EduTutor AI: Personalized Learning with Generative AI and LMS Integration

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Page 1: Title Page

Project Title: EduTutor AI: Personalized Learning with Generative AI and LMS Integration\ **Submitted By:** VANGARA VENKATESH\ **Specialization:** Artificial Intelligence & Machine Learning\ **Institution:** Kallam Haranadhareddy Institute of Technology

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Page 2: Abstract

EduTutor AI is a personalized education platform built using generative AI technologies and integrated with Learning Management Systems like Google Classroom. Powered by IBM Watsonx and Granite foundation models, it generates customized quizzes, evaluates student performance, and provides educators with real-time insights. This system is built to enhance learning outcomes by personalizing the educational experience.

Page 3: Introduction

Generative AI is transforming the education sector by enabling systems that adapt to individual student needs. EduTutor AI leverages this capability to deliver customized quizzes, assessments, and learning paths. The integration with Google Classroom ensures seamless data access and automation in quiz generation aligned with the academic syllabus.

Page 4: Problem Statement

Traditional education systems:

- Lack personalization in teaching
- Offer static quizzes and tests
- Require manual performance tracking by educators

These limitations prevent effective learning. EduTutor AI addresses these challenges by delivering AI-generated content tailored to each student.

Page 5: Objectives

- Automate quiz generation using IBM Watsonx
- Provide real-time feedback and scoring
- Synchronize with Google Classroom data
- Enable educators to track student progress through dashboards

- Store quiz history using vector databases for future analysis

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Page 6: System Architecture

Modules Used:

1. **FastAPI** – Backend server handling user requests, quiz generation, and evaluation.
2. **Watsonx + LangChain** – Generates quiz questions based on input topics and difficulty.
3. **Pinecone** – Stores user profiles, quiz metadata, and supports similarity-based learning.
4. **Streamlit** – Provides the frontend interface for students and educators.

A system diagram shows data flow between modules.

Page 7: Technology Stack

- **Programming Language:** Python 3.11+
- **Frameworks:** FastAPI (backend), Streamlit (frontend)
- **AI Services:** IBM Watsonx, Granite LLM
- **Database:** Pinecone vector DB
- **OAuth & LMS Integration:** Google OAuth 2.0, Google Classroom API
- **Environment Management:** .env files, Python dotenv

Page 8: Working Flow

1. Student logs in (manual or Google Classroom)
2. Chooses topic and difficulty level
3. Watsonx generates a quiz via LangChain prompt templates
4. Student submits quiz
5. Backend evaluates answers and stores metadata in Pinecone
6. Educators access analytics from Streamlit dashboard

Page 9: Results and Use Cases

- **Students:** Benefit from adaptive learning experiences
- **Educators:** Get instant visibility on class performance
- **Admins:** Integrate system with LMS platforms for curriculum management

Use Cases:

- Regular Assessments
- Diagnostic Testing
- Adaptive Learning Support

Page 10: Conclusion and Future Enhancements

EduTutor AI is a step toward intelligent education solutions that personalize learning and streamline educator efforts. Future enhancements include:

- Chat-based tutoring
- Multi-language support
- PDF export of quizzes
- LMS integrations beyond Google Classroom

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End of Documentation