4.ipynb - Colab
Gradio
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EduTutor AI – Your Personalized Study Buddy
Learn any topic your way - Visual, Quick, Quiz, Real-life, or even get Challenged!
What topic do you want to learn?
Ecosystems
Surprise Me with a Concept
Choose your learning style
Quick Revision Notes
Step-by-Step Explanation
✓ Quick Revision Notes
Visual Analogy
Quiz Time (3 Questions)
Quiz Feedback Coach
Real-Life Example
Challenge Me
Producers (e.g., plants, algae) - Convert sunlight into energy via photosynthesis.
Consumers (e.g., herbivores, carnivores, omnivores) - Obtain energy by feeding on producers or other consumers.
Decomposers (e.g., fungi, bacteria) - Break down dead organic matter, recycling nutrients.
Abiotic Factors:
Climate (temperature, precipitation)
Topography (elevation, slope)
Heavy rain
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