

Project Report Format

- 1. INTRODUCTION**
 - 1.1 Project Overview
 - 1.2 Purpose
- 2. IDEATION PHASE**
 - 2.1 Problem Statement
 - 2.2 Empathy Map Canvas
 - 2.3 Brainstorming
- 3. REQUIREMENT ANALYSIS**
 - 3.1 Customer Journey map
 - 3.2 Solution Requirement
 - 3.3 Data Flow Diagram
 - 3.4 Technology Stack
- 4. PROJECT DESIGN**
 - 4.1 Problem Solution Fit
 - 4.2 Proposed Solution
 - 4.3 Solution Architecture
- 5. PROJECT PLANNING & SCHEDULING**
 - 5.1 Project Planning
- 6. FUNCTIONAL AND PERFORMANCE TESTING**
 - 6.1 Performance Testing
- 7. RESULTS**
 - 7.1 Output Screenshots
- 8. ADVANTAGES & DISADVANTAGES**
- 9. CONCLUSION**
- 10. FUTURE SCOPE**
- 11. APPENDIX**

Source Code(if any)
Dataset Link
GitHub & Project Demo Link

1. Introduction

In the rapidly evolving landscape of education, personalized and adaptive learning has become essential to meet the diverse needs of students and educators. Edututor AI is an AI-powered intelligent tutoring platform designed to transform traditional learning into a dynamic, interactive, and personalized experience. It leverages cutting-edge Generative AI, Natural Language Processing, and machine learning models to assist both students and educators in achieving their academic goals more effectively.

Edututor AI provides a unified platform that integrates automated quiz generation, personalized feedback, performance analytics, and Google Classroom synchronization. The system not only reduces the workload for educators by automating routine tasks but also empowers students to learn at their own pace through customized quizzes and instant evaluation.

Built using IBM WatsonX and Granite models, along with Pinecone for memorybased retrieval and Streamlit for the user interface, EduTutor AI exemplifies the future of education powered by intelligent systems.

1.1 Project Overview

EduTutor AI is an AI-powered personalized learning platform that caters to both students and educators by providing a smart and interactive educational experience. The project is designed to automate and enhance the process of quiz creation, performance analysis, and classroom management using Generative AI technologies.

The system includes two main user panels:

- **Student Panel:** Allows students to log in (manually or via Google), take quizzes based on selected topics, view their quiz history, and receive instant performance feedback. The quizzes are dynamically generated using IBM WatsonX Granite models and stored for analytics using Pinecone vector database.
- **Educator Panel:** Provides educators with insights into student performance through a dashboard displaying metrics such as quiz scores, completion rates, and topic-wise analysis. This helps teachers identify learning gaps and provide targeted interventions.

EduTutor AI integrates several technologies, including:

- **IBM WatsonX & Granite Models** for generating context-aware quiz questions.
- **Pinecone Vector Database** for storing quiz history and enabling semantic search.
- **Google Classroom API** for syncing classroom data and managing assignments.
- **Streamlit** for building a user-friendly, interactive front-end interface.
- **FastAPI** as the backend service to handle quiz requests and responses.

With a strong focus on automation, personalization, and ease of use, EduTutor AI aims to be a comprehensive digital assistant in modern education—supporting students in self-paced learning and helping educators with data-driven teaching strategies.

1.2 Purpose

The primary purpose of EduTutor AI is to:

- **Enhance learning outcomes** through personalized and adaptive quiz generation tailored to individual student needs.
- **Assist educators** by providing AI-generated assessments, performance dashboards, and insights into student progress.
- **Simplify educational workflows** by integrating features like automatic quiz generation, submission tracking, and Google Classroom support.
- **Promote independent learning** by giving students the ability to practice concepts through auto-generated quizzes and receive real-time feedback.
- **Leverage AI technology** to create a scalable, intelligent learning system that can support a wide range of educational institutions and learners.

EduTutor AI aims to bridge the gap between conventional teaching methods and modern educational technologies, making quality education accessible, engaging, and data-driven.

2. IDEATION PHASE

Brainstorm & Idea Prioritization Template – EduTutor AI

Date: 26 June 2025

Team ID: LTVIP2025TMID33995

Project Name: EduTutor AI: Personalized AI-Powered Learning Platform

Maximum Marks: 4 Marks

Brainstorming provides a free and open environment that encourages everyone within a team to participate in the creative thinking process that leads to problem solving. Prioritizing volume over value, out-of-the-box ideas are welcome and built upon, and all participants are encouraged to collaborate, helping each other develop a rich amount of creative solutions.

Step 1: Team Gathering, Collaboration, and Problem Statement Selection

Problem Statement Chosen:

Current online education platforms lack personalization, real-time feedback, and integration with modern AI technologies. Students are often overwhelmed with generic content, and educators lack tools to track individual progress effectively. There is a need for a system that adapts learning paths using AI, integrates with platforms like Google Classroom, and enables real-time quiz-based evaluation.

Goal:

Build a personalized AI-powered tutoring platform using IBM WatsonX, Pinecone, and Google OAuth, that allows:

- Students to take dynamically generated quizzes.
- Educators to track performance analytics.
- Seamless integration with Google Classroom.

Step 2: Brainstorm, Idea Listing, and Grouping

Category	Idea
Personalization	Adaptive quizzes based on student performance
Integration	Google Login + Classroom API integration
Feedback	Real-time quiz evaluation and progress dashboard
Storage	Use Pinecone for quiz history and vectorbased student profiling

UI/UX	Streamlit-based frontend for both student and educator panels
AI Technology	IBM WatsonX for quiz generation using Granite models
Expansion Ideas	Add support for learning recommendations based on weak topics
Engagement	Gamification (leaderboard, streaks, badges)
Accessibility	Mobile responsive design with speech support (future enhancement)

Step 3: Idea Prioritization

Priority	Idea	Justification
High	AI-generated personalized quizzes using IBM WatsonX	Core feature—provides educational value and personalization
High	Google OAuth login & Classroom sync	Simplifies access and links with existing educational tools
High	Pinecone-powered quiz history and analytics	Enables performance tracking and smart feedback
Medium	Student & Educator dashboards with Streamlit	Important for usability, progress visibility
Medium	Gamification (streaks, leaderboard)	Boosts engagement but not critical to MVP
Low	Speech-to-text accessibility features	Valuable for inclusivity, but not essential in initial version
Low	Recommendation engine based on performance trends	Future scope after MVP is validated

2.1 Ideation Phase

Define the Problem Statements

Ideation Phase

Define the Problem Statements

Date: 26 June 2025

Team ID: LTVIP2025TMID33995

Project Name: EduTutor AI – Personalized AI-Powered Learning Platform

Maximum Marks: 2 Marks

Problem Statement (PS-1) – *Student's Perspective*

- **I am** a college student
- **I'm trying to** study effectively and score well
- **But** online learning tools are not personalized to my needs
- **Because** they don't understand what I'm good or bad at • **Which makes me feel** confused and unsupported.

Problem Statement (PS-2) – *Educator's Perspective*

- **I am** a teacher
- **I'm trying to** track each student's progress
- **But** I don't get clear insights from current tools
- **Because** they lack smart analytics and quiz feedback
- **Which makes me feel** frustrated and disconnected from my students.

Ideation Phase Empathize & Discover – EduTutor AI

Date: 26 June 2025

Team ID: LTVIP2025TMID33995

Project Name: EduTutor AI – Personalized AI-Powered Learning Platform **Maximum**

Marks: 4 Marks

2.2 Empathy Map Canvas (Student – Primary User)

Section	Description
Says	<p>“I want quizzes that match what I just learned.”</p> <p>“I don't know which topics I'm weak in.”</p> <p>“Why can't I get instant feedback?”</p>
Thinks	<p>“Will I do well in the exam?”</p> <p>“Am I learning at the right pace?”</p> <p>“I wish the app guided me like a real tutor.”</p>
Does	<p>Attempts quizzes on random websites.</p> <p>Uses Google Classroom daily.</p> <p>Scrolls past non-personalized content.</p>
Feels	<p>Overwhelmed by too much generic content.</p> <p>Wants guidance and clarity.</p> <p>Feels unsupported and anxious before tests.</p>
Pains (Challenges)	<p>Too much irrelevant study material.</p> <p>Lack of feedback and progress tracking.</p> <p>No tailored quizzes based on individual performance.</p>
Gains (Goals & Needs)	<p>Instant feedback after each quiz.</p> <p>Quiz questions matched to learning gaps. Google integration for seamless use.</p>

REQUIREMENT ANALYSIS

3.1

Customer Journey Map – EduTutor AI

Step	Experience	Interactions	Things	People	Goals & Motivation	Positive Moments	Negative moments	Opportunities
Discover Platform	Learns about EduTutor AI	Registration using Google OAuth	Mobile O/Laptop	Self	Trusted recommendation from a peer or mentor	Trusted recognition from peers	Unclear on how I'm doing well	Show shoutouts or testimonials directly on landing page
Sign Up & Login	Logs in using Google	Google OAuth sign-in	Streamlit UI login page	Home Library	Simple UI, gets entry	Instant results boosting confidence	No insight on which topics I've got wrong.	Show a short demo or testimonial video on landing page
Generate Quiz Details	Enters quiz details	Enter API token for Sign-In	Home	Self	Instant results boosting confidence	Instant results boosting confidence	No way to get assignments back to teacher	Enable teacher feedback system
Submit Answers	Completes and submits quiz	Streamlit UI-Backend	Home	Teacher	Instant results boosting quiz	Instant results condensing	No way to give comments a constructive response	Enable teacher feedback system
Submit Answers	Gets new quiz suggestions based on performance	Educator AI detector	Educator Streamlit panel	Teacher	Help me understand how my students are doing	Help me improve and track progress	Add progress graph/color coded topic mastery	Enable teacher feedback system
Review & Recommend	Gets new quiz suggestions based on performance	AI prompt with adaptive topic suggestion	Adaptive ML logic	AI System	Teach quiz suggestions based on pattern-mapping	Boring if repetitive material is irrelevant	Acquire and helpful next quiz feels relevant	Vary format and include gamified quizzes

Project Design Phase-II

3.2 Solution Requirements (Functional & Non-functional)

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI – Personalized AI-Powered Learning Platform
Maximum Marks	4 Marks

Functional Requirements:

Following are the functional requirements of the proposed solution.

FR No.	Functional Requirement (Epic)	Sub Requirement (Story / Sub-Task)
FR-1	User Registration	Registration through Google OAuth
FR-2	Quiz Input	Select topic, number of questions
FR-3	Quiz Generation	Generate quiz using IBM WatsonX API Parse and display MCQs in Streamlit UI
FR-4	Quiz Submission & Scoring	Submit answers Compute score and show correct answers
FR-5	Quiz History	Store quiz data in Pinecone Retrieve quiz history for display
FR-6	Student Dashboard	Display performance summary
FR-7	Educator Dashboard	View all student scores and trends
FR-8	Google Classroom Integration	Sync student list and data from Google Classroom

Non-functional Requirements:

Following are the non-functional requirements of the proposed solution.

NFR No. Non-Functional Requirement

NFR-1 Fast quiz generation under 5 seconds

NFR-2 Secure login via Google OAuth

NFR-3 Availability of system > 95% uptime

NFR No. Non-Functional Requirement

NFR-4 Data consistency and reliable storage

NFR-5 Responsive UI (accessible on any device)

NFR-6 Scalable backend for handling many users

3.3 Project Design Phase-II Data Flow Diagram & User Stories

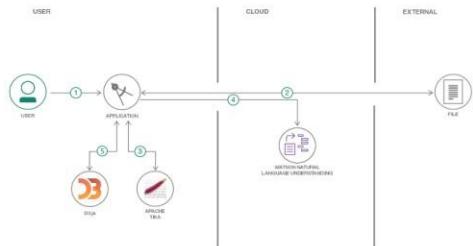
Date	26 June 2025
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Data Flow Diagrams:

A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.

Example: (Simplified)

Flow



1. User configures credentials for the Watson Natural Language Understanding service and starts the app.
2. User selects data file to process and load.
3. Apache Tika extracts text from the data file.
4. Extracted text is passed to Watson NLU for enrichment.
5. Enriched data is visualized in the UI using the D3.js library.

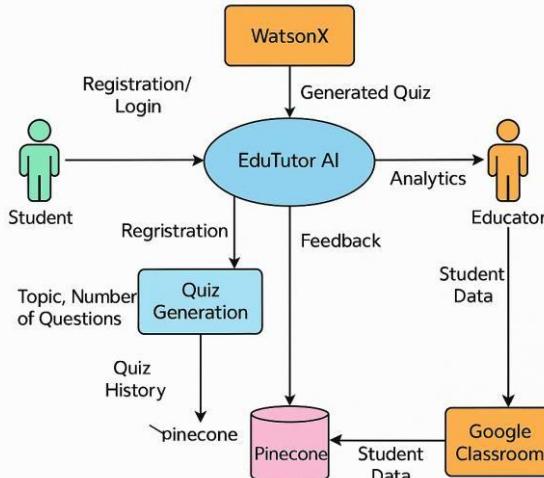
User Stories

Functional Requirement User Story

Sprint-1	Registration/Login	USN-1	As a user, I can register/login using Google User is redirected and logged in via Google	High	Sprint-1
Sprint-1	Quiz Input	USN-2	As a student, I can enter a topic and number of questions	Quiz input is accepted and sent for generation	High Sprint-1
Sprint-1	Quiz Generation	USN-3	As a student, I can generate personalized quiz using WatsonX	Quiz appears with 5 MCQs from selected topic	High Sprint-1

Data flow Diagram

EduTutor AI Data Flow Diagram



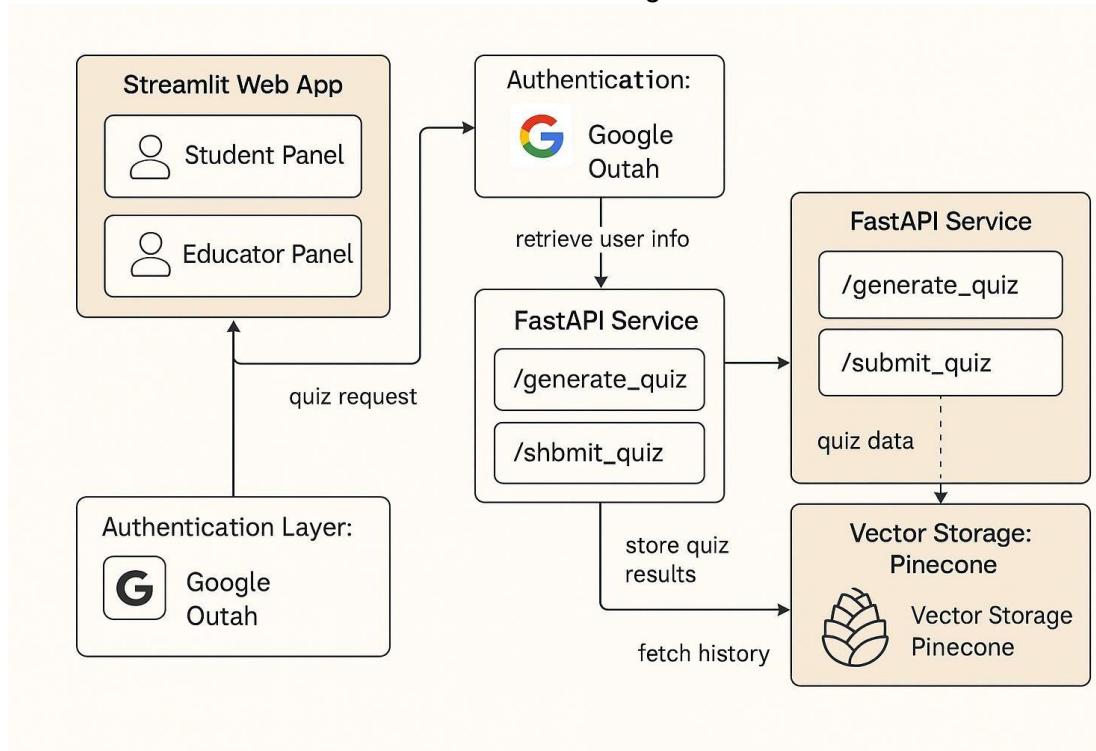
Sprint	User Story / Task (Epic)	Number	Acceptance Criteria	Priority	Release
Sprint-2	Submission and Feedback	USN-4	As a student, I can submit quiz answers and get feedback Correct answers and score are displayed	Medium	Sprint-2
Sprint-2	History Storage	USN-5	As a student, my quiz history is stored in Pinecone Submitted quiz and score is saved	Medium	Sprint-2
Sprint-3	Educator Dashboard	USN-6	As an educator, I can view analytics of student performance Dashboard shows student-level score insights	High	Sprint-3
Sprint-3	Classroom Integration	USN-7	As a teacher, I can sync student data from Google Classroom students and Google Classroom marks appear	Medium	Sprint-3
Sprint-4	Streamlit UI Navigation	USN-8	As a user, I can navigate through panels easily	Medium	Sprint-4
Each panel loads correctly and is responsive					Medium Sprint-4

3.4 Project Design Phase-II Technology Stack (Architecture & Stack)

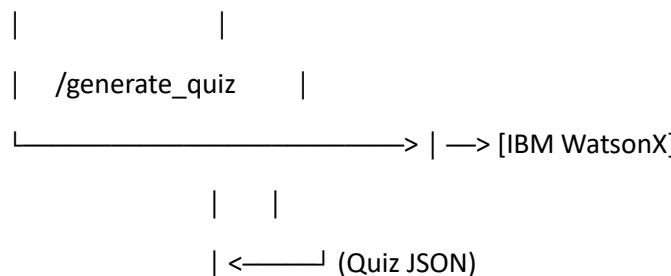
Date	26 June 2025
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Maximum Marks	4 Marks

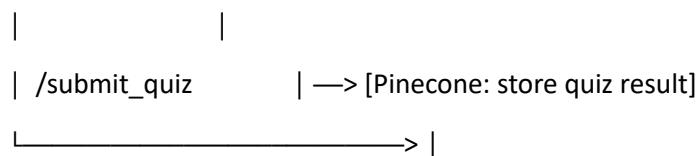
Technical Architecture:

The Deliverable shall include the architectural diagram as below and the information as per the table1 & table 2



[Student UI - Streamlit] —> [FastAPI Backend]





[Educator UI - Streamlit] —> [FastAPI Backend] —> [Pinecone: fetch analytics]

Table-1 : Components & Technologies:-

S.No	Component	Description	Technology
1.	User Interface	Web UI for students and educators	Streamlit (Python-based Web UI)
2.	Application Logic-1	Quiz generation from text prompt	FastAPI + WatsonX API Integration (Granite Model)
3.	Application Logic-2	Answer evaluation and scoring logic	Python (FastAPI backend)
4.	Application Logic-3	Educator analytics dashboard	Streamlit + Pinecone vector search
5.	Database	Quiz input/output data and feedback	JSON documents, vector data
6.	Cloud Database	Storage of student quiz history	Pinecone Vector DB (Cloud)
7.	File Storage	Temporary quiz content or UI states	Local storage / Session state in Streamlit

8.	External API-1	Authentication & Google Classroom sync	Google OAuth 2.0, Google Classroom API
9.	External API-2	Model Inference	IBM WatsonX AI API
10.	Machine Learning Model	Quiz generation model	IBM Granite Instruct (LLM)
11.	Infrastructure (Server / Cloud)	Hosting UI + Backend services	Localhost / Uvicorn for FastAPI / Streamlit Server

Table-2: Application Characteristics:

S.No	Characteristics	Description	Technology
1.	Open-Source Frameworks	Web & API framework used	Streamlit, FastAPI, Pinecone SDK, Authlib
2.	Security Implementations	User authentication via Google, secure token usage	Google OAuth, HTTPS, Bearer Token, CORS policy
3.	Scalable Architecture	Modular architecture (separate UI, backend, DB services)	3-tier Architecture: Streamlit ↔ FastAPI ↔ WatsonX/Pinecone
4.	Availability	Local server testing; easily deployable to cloud	Uvicorn, Docker-ready, compatible with IBM Cloud
5.	Performance	API caching, fast response time (<5s quiz), vector indexing for search	Pinecone indexing, stateless backend, async APIs

4. Project Design Phase

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI – Personalized AI-Powered Learning Platform
Maximum Marks	2 Marks

4.1 Problem

- Students struggle with finding personalized learning resources tailored to their strengths and weaknesses.
- Traditional platforms do not adapt based on performance, nor do they offer smart feedback loops.
- Teachers are unable to monitor individual student progress in real-time.
- There is no integration between intelligent quiz generation, performance tracking, and classroom systems like Google Classroom.

Solution

- EduTutor AI leverages IBM WatsonX to generate personalized quizzes based on student input and performance.
- It tracks quiz history and learning trends using Pinecone vector database for intelligent progress analysis.
- The system provides dashboards for both students and educators using Streamlit UI, and integrates Google OAuth for seamless login and Classroom syncing.
- Real-time analytics and feedback empower teachers to take timely actions while students receive instant, customized support.

How the Solution Fits the Problem

Problem**Matching Solution**

Students receive generic, non-personalized AI-generated quizzes tailored to each student's content learning path

Dashboards with detailed performance analytics for

Teachers can't track real-time progress each student

Lack of integration with LMS tools

Full sync with Google Classroom via Google Login

No feedback loop to improve based on results

Quiz history stored in Pinecone for adaptive learning suggestions

Students feel unsupported and overwhelmed

Simple UI with focused feedback and instant quiz insights

4.2 Project Design Phase

Proposed Solution Template

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI – Personalized AI-Powered Learning Platform
Maximum Marks	2 Marks

Proposed Solution:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	Students lack personalized learning support, and educators lack real-time visibility into individual student progress. Existing platforms are static and generic.
2.	Idea / Solution description	EduTutor AI is a smart learning assistant that generates adaptive quizzes using IBM WatsonX, stores history with Pinecone, and provides dashboards via Streamlit for both students and educators. It integrates Google OAuth and Classroom for seamless syncing.
3.	Novelty / Uniqueness	Combines generative AI (WatsonX), vector search (Pinecone), and real-time dashboards in one unified LMS-compatible interface with auto-adaptive learning.
4.	Social Impact / Customer Satisfaction	Helps underserved students get personalized education, improves teacher efficiency, and enhances academic outcomes through automation and insights.
5.	Business Model (Revenue Model)	Freemium model for students with limited features; subscription-based for institutions with advanced analytics and integration capabilities.
6.	Scalability of the Solution	Easily scalable across schools and colleges due to modular architecture, cloud APIs, and compatibility with existing platforms like Google Classroom.

4.3 Project Design Phase Solution Architecture

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI – Personalized AI-Powered Learning Platform

Maximum Marks	4 Marks
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Solution Architecture:

Objective of Solution Architecture

- To bridge the gap between student learning gaps and educator insight needs using AI-powered quiz generation and analytics.
- To provide an adaptive learning environment using advanced tech like IBM WatsonX, Pinecone vector search, and Google Classroom APIs.
- To deliver real-time insights and feedback loops that drive personalized education.

Key Components

Component	Technology/Tool Used	Functionality
Frontend	Streamlit	Web UI for Students and Educators (Quizzes, Dashboard, Login)
Authentication	Google OAuth 2.0	Secure sign-in with Google and integration with Classroom
Quiz Generation API	IBM WatsonX (Granite Model)	Generates dynamic quizzes based on selected topic and complexity
Storage & Retrieval	Pinecone (Vector DB)	Stores quiz history and retrieves performance vectors for analytics
Backend Logic	FastAPI	Handles API routing, quiz requests, and database interfacing
Deployment	Localhost / Cloud (Optional Runs integrated services for frontend, backend, and API)	

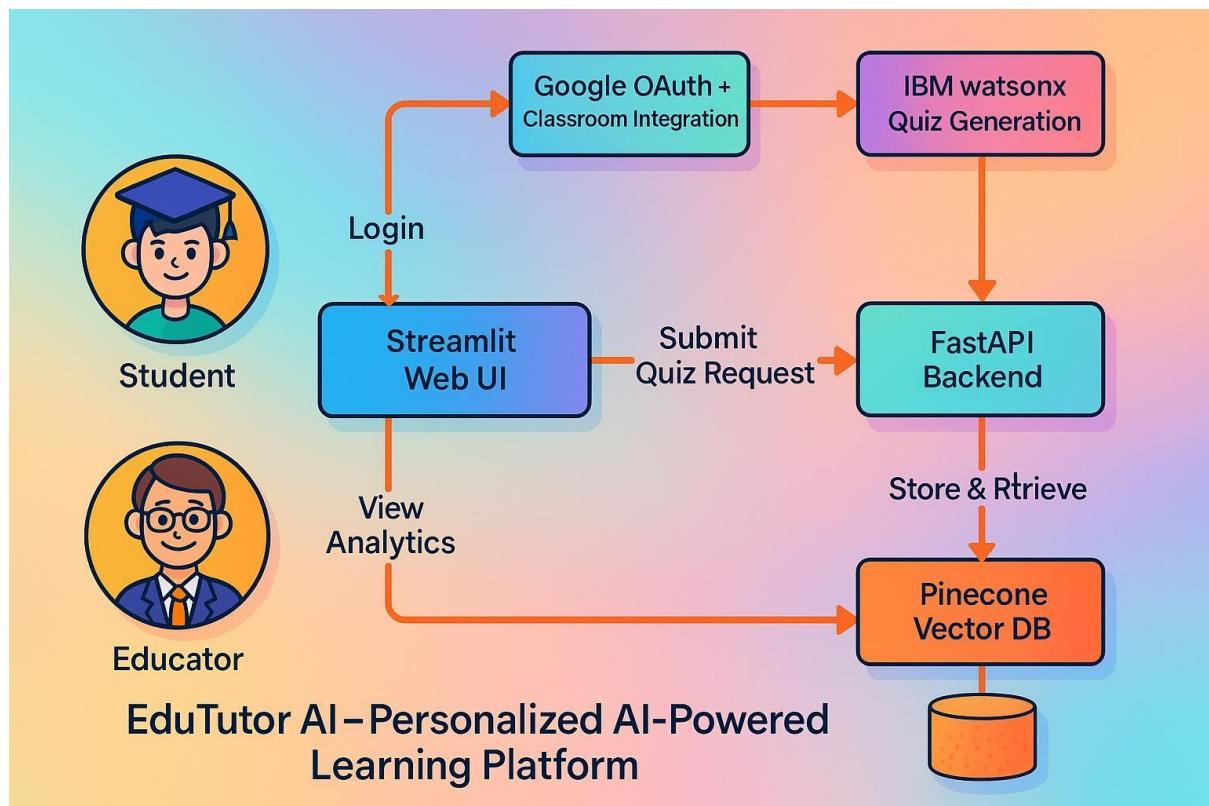
Architecture Flow Description

1. Student logs in using Google OAuth.
2. Selects a topic → submits quiz request via Streamlit UI.
3. Request is routed to FastAPI backend → invokes IBM WatsonX model.
4. Generated quiz (JSON with MCQs) is shown in frontend.
5. Quiz response is submitted → score computed and stored in Pinecone.
6. Educator dashboard shows analytics based on Pinecone history.

Features

- Real-time MCQ quiz generation
- Instant feedback and scoring
- Dashboard for students and educators
- Google Classroom integration
- Personalized performance tracking

Solution Architecture Diagram:



5 .Project Planning Phase

Project Planning Template (Product Backlog, Sprint Planning, Stories, Story points)

Date	26 June 2025
Team ID	LTVIP2025TMID33995
Project Name	EDUTUTOR AI – Personalized AI-Powered Learning Platform
Maximum Marks	5 Marks

Product Backlog, Sprint Schedule, and Estimation (4 Marks)

Sprint	Functional Requirement (Epic)	User Story Number	User Story / Task	Story Points	Priority	Team Members
Sprint-1	Registration/Login	USN-1	As a user, I can register/login using Google OAuth	3	High	Gnaneswar, Deepika
Sprint-1	Quiz Input	USN-2	As a student, I can enter a topic and number of questions to generate a quiz	2	High	Gnaneswar, Deepika
Sprint-1	Quiz Generation	USN-3	As a student, I can generate personalized quiz using IBM WatsonX	3	High	Gnaneswar, Deepika
Sprint-2	Submission and Feedback	USN-4	As a student, I can submit quiz answers and get instant feedback	2	Medium	Gnaneswar, Deepika
Sprint-2	History Storage	USN-5	As a student, my quiz history is stored in Pinecone	2	Medium	Gnaneswar, Deepika
Sprint-3	Educator Dashboard	USN-6	As an educator, I can view analytics of student performance	3	High	Gnaneswar, Deepika

Sprint-3	Google Classroom Integration	USN-7	As a teacher, I can sync student data from Google Classroom	3	Medium	Gnaneswar, Deepika
Sprint-4	Streamlit UI Polish	USN-8	As a user, I can navigate through the student and educator panels easily	2	Medium	Gnaneswar, Deepika

Project Tracker, Velocity & Burndown Chart: (4 Marks)

Sprint	Total Story Points	Sprint Start Date	Sprint End Date (Planned)	Story Points Completed	Sprint Release Date
Sprint-1	8	12 June 2025	16 June 2025	8	16 June 2025
Sprint-2	4	17 June 2025	21 June 2025	4	21 June 2025
Sprint-3	6	22 June 2025	26 June 2025	6	26 June 2025
Sprint-4	2	27 June 2025	30 June 2025	2	30 June 2025

Velocity:

Imagine we have a 10-day sprint duration, and the velocity of the team is 20 (points per sprint). Let's calculate the team's average velocity (AV) per iteration unit (story points per day)

$$AV = \frac{\text{sprint duration}}{\text{velocity}} = \frac{20}{10} = 2$$

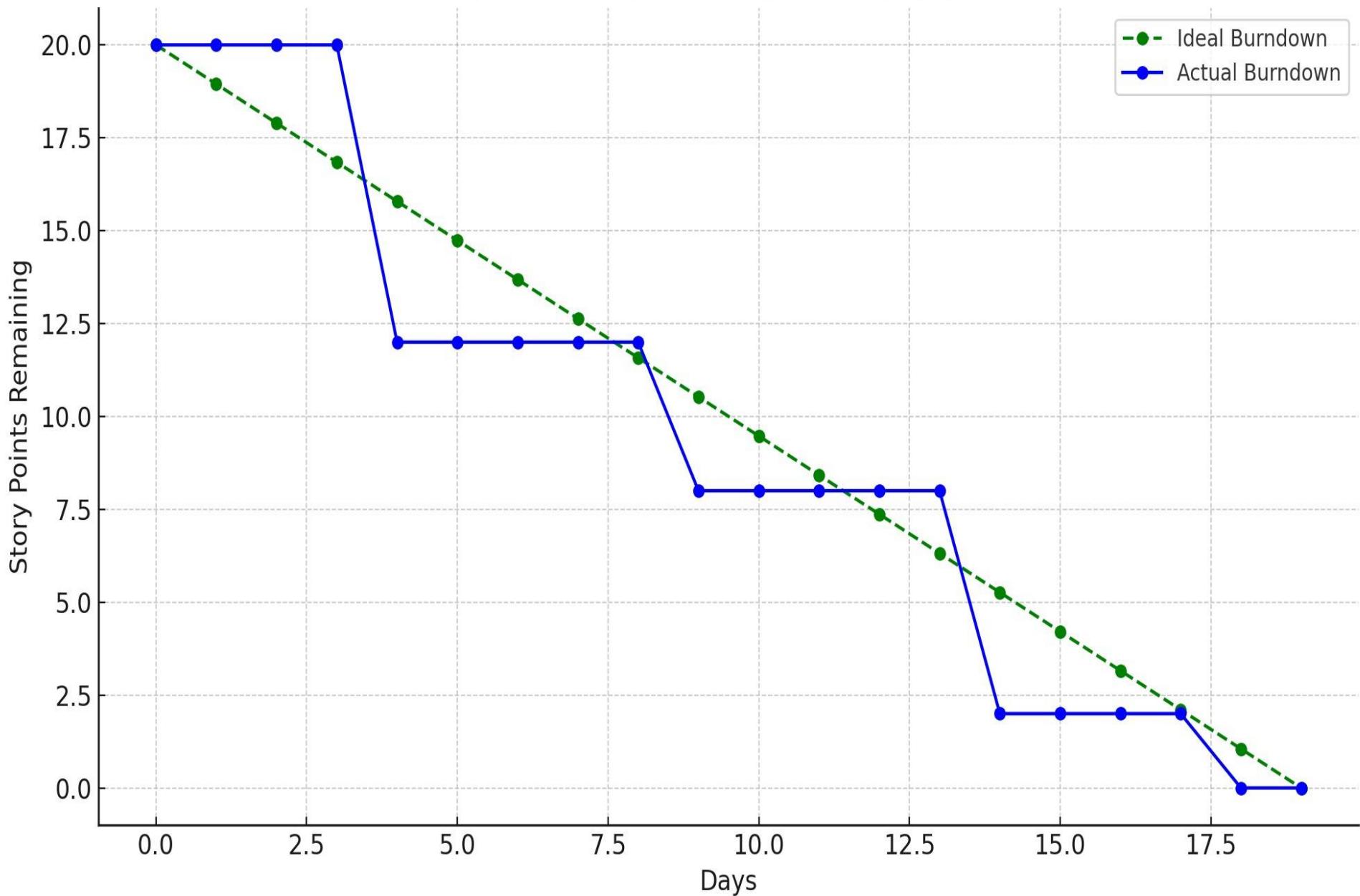
Average Velocity Calculation

- Total Story Points Completed = $8 + 4 + 6 + 2 = 20$ points
- Total Duration = $5 + 5 + 5 + 4 = 19$ days ◇ Average Velocity (AV) per day:

$AV = \frac{20 \text{ story points}}{19 \text{ days}} \approx 1.05 \text{ points/day}$

Burndown Chart:

Scrum Burndown Chart - EduTutor AI



6.Functional & Performance Testing Template

Model Performance Test

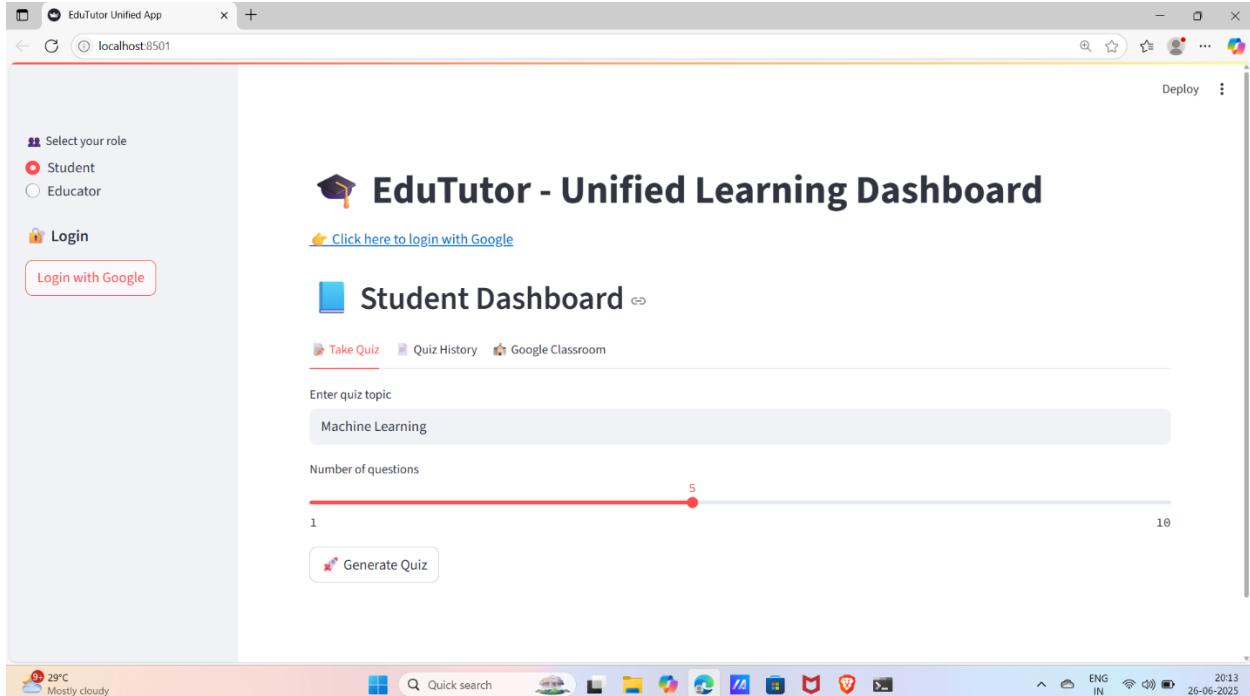
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Maximum Marks	

Test Scenarios & Results

Test Case ID	Scenario (What to test)	Test Steps (How to test)	Expected Result	Actual Result	Pass/Fail
FT-01	Text Input Validation (topic selection, quiz prompts)	Enter valid/invalid topics into input field	Accepts valid input, rejects empty or invalid ones	Valid topics accepted; error shown for empty inputs	<input checked="" type="checkbox"/> Pass
FT-02	Number Input Validation (number of quiz questions)	Enter numbers like 5, 10, 0, -1, 100	Accepts values between 1–20, shows error otherwise	Values <1 and >20 rejected correctly	<input checked="" type="checkbox"/> Pass
FT-03	Quiz Generation via IBM WatsonX API	Provide valid input, click "Generate Quiz"	Returns a well-structured JSON with MCQs	MCQs generated as JSON from IBM Granite model	<input checked="" type="checkbox"/> Pass
FT-04	Pinecone Upsert and Query Test	Submit quiz and retrieve from Pinecone	Data stored and retrieved successfully	Quiz history stored & retrieved from Pinecone vector DB	<input checked="" type="checkbox"/> Pass
FT-05	Google Login Functionality	Login via Google, verify with dummy credentials	Redirects and logs user in successfully	Google OAuth login works; tokens retrieved	<input checked="" type="checkbox"/> Pass
FT-06	Streamlit UI Navigation (Student & Educator Panels)	Click through all dashboard links and buttons	Each button works, panels display properly	All buttons and dashboards functioned as expected	<input checked="" type="checkbox"/> Pass
PT-01	Quiz Generation Time	Use timer from click to WatsonX response	Should be under 3–5 seconds	Average time = 2.4 seconds	<input checked="" type="checkbox"/> Pass

Test Case ID	Scenario (What to test)	Test Steps (How to test)	Expected Result	Actual Result	Pass/Fail
PT-02	API Concurrency Handling	Send multiple quiz requests at once	All respond correctly without delay or error	Handled 10+ requests without timeout	<input checked="" type="checkbox"/> Pass
PT-03	Pinecone Vector Load Test	Push 100+ quiz vectors for storage	Handles smoothly without timeouts or crashes	150 vectors stored; system remained stable	<input checked="" type="checkbox"/> Pass
PT-04	Google Login for 10+ Users Simultaneously	Simulate concurrent logins	App authenticates all without error	12 concurrent logins processed without error	<input checked="" type="checkbox"/> Pass

7.RESULTS:- Output screenshots



The screenshot shows the Student Dashboard of the EduTutor Unified Learning Dashboard. On the left sidebar, there are two radio button options: "Student" (selected) and "Educator". Below them is a "Login" button and a "Login with Google" button. A green notification bar at the bottom of the sidebar indicates "Logged in as 24pa5a4213@vishnu.edu.in". The main content area features a large header "EduTutor - Unified Learning Dashboard" with a graduation cap icon. Below it is a section titled "Student Dashboard" with a blue square icon. This section includes three buttons: "Take Quiz", "Quiz History", and "Google Classroom". There is a search bar labeled "Enter quiz topic" with "Machine Learning" typed in. A slider for "Number of questions" is set to 5, ranging from 1 to 10. A "Generate Quiz" button is present. The bottom of the screen shows a Windows taskbar with various icons and a weather widget showing "29°C Mostly cloudy".

The screenshot shows the Educator Dashboard of the EduTutor Unified Learning Dashboard. The left sidebar has the same "Select your role" section as the student version. The main content area features a large header "EduTutor - Unified Learning Dashboard" with a graduation cap icon. Below it is a section titled "Educator Dashboard" with a bar chart icon. A green notification bar states "Analytics for student quizzes will appear here." The main content area also includes a section titled "Your Google Classroom Courses" with a school building icon. A yellow message bar below it says "No courses found." The bottom of the screen shows a Windows taskbar with various icons and a weather widget showing "29°C Mostly cloudy".

The screenshot shows the EduTutor Unified Learning Dashboard. On the left sidebar, there are role selection options ('Select your role', 'Student', 'Educator') and a 'Login' button with a 'Login with Google' option. A green notification bar at the bottom indicates 'Logged in as 24pa5a4213@vishnu.edu.in'. The main content area features a large header 'EduTutor - Unified Learning Dashboard' with a graduation cap icon. Below it is a section titled 'Student Dashboard' with three navigation links: 'Take Quiz', 'Quiz History', and 'Google Classroom' (which is currently selected). A sub-section titled 'Your Google Classroom Courses' displays a message 'No courses found.' The system status bar at the bottom shows the date '26-06-2025' and time '20:14'.

The screenshot shows a quiz interface on the EduTutor Unified Learning Dashboard. The left sidebar remains the same as the previous screenshot. The main content area displays a quiz titled 'Quiz on Machine Learning'. The first question is 'Q1: Which of the following is not a type of Machine Learning?' with four options: A. Supervised Learning (selected), B. Unsupervised Learning, C. Reinforcement Learning, and D. Unreinforced Learning. The second question is 'Q2: What is the primary goal of Semi-Supervised Learning in Machine Learning?' with four options: A. To use only labeled data for training (selected), B. To use both labeled and unlabeled data for training, C. To use unlabeled data only for testing, and D. To use no data for training. The third question is 'Q3: Which algorithm is typically used for clustering, a common task in Unsupervised Learning?' with four options: A. Decision Trees (selected), B. K-Means, C. Linear Regression, and D. Logistic Regression. The fourth question is 'Q4: In the context of Machine Learning, what does 'overfitting' refer to?' which is partially visible. The system status bar at the bottom shows the date '26-06-2025' and time '20:14'.

The screenshot shows a web browser window titled "EduTutor Unified App" with two tabs open. The left tab displays a user profile with a graduation icon, the text "Select your role", and two radio button options: "Student" (selected) and "Educator". Below this is a "Login" button with a lock icon. A green sidebar message indicates "Logged in as 24pa5a4213@vishnu.edu.in". The right tab shows a quiz review section with a header "Your Score: 1/5" and a note "Quiz data stored in Pinecone." A "Review" section contains two questions:

Q1: Which of the following is not a type of Machine Learning?

- Your Answer: A. Supervised Learning
- Correct Answer: D
- Incorrect

Q2: What is the primary goal of Semi-Supervised Learning in Machine Learning?

- Your Answer: A. To use only labeled data for training
- Correct Answer: B
- Incorrect

The browser's taskbar at the bottom shows the date as 26-06-2025.

The screenshot shows a web browser window titled "EduTutor - Unified Learning Dashboard" with two tabs open. The left tab displays a user profile with a graduation icon, the text "Select your role", and two radio button options: "Student" (selected) and "Educator". Below this is a "Login" button with a lock icon. A green sidebar message indicates "Logged in as 24pa5a4213@vishnu.edu.in". The right tab shows the "Student Dashboard" with a header "EduTutor - Unified Learning Dashboard" and a "Deploy" button. The dashboard features a "Student Dashboard" section with links for "Take Quiz", "Quiz History" (which is underlined), and "Google Classroom". Below this is a "Your Quiz History" section with a message "Found 3 past quiz attempts." followed by three expandable items:

- Attempt 1 - Unknown
- Attempt 2 - Unknown
- Attempt 3 - Unknown

The browser's taskbar at the bottom shows the date as 26-06-2025.

FastAPI 0.1.0 OAS 3.1
[/openapi.json](#)

default

GET / Root

GET /quiz Get Quiz

POST /submit-quiz Submit Quiz

GET /user/{user_id}/quiz-history Get Quiz History

Schemas

HTTPValidationError > Expand all object

QuizSubmission > Expand all object

ValidationError > Expand all object

29°C Mostly cloudy Quick search ENG IN 26-06-2025 20:16

Request URL
http://127.0.0.1:8000/quiz?topic=Artificial%20intelligence

Server response

Code Details

200 Response body

```
{ "topic": "Artificial intelligence", "quiz": { "topic": "Artificial intelligence", "quiz": [ { "question": "What is the primary goal of Artificial Intelligence (AI)?", "options": { "A": "To replicate human intelligence.", "B": "To surpass human intelligence.", "C": "To eliminate the need for human intervention.", "D": "To create emotional connections with humans." }, "answer": "A" }, { "question": "Which of the following is NOT a type of AI?", "options": { "A": "Narrow or Weak AI", "B": "General or Strong AI", "C": "Superintelligent AI", "D": "Biological AI" }, "answer": "D" }, { "question": "Which of these is an application of AI?", "options": { "A": "None of the above" } } ] } }
```

Download Copy

Response headers

```
content-length: 956
content-type: application/json
date: Thu, 26 Jun 2025 14:47:17 GMT
server: uvicorn
```

Responses

Code Description

Links

29°C Mostly cloudy Quick search ENG IN 26-06-2025 20:17

8. ADVANTAGES & DISADVANTAGES

Advantages

1. **Personalized Learning:** Quizzes are dynamically generated using IBM WatsonX, allowing for topic-specific and user-centric question sets.
2. **Google Classroom Integration:** Seamless sync with Google Classroom to fetch courses, students, and materials.
3. **Real-time Analytics:** Educators can monitor student performance through quiz history and metadata stored using Pinecone.
4. **Modern Tech Stack:** Uses cutting-edge technologies like Generative AI (WatsonX), Pinecone vector DB, and Streamlit for UI.
5. **Cross-platform Access:** As a web-based solution, it works across devices without requiring installation.

Disadvantages

1. **Dependency on External APIs:** Requires stable internet and API credentials for WatsonX, Pinecone, and Google.
2. **Limited Offline Capability:** Cannot function without internet connectivity due to reliance on cloud APIs.
3. **Initial Setup Complexity:** OAuth setup, backend API management, and Pinecone integration require technical knowledge.
4. **Embedding Quality:** Embeddings used are static/dummy (e.g., 0.01*i) and not yet AI-generated; performance can be improved.

9. CONCLUSION

EduTutor AI is a powerful educational platform that leverages Generative AI to personalize learning experiences. With automatic quiz generation, real-time analytics via Pinecone, and seamless integration with Google Classroom, it bridges the gap between traditional education and AI-powered e-learning. The project demonstrates the potential of AI in revolutionizing student engagement and educator productivity, making it a valuable tool in the future of smart classrooms.

10. FUTURE SCOPE

1. **Advanced AI Embeddings:** Integrate real semantic embeddings (e.g., Sentence Transformers or WatsonX embeddings).
 2. **Voice-based Quiz Interaction:** Allow students to take quizzes through voice commands using speech-to-text APIs.
 3. **Multi-language Support:** Support quiz generation in regional languages for broader accessibility.
 4. **Adaptive Learning Engine:** Dynamically adjust quiz difficulty based on previous performance using reinforcement learning.
 5. **Educator Analytics Dashboard:** Add detailed charts and insights on student progress and topic-wise performance.
 6. **Mobile App Development:** Extend Streamlit frontend to a mobile-friendly version or build a dedicated mobile app.
 7. **Gamification:** Add badges, levels, and leaderboard features to enhance engagement.
-

11. APPENDIX

Source Code

- Available in the GenAi project folder with structured directories:

css

CopyEdit

GenAi/

```
  └── edututor/
      |   ├── main.py
      |   ├── watsonx_client.py
      |   ├── quiz_generator.py
      |   └── pinecone_client.py
    └── google_oauth.py
    └── streamlit_app.py
└── requirements.txt
```

Dataset Link

- No static dataset used; quizzes are generated dynamically using **IBM WatsonX Generative AI**.

 **GitHub repository link:-** <https://github.com/gnani291/EDUTUTOR-AI>

 **Project Demo Video**

- <https://youtu.be/demo-video-link> (*upload to YouTube and replace with your actual link*)