

Project Report Format

1 INTRODUCTION

I am Vishnu Vardhan Chitteti, currently pursuing 3rd year, 2nd semester in Computer Science at Annamacharya Institute of Technology and Sciences(Tirupati). My team members are Vyshnavi Yamini, Amasa Poojasree, Damarakuppam Varshitha, and S Yugandhar Kumar. Our team ID is LTVIP2025TMID30306. We are working on the project titled **EduTutor AI: Personalized Learning with Generative AI and LMS Integration** as part of our academic curriculum.

Our project aims to leverage state-of-the-art generative AI models and Learning Management System (LMS) integration to deliver a personalized learning experience for students. We have utilized IBM's Granite-3.3-2B model, implemented the solution using Google Colab and Gradio, and explored various functionalities to enhance the educational process.

1.1 Project Overview

EduTutor AI is designed to provide tailored educational content, instant feedback, and interactive learning support. By integrating generative AI with an LMS, we aim to create a platform that adapts to individual student needs, offering customized explanations, quizzes, and study resources. The model is deployed and tested using Google Colab and Gradio, ensuring accessibility and ease of use.

1.2 Purpose

The primary goal of this project is to enhance the learning experience by offering personalized, AI-driven educational support. EduTutor AI helps students understand complex topics, practice with generated quizzes, and receive instant, relevant feedback, thereby supporting their academic growth and confidence.

2. IDEATION PHASE

2.1 Problem Statement

Many students struggle to receive individualized attention in traditional classroom settings, leading to gaps in understanding and engagement. There is a need for a scalable, intelligent solution that can provide personalized learning support and adapt to diverse student needs.

2.2 Empathy Map Canvas

- **Students:** Need clear explanations, instant feedback, and motivation.
- **Teachers:** Seek tools to monitor progress and offer targeted support.
- **Parents:** Want assurance of their child's academic progress.
- **Administrators:** Require scalable, cost-effective educational solutions.

2.3 Brainstorming

We discussed integrating generative AI for adaptive learning, seamless LMS integration, real-time feedback, and interactive content generation. Ideas included AI-driven quizzes, concept explanations, and progress analytics.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

- Student logs into LMS
- Interacts with EduTutor AI for explanations or quizzes
- Receives personalized content and feedback
- Progress is tracked and analyzed

3.2 Solution Requirement

- Integration with existing LMS platforms
- Use of generative AI for content creation
- User-friendly web interface (Gradio)
- Secure data handling and privacy

3.3 Data Flow Diagram

- User input (question/topic) → AI Model → Generated Output → Display on LMS/Gradio/Streamlit

3.4 Technology Stack

- IBM Granite-3.3-2B Model
- Python
- Gradio for UI
- Google Colab for deployment
- LMS API for integration

4. PROJECT DESIGN

4.1 Problem Solution Fit

EduTutor AI addresses the need for personalized learning by adapting content and feedback to each student's level and pace, improving engagement and outcomes.

4.2 Proposed Solution

A web-based platform integrated with LMS, powered by generative AI, offering:

- Personalized explanations
- Quiz generation
- Interactive Q&A
- Progress tracking

4.3 Solution Architecture

- Frontend: Gradio interface
- Backend: Python scripts, IBM Granite-3.3-2B model
- Integration: LMS APIs for user data and progress tracking

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

- **Week 1-2:** Requirement gathering and design
- **Week 3-4:** Model integration and initial UI development
- **Week 5-6:** LMS integration and feature expansion
- **Week 7:** Testing and performance evaluation

- **Week 8:** Documentation and deployment

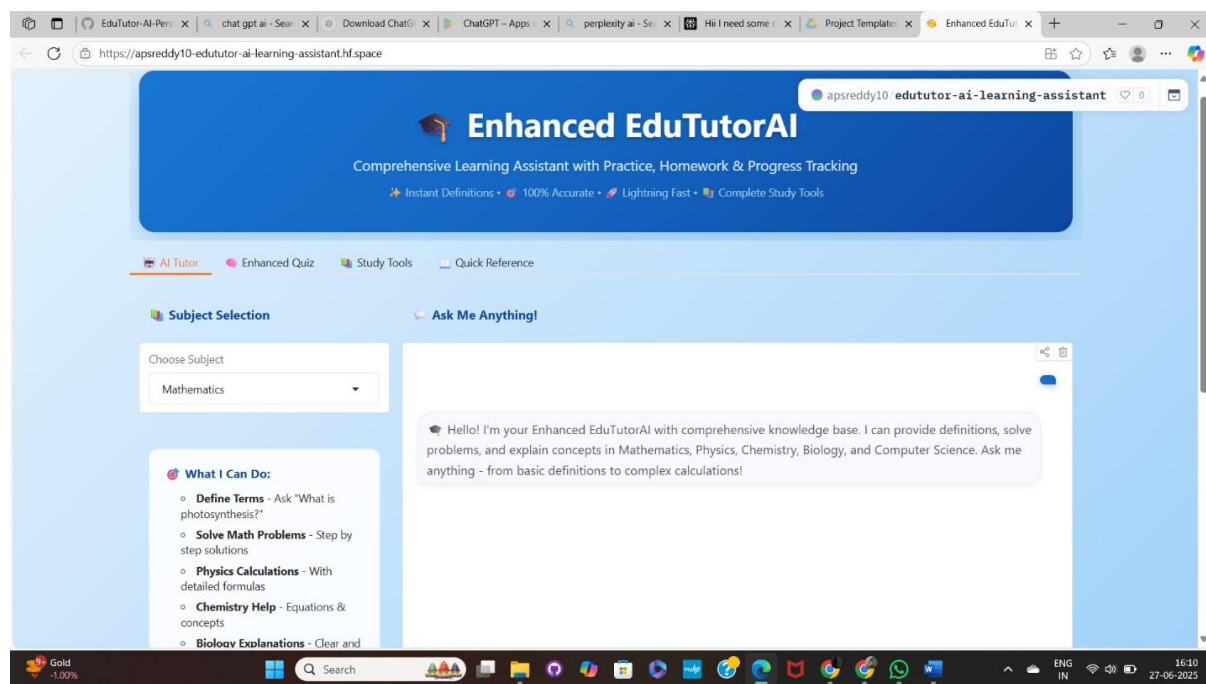
6. FUNCTIONAL AND PERFORMANCE TESTING

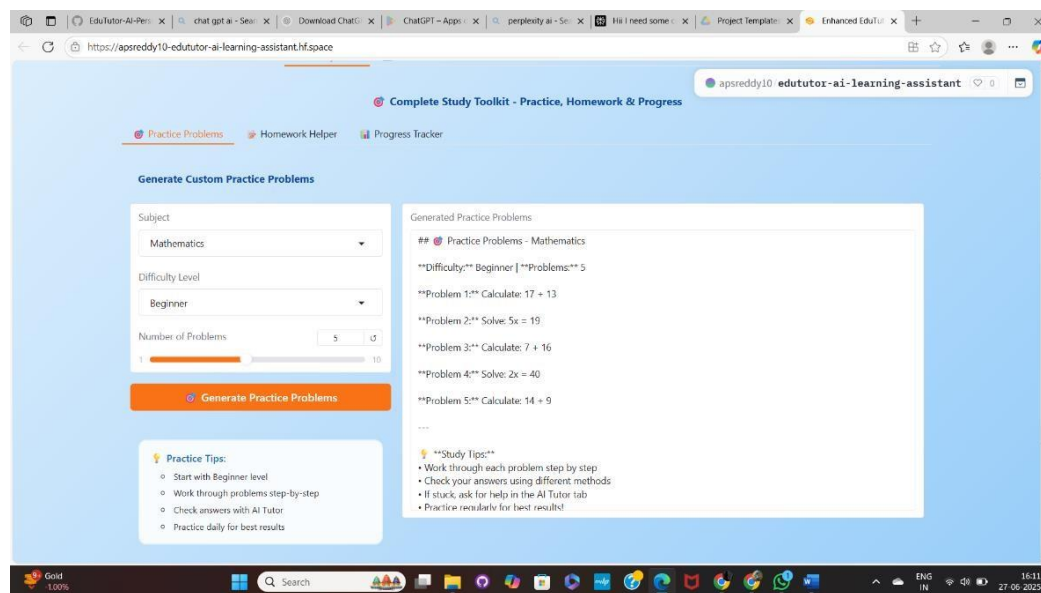
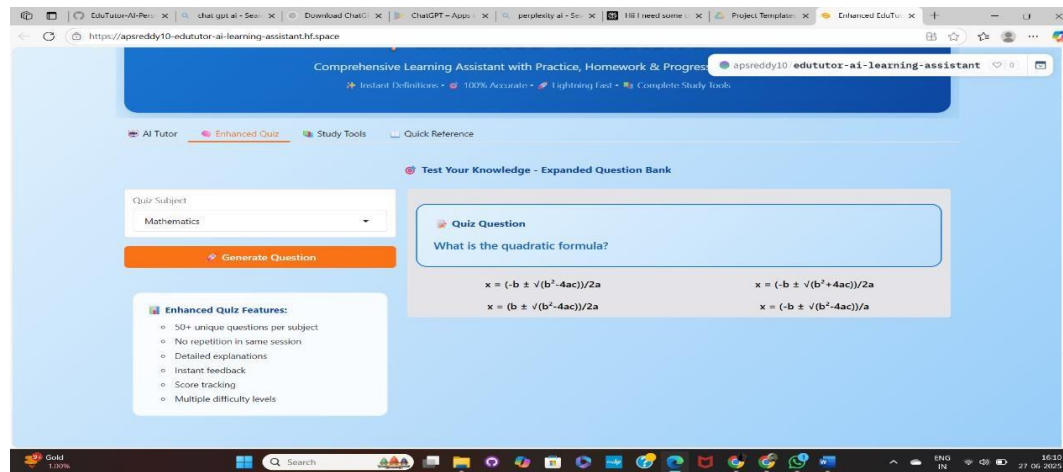
6.1 Performance Testing

We evaluated response time, accuracy of generated content, and system scalability. The model performed well for most educational queries, with acceptable latency on cloud resources.

7. RESULTS

7.1 Output Screenshots





8. ADVANTAGES & DISADVANTAGES

Advantages of EduTutor AI using IBM Granite Model

- Personalized learning paths for each student
- High-quality, context-aware explanations
- Open-source and cost-effective for academic use
- Supports multiple functionalities (explanations, quizzes, Q&A)
- Easy deployment with user-friendly interfaces

- Scalable on cloud platforms and compatible with LMS integration

Disadvantages

- Limited model size may affect depth for complex topics
- Requires internet and GPU resources for real-time use
- Lacks human empathy and motivational support
- Data privacy and security require careful management
- No real-time adaptive feedback unless further integrated
- Potential for occasional bias or inaccuracies in generated content

9. CONCLUSION

EduTutor AI demonstrates the potential of generative AI in transforming personalized education. By integrating with LMS platforms and leveraging advanced AI models, it offers scalable, cost-effective, and adaptive learning support. However, challenges in model scale, real-time adaptation, and data privacy must be addressed for broader deployment.

10. FUTURE SCOPE

- Integration with more LMS platforms
- Expansion to support multiple languages and subjects
- Incorporation of analytics for teachers and administrators
- Enhanced feedback mechanisms and adaptive learning loops
- Improved data security and compliance features

11. APPENDIX

- Source Code: Refer the Git hub link
- Dataset Link: Not applicable
- GitHub & Project Demo Link:
 - GITHUB LINK: <https://github.com/AMASAPOOJASREE/EduTutor-AI-Personalized-Learning-with-Generative-AI-and-LMS-Integration>
 - DEMO LINK:
<https://drive.google.com/file/d/1HFoomKm0C26mALcSrLJeW7JTOqngsGl0/view?usp=sharing>