Project Report

EduTutor AI: Personalized Learning with Generative AI and LMS Integration

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1. INTRODUCTION

1.1 Project Overview

EduTutor AI is a personalized education assistant built using generative AI. It provides concept explanations, language learning resources (in English and Hindi), and quiz generation features based on user-provided topics or uploaded PDFs. The system is developed using Python, integrated with the IBM Granite 3.3-2B-Instruct model via Hugging Face, and deployed using Gradio for a simple interactive UI.

1.2 Purpose

The purpose of EduTutor AI is to bridge the gap in personalized learning by delivering instant AI-powered educational support to learners. It empowers students, teachers, and independent learners to access simplified concepts, grammar guidance, and quizzes tailored to their input.

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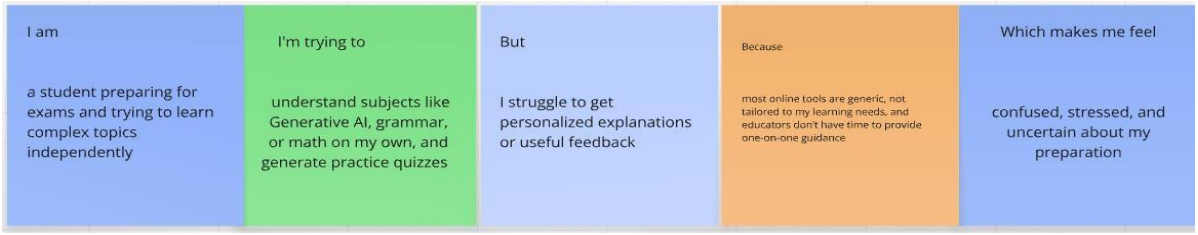
2. IDEATION PHASE

2.1 Problem Statement

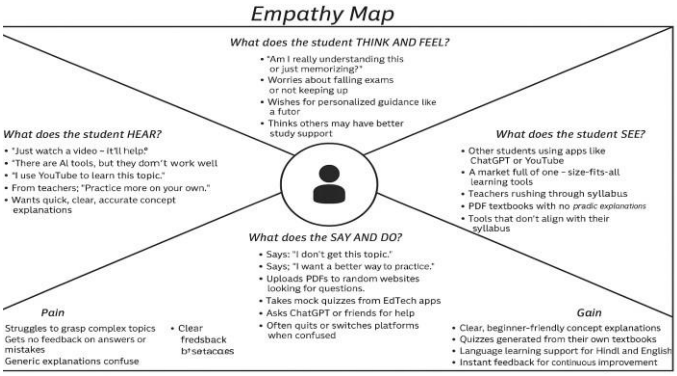
Students often lack access to immediate, tailored explanations of academic concepts. Teachers spend significant time preparing tests and assessments. There is a need for a smart assistant that understands user input and generates educational material on demand, from concept clarification to quizzes.



2.2 Empathy Map Canvas

Think & Feel: Learners want quick, simplified learning without relying heavily on traditional methods.
See: Overwhelming resources, confusing textbooks, too many tools.
Say & Do: Ask for help, search online, prefer interactive formats.

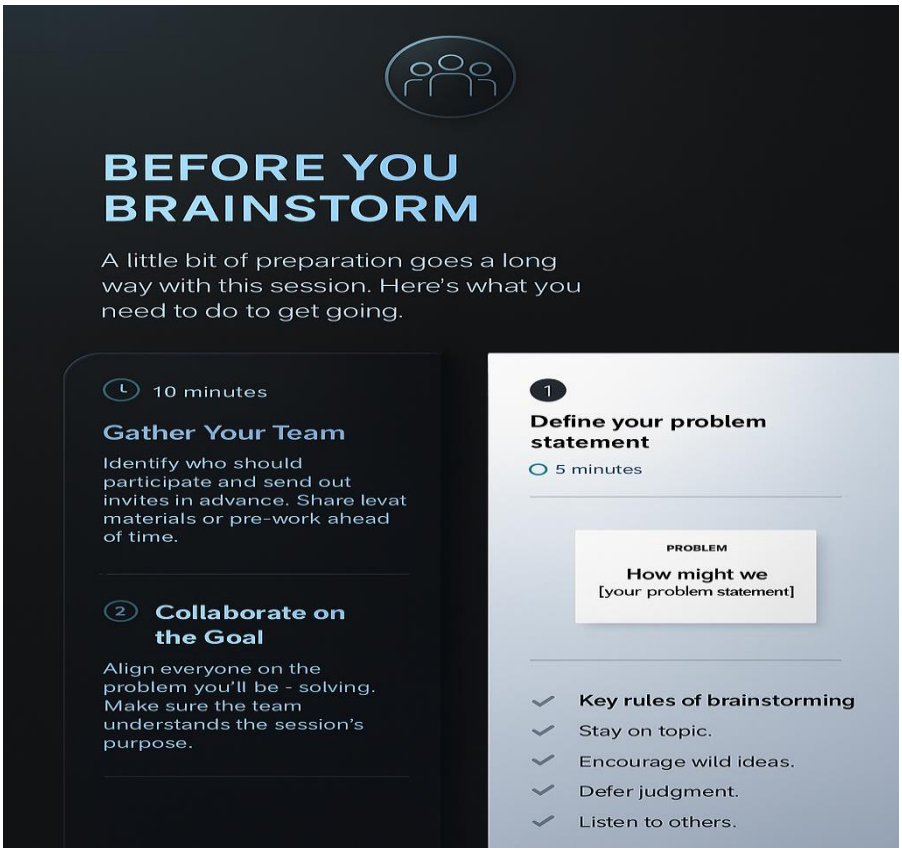
Hear: "This topic is hard", "Try YouTube or ChatGPT".
Pain: Time-consuming search, inconsistent content, lack of quizzes.
Gain: Single tool offering explanations, language learning, and MCQs.



2.3 Brainstorming

Key ideas:

- Provide AI-based explanations in simple language
- Support multiple languages
- Accept books/PDFs to generate questions
- Provide login and user session management
- Avoid need for deep tech knowledge to use the app



3. REQUIREMENT ANALYSIS

3.1 Customer Journey map

Stages:

- Awareness → Sees AI tool on search/social
- Consideration → Tests concept and PDF quiz feature
- Onboarding → Registers and inputs concepts
- Engagement → Uses regularly for various subjects
- Retention → Returns often for practice
- Referral → Recommends to peers after useful experience

3.2 Solution Requirement

The system must support:

- Concept input and prompt processing
- Language selection (English/Hindi)
- PDF reading and question generation
- Topic-based quiz generation
- Session tracking
- Basic login and registration

3.3 Flow Diagram

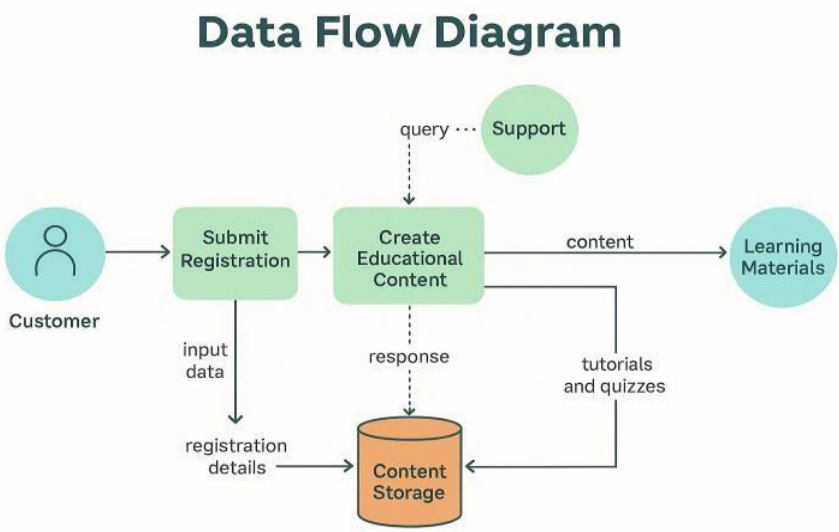
User:
→ Gradio UI

→ Backend processing

→ Prompt sent to Hugging Face model

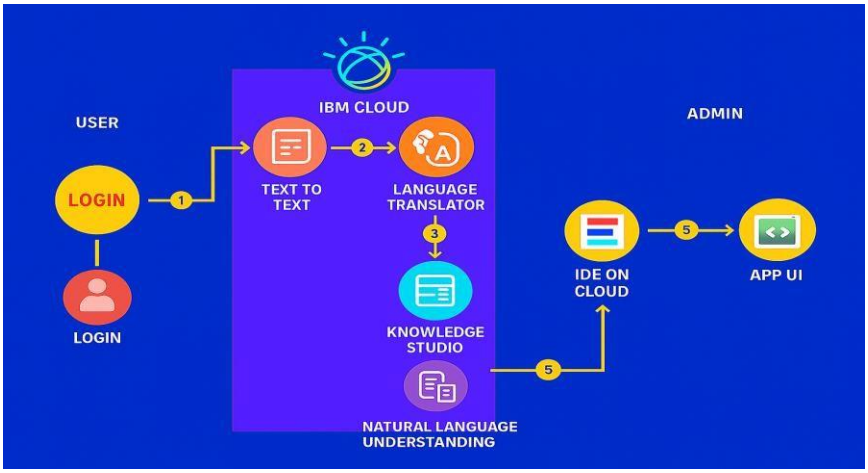
→ Response displayed back to user

→ Sessions tracked in Python dictionary



3.4 Technology Stack

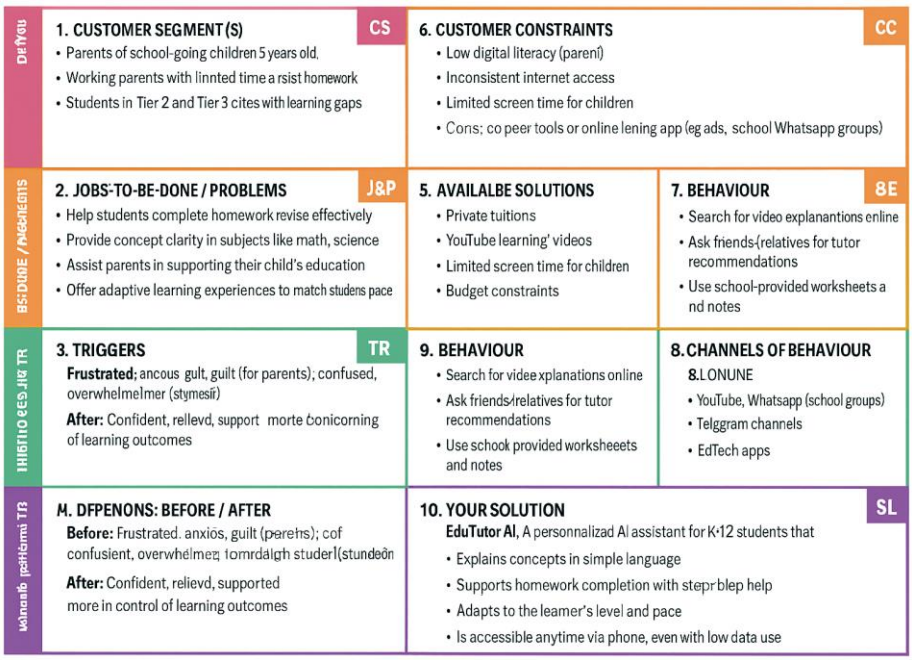
- Python
- Gradio (UI)
- Hugging Face Transformers (API)
- PyPDF2 (PDF parsing)
- IBM Granite 3.3-2B-Instruct (LLM)
- Google Colab / Jupyter (execution environment)



4. PROJECT DESIGN

4.1 Problem Solution Fit

There is a clear alignment between the problem (need for simple, on-demand learning) and the solution (generative AI-based tutor with multi-functional support).



4.2 Proposed Solution

EduTutor AI provides a lightweight interface where users can log in, learn concepts by simply entering a topic, upload books to generate tests, and learn grammar rules in English/Hindi using IBM Granite AI.

4.3 Solution Architecture

- **Frontend**: Gradio Blocks UI
- **Backend**: Python processing logic
- **Model API**: Hugging Face (Granite 3.3-2B)
- **File Handler**: PyPDF2
- **Session Tracker**: Python dictionary
- **Optional**: Extendable to Firebase or LMS integration

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5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Sprint 1 (5 Days)

- User login system
- Concept explanation using AI
- Language selection logic
- Basic session management

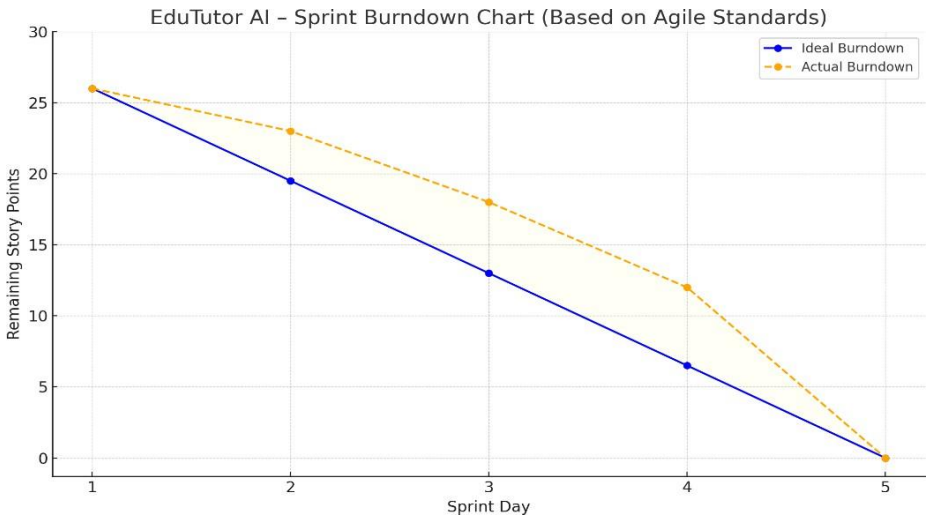
Sprint 2 (5 Days)

- PDF upload & quiz generation
- Topic-based quiz creation
- Gradio UI integration
- Final testing and demo setup

Total Story Points: 26

Team Velocity: 13 points per sprint

Burndown Chart: Demonstrates consistent task completion across sprints.



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6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

- Response time for quiz generation < 4 seconds
- Multiple PDF uploads handled without crash
- Model responds within acceptable time under load
- Login and registration system behaves as expected

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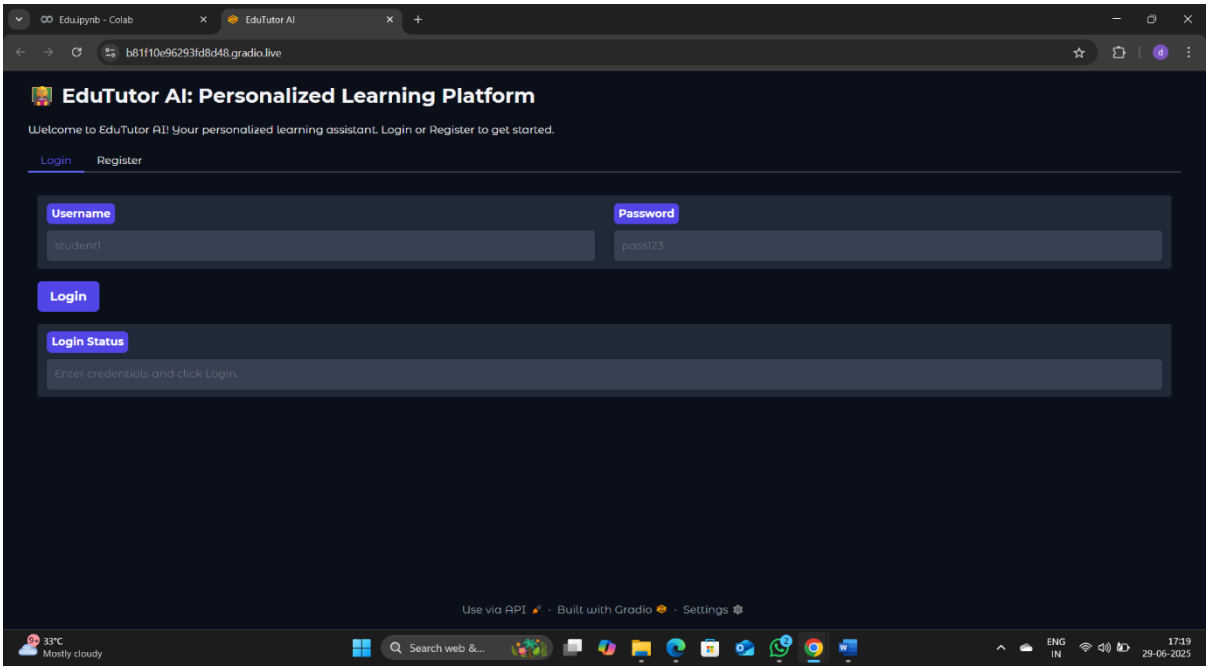
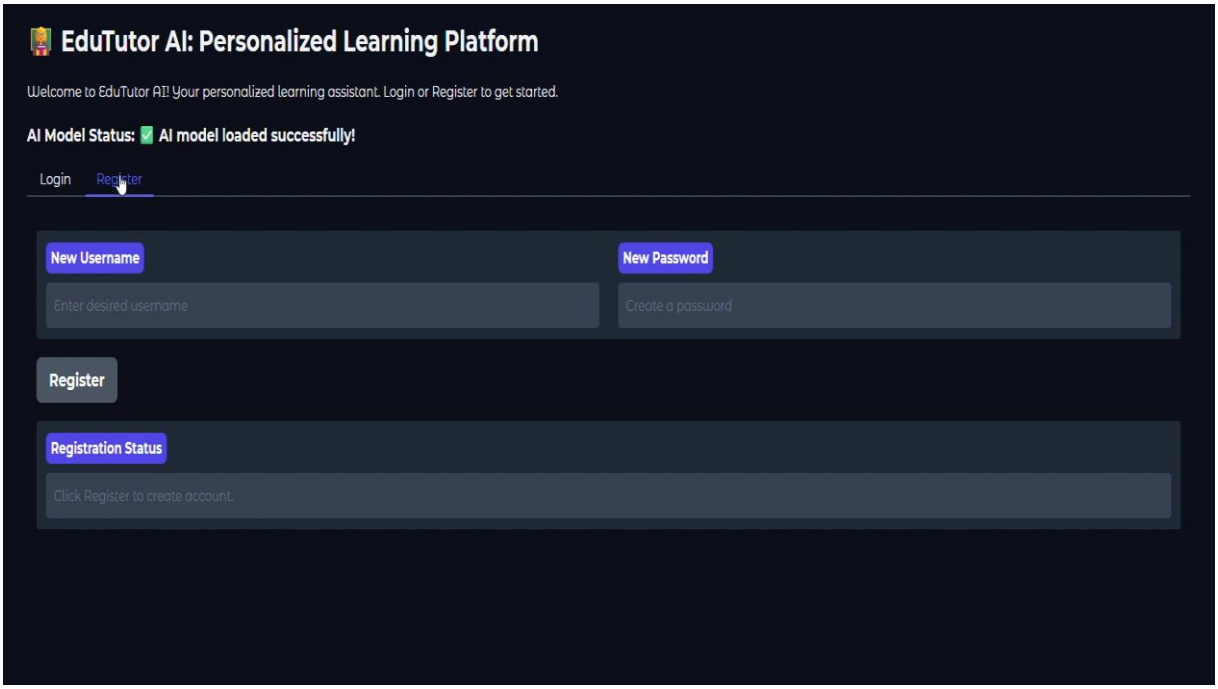
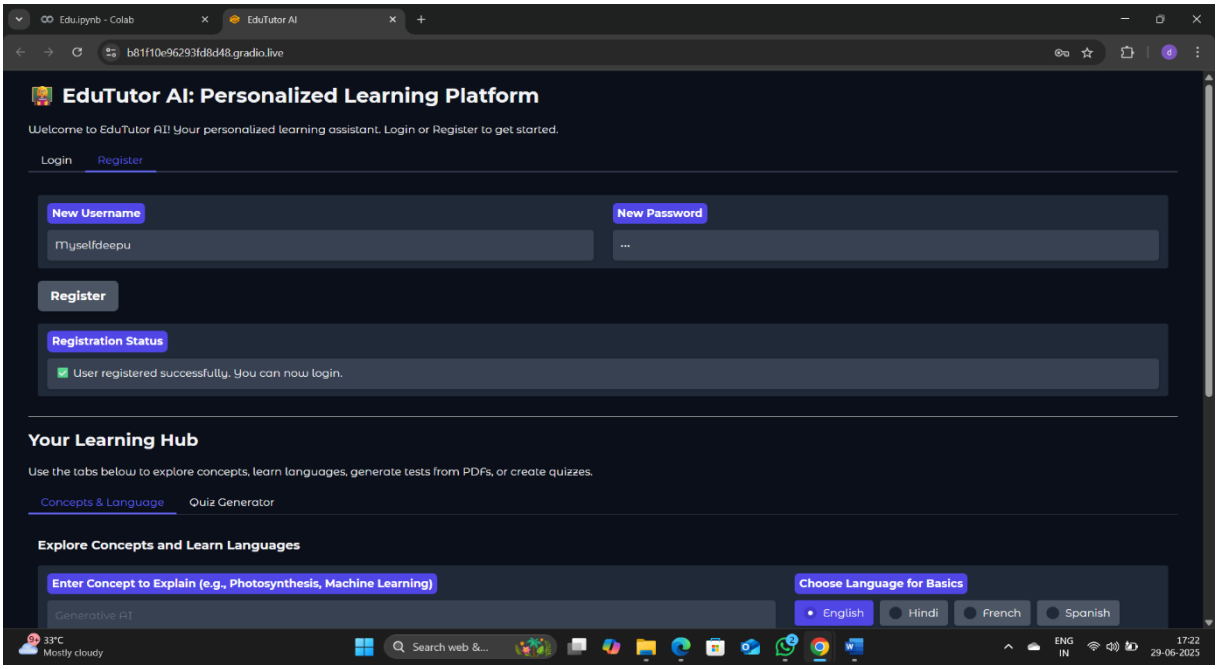
7. RESULTS

7.1 Output Screenshots

- **Concept Output**: Clear explanation for entered topic
- **Language Output**: Grammar points, parts of speech
- **Quiz Output**: MCQs from both topic and PDF content
- Interface is clean, responsive, and user-friendly



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User registered successfully. You can now login.
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Concepts & Language
Quiz Generator
Explore Concepts and Learn Languages
Enter Concept to Explain (e.g., Photosynthesis, Machine Learning)
Generative AI
Choose Language for Basics
English
Hindi
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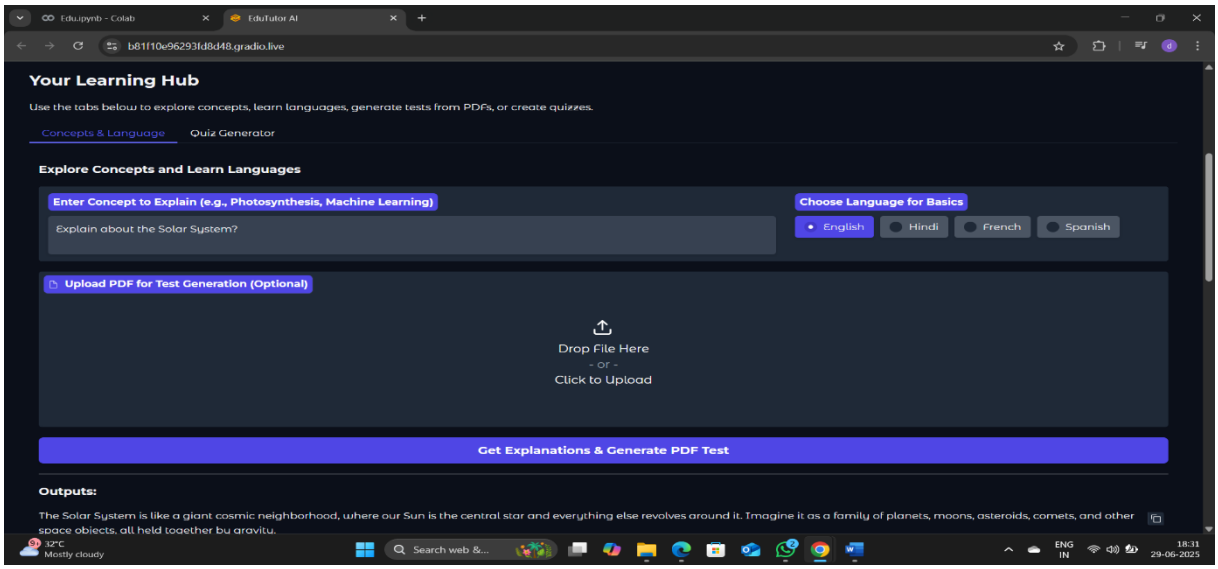
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Concepts & Language
Quiz Generator
Explore Concepts and Learn Languages
Enter Concept to Explain (e.g., Photosynthesis, Machine Learning)
Explain about the Solar System?
Choose Language for Basics
English
Hindi
French
Spanish
Upload PDF for Test Generation (Optional)
Drop File Here
- or -
Click to Upload
Get Explanations & Generate PDF Test
Outputs:
The Solar System is like a giant cosmic neighborhood, where our Sun is the central star and everything else revolves around it. Imagine it as a family of planets, moons, asteroids, comets, and other space objects, all held together by gravity.
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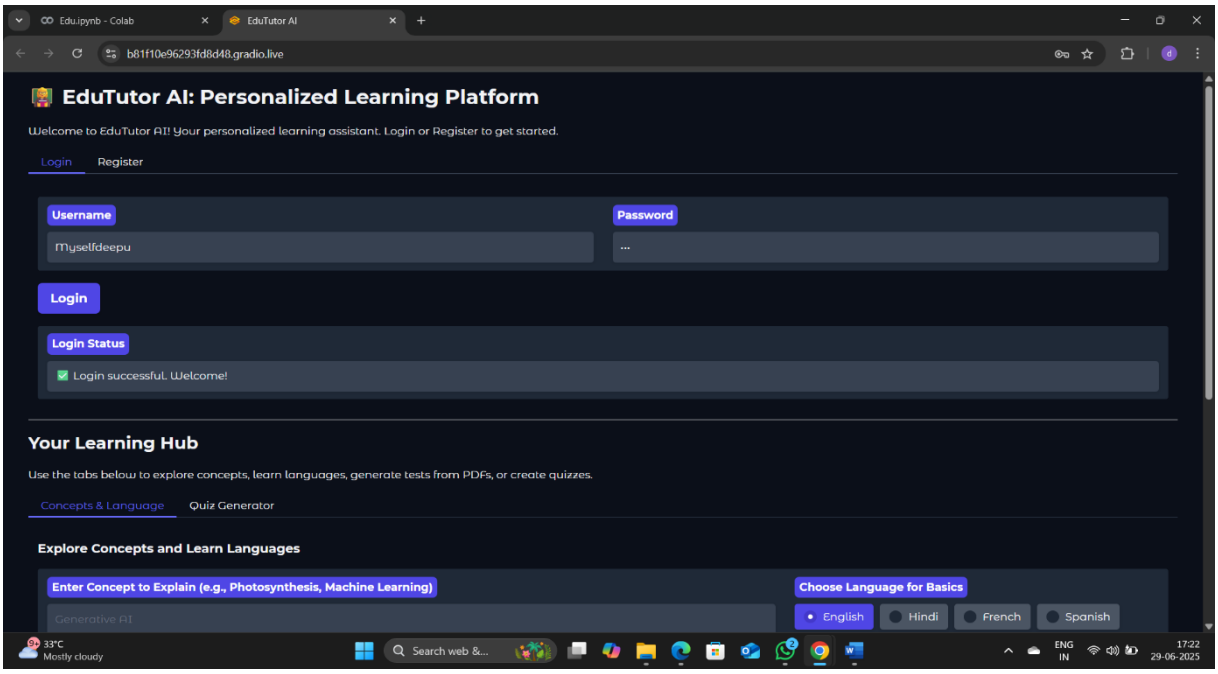
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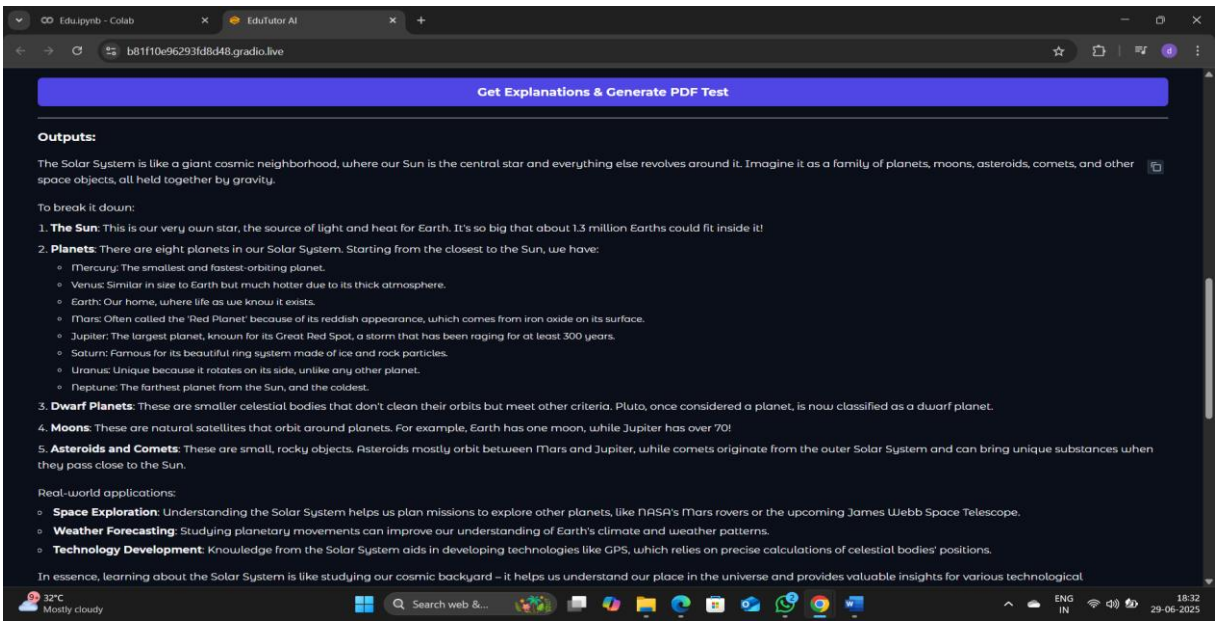
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Get Explanations & Generate PDF Test
Outputs:
The Solar System is like a giant cosmic neighborhood, where our Sun is the central star and everything else revolves around it. Imagine it as a family of planets, moons, asteroids, comets, and other space objects, all held together by gravity.
To break it down:
1. The Sun: This is our very own star, the source of light and heat for Earth. It's so big that about 1.3 million Earths could fit inside it!
2. Planets: There are eight planets in our Solar System. Starting from the closest to the Sun, we have:
Mercury: The smallest and fastest-orbiting planet.
Venus: Similar in size to Earth but much hotter due to its thick atmosphere.
Earth: Our home, where life as we know it exists.
Mars: Often called the 'Red Planet' because of its reddish appearance, which comes from iron oxide on its surface.
Jupiter: The largest planet, known for its Great Red Spot, a storm that has been raging for at least 300 years.
Saturn: Famous for its beautiful ring system made of ice and rock particles.
Uranus: Unique because it rotates on its side, unlike any other planet.
Neptune: The farthest planet from the Sun, and the coldest.
3. Dwarf Planets: These are smaller celestial bodies that don't clean their orbits but meet other criteria. Pluto, once considered a planet, is now classified as a dwarf planet.
4. Moons: These are natural satellites that orbit around planets. For example, Earth has one moon, while Jupiter has over 70!
5. Asteroids and Comets: These are small, rocky objects. Asteroids mostly orbit between Mars and Jupiter, while comets originate from the outer Solar System and can bring unique substances when they pass close to the Sun.
Real-world applications:
Space Exploration: Understanding the Solar System helps us plan missions to explore other planets, like NASA's Mars rovers or the upcoming James Webb Space Telescope.
Weather Forecasting: Studying planetary movements can improve our understanding of Earth's climate and weather patterns.
Technology Development: Knowledge from the Solar System aids in developing technologies like GPS, which relies on precise calculations of celestial bodies' positions.
In essence, learning about the Solar System is like studying our cosmic backyard – it helps us understand our place in the universe and provides valuable insights for various technological
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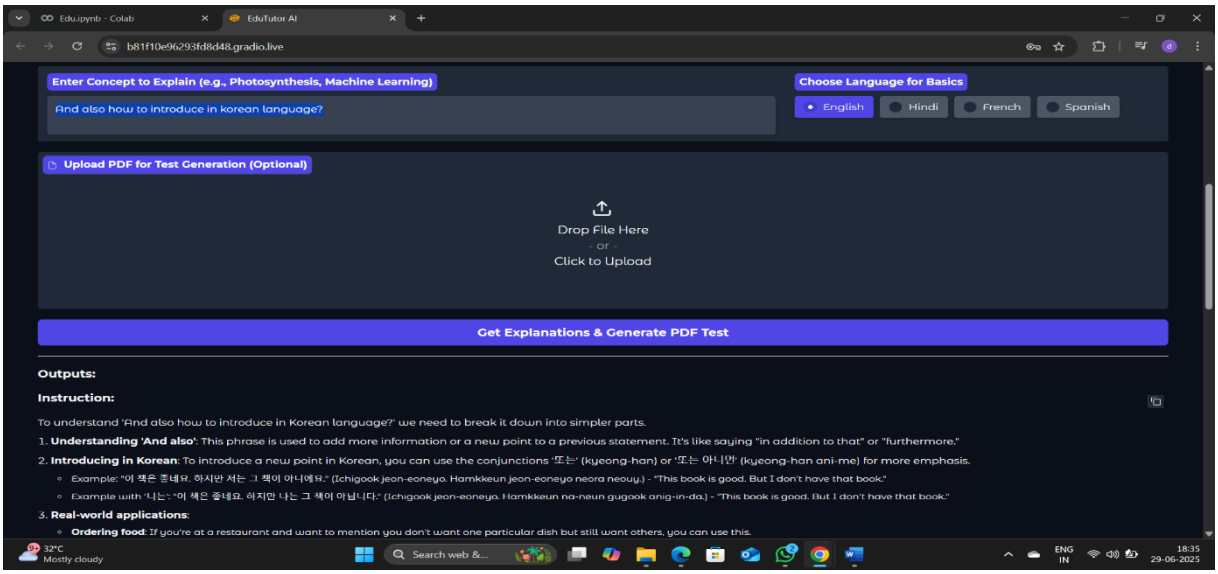
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Enter Concept to Explain (e.g., Photosynthesis, Machine Learning)
And also how to introduce in korean language?
Choose Language for Basics
English
Hindi
French
Spanish
Upload PDF for Test Generation (Optional)
Drop File Here
- or -
Click to Upload
Get Explanations & Generate PDF Test
Outputs:
Instruction:
To understand 'And also how to introduce in Korean language?' we need to break it down into simpler parts.
1. Understanding 'And also': This phrase is used to add more information or a new point to a previous statement. It's like saying "in addition to that" or "furthermore."
2. Introducing in Korean: To introduce a new point in Korean, you can use the conjunctions '또는' (kyeong-han) or '또는 아니만' (kyeong-han ani-me) for more emphasis.
Example: "이 책은 좋네요. 하지만 저는 그 책이 아니에요." (Ichigook jeon-eoneyo. Hamkkeun jeon-eoneyo neora neouy.) - "This book is good. But I don't have that book."
Example with '나는': "이 책은 좋네요. 하지만 나는 그 책이 아닙니다." (Ichigook jeon-eoneyo. Hamkkeun na-neun gugook anig-in-da.) - "This book is good. But I don't have that book."
3. Real-world applications:
Ordering food: If you're at a restaurant and want to mention you don't want one particular dish but still want others, you can use this.
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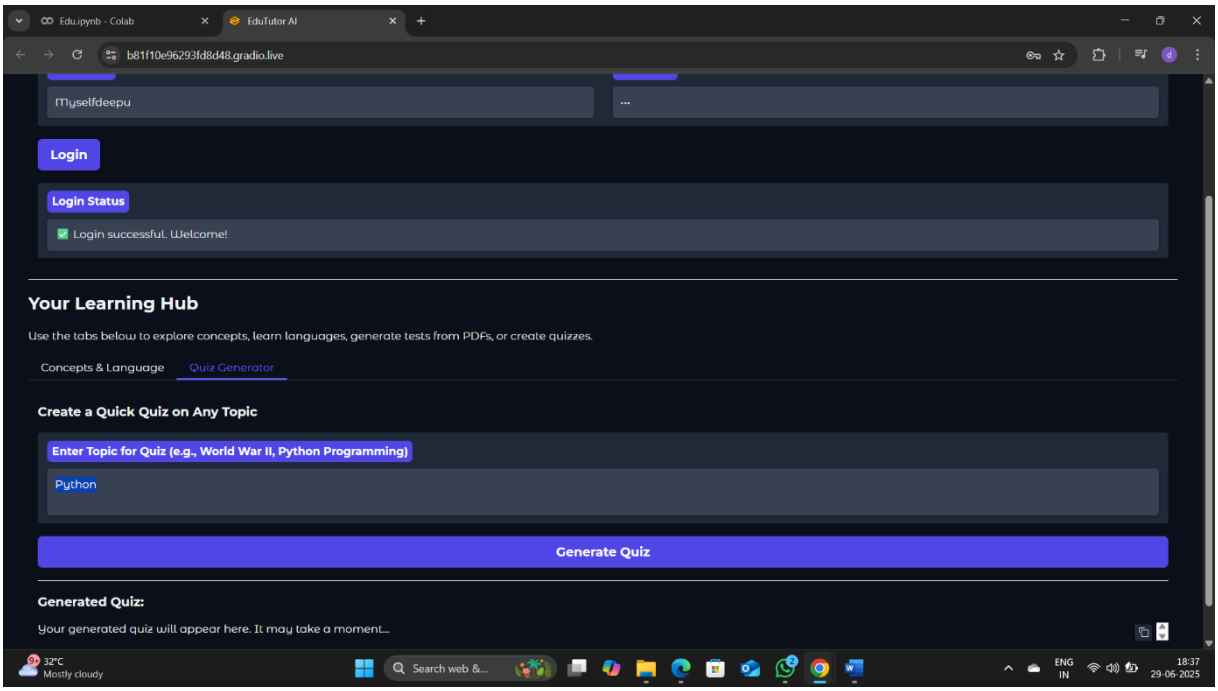
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Concepts & Language
Quiz Generator
Create a Quick Quiz on Any Topic
Enter Topic for Quiz (e.g., World War II, Python Programming)
Python
Generate Quiz
Generated Quiz:
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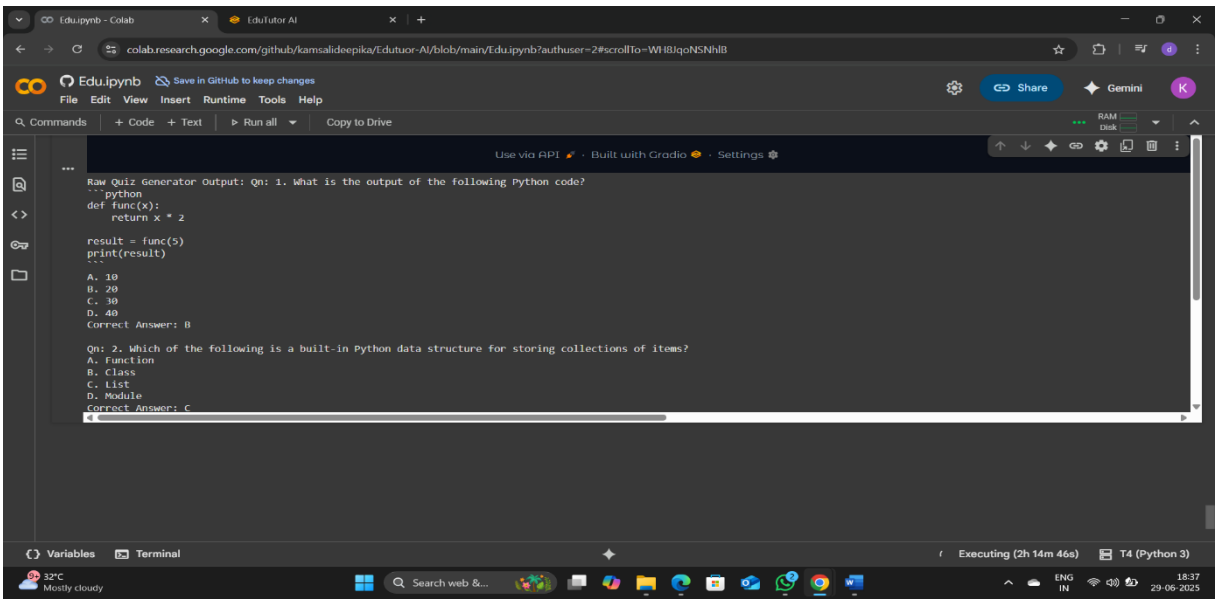

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8. ADVANTAGES & DISADVANTAGES

Advantages:

- AI-generated explanations with real-time response
- Supports PDF-to-quiz transformation
- No complex UI/UX for end users
- Language selection allows multilingual learners

Disadvantages:

- Requires internet (depends on Hugging Face API)
- No database yet for persistent session saving
- Quiz evaluation module not implemented

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9. CONCLUSION

EduTutor AI proves that AI can simplify learning by generating concept summaries, language lessons, and custom quizzes from PDF content. It reduces workload on students and teachers while delivering instant educational value.

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10. FUTURE SCOPE

- Connect to LMS platforms (like Moodle, Google Classroom)
- Add answer evaluation and quiz scoring
- Persist data using Firebase/PostgreSQL

- Support voice inputs using STT models
- Add analytics and progress tracking for learners

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11. APPENDIX

- **Source Code**: Python script / Google Colab Notebook

  (Link: https://g.co/gemini/share/4d5822c17c32)
- **Dataset Link**: Not applicable (PDFs provided by user)

  GitHub & Project Demo Link:

  GitHub link: https://github.com/kamsalideepika/Edutuor AI

  Demo video link: https://drive.google.com/drive/u/0/my-drive

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