1. Title Page
Project Title:
EduTutor AI – Personalized Learning Assistant
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2. Introduction

In the modern education system, there is an increasing demand for personalized and

interactive learning tools that can adapt to the pace and style of each student.

EduTutor AI – Detailed Project Report

EduTutor AI was developed as a solution to help both students and teachers by automating two major tasks:
1. Explaining complex concepts in a simple, easy-to-understand way
2. Generating quizzes instantly for practice and self-evaluation
Traditional learning requires students to spend hours searching for clear explanations and teachers to manually create assessments. EduTutor AI bridges this gap by leveraging Generative AI to provide instant, accurate, and interactive learning resources.
3. Problem Statement
Students often face the following challenges:
Difficulty understanding complex topics in textbooks
Lack of quick access to examples and practical explanations
Limited availability of question banks for practice

Teachers spending significant time preparing quizzes manually
EduTutor AI solves these problems by offering:
AI-powered explanations for any concept
Automatic quiz generation covering different question formats
Instant feedback through a separate answers section
4. Objectives
The main objectives of EduTutor Al are:
To provide detailed explanations of concepts in simple language
To automatically generate quizzes with multiple question types
To make learning interactive and engaging through a web interface
To minimize teacher workload by automating question creation

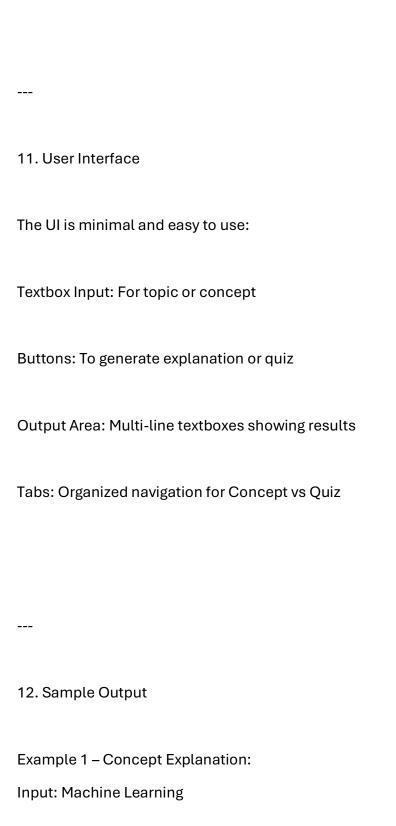
To run on free, cloud-based platforms like Google Colab so anyone can access it
5. Scope & Benefits
Scope
Suitable for school, college, and competitive exam preparation
Can be extended to support subject-specific learning modules
Scalable to include progress tracking, performance analytics, and adaptive learning
Benefits
Saves time for both teachers and students
Improves conceptual clarity and retention
Encourages self-paced learning

Accessible from any device with internet
6. Literature Review
Several AI-based learning tools exist, such as ChatGPT, Khan Academy AI, and Google Socratic.
However, EduTutor AI is unique because:
It is open-source and lightweight using IBM Granite 3.2 2B model
Te to open source and agricworghe doing 1511 Oranic 0.2 25 modes
It provides custom quiz generation with answers, not just explanations
It is simple to deploy on Google Colab without paid infrastructure
7. Technologies Used
Component Technology Used

Programming Python 3.8+		
ML Model	IBM Granite 3.2 2B Instruct	
Libraries	Transformers, Torch, Gradio	
Deployment	Google Colab (T4 GPU)	
Version Cont	rol GitHub	
8. System Arc	chitecture	
The project co	onsists of Frontend, Backend, and Deployment layers:	
F		
Frontend (Gra	adio):	
Two tabs: Co.	ncept Explanation & Quiz Generator	
1110 (450, 60)	moopt Explanation & Quiz Constatol	
Accepts user	input and displays output in scrollable text boxes	
·		
Backend (Pyt	hon + Granite Model):	
Loads IBM Gr	anite model and tokenizer	
Processes pro	ompts, generates responses using model.generate()	

Deployment:
Runs entirely on Google Colab
Gradio provides a public URL for testing and demonstration
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9. Workflow
1. User enters a topic or concept
2. The input is tokenized and sent to IBM Granite model
3. Model generates detailed explanation or quiz
4. Output is displayed in the Gradio interface

5. User can switch between tabs for explanations or quizzes
10. Implementation
Code Explanation
Model Loading: Loads IBM Granite from Hugging Face with GPU acceleration if available
Functions:
concept_explanation(concept) → Generates detailed explanation
quiz_generator(concept) → Creates quiz with answers section
Gradio Interface:
Creates two tabs for user input
Launches app with app.launch(share=True) to generate share link



Output:
> Machine Learning is a subset of Artificial Intelligence where machines learn from data and improve automatically
Example 2 – Quiz Generation:
Input: Physics
Output:
> Q1: What is the SI unit of force? (MCQ)
Q2: Acceleration is the rate of change of velocity. (True/False)
ANSWERS: 1. Newton 2. True
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13. Testing
Unit Testing: Verified function outputs for various prompts
Manual Testing: Checked UI functionality, switching tabs, and input handling

Edge Cases: Tested long inputs, empty inputs, and special characters
14. Results
EduTutor AI successfully:
Generated detailed explanations for multiple topics
Produced diverse quizzes (MCQ, True/False, Short Answer)
Displayed answers separately for easy checking
Ran on Google Colab without errors
15. Future Enhancements
Add PDF export for quizzes

Add voice input and text-to-speech
Introduce score tracking for quizzes
Create subject-specific modules (Math, Physics, Chemistry)
16. Conclusion
EduTutor AI demonstrates how Generative AI can transform education by making learning interactive and personalized.
This project can serve as a foundation for building AI-powered learning platforms that are open-source, scalable, and easy to use