Project Report: EduTutor AI

1. INTRODUCTION

1.1 Project Overview

EduTutor AI is an intelligent question-answering application powered by IBM Watsonx's foundation models. It allows users—particularly students—to input academic or general queries and receive AI-generated responses in natural language. The app is built using Streamlit and deployed via Streamlit Cloud, integrating IBM Watson's Granite 3B-Instruct model.

1.2 Purpose

The purpose of this project is to create a virtual AI tutor that can enhance students' learning experiences by providing instant answers, explanations, and insights, especially in self-study environments.

2. IDEATION PHASE

2.1 Problem Statement

Students often struggle to find immediate answers to academic questions outside classroom hours. Most existing platforms are either too generic or require paid subscriptions.

2.2 Empathy Map Canvas

- Think & Feel: Needs accurate, fast answers.
- See: Many irrelevant or overly technical answers online.
- Say & Do: Prefers conversational, to-the-point help.
- Hear: From peers—"I wish I had a 24/7 study buddy."

2.3 Brainstorming

- Use IBM Watsonx models for language understanding.
- Build a light, deployable UI with Streamlit.
- Host on Streamlit Cloud for free/public access.

3. REQUIREMENT ANALYSIS

3.1 Customer Journey Map

1. User lands on the app

2. Enters a question

3. Clicks “Get Answer”

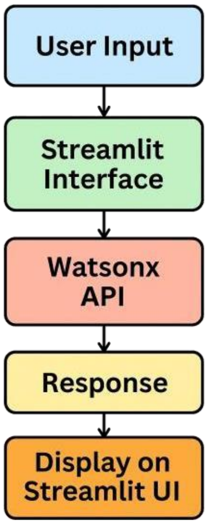
4. Receives an AI-generated response

5. Uses the answer for learning

3.2 Solution Requirement

- API Key and Project ID from IBM Cloud
- Python, Streamlit
- Access to Watsonx models

3.3 Data Flow Diagram



3.4 Technology Stack

- Frontend: Streamlit
- Backend: Python

- AI Model: IBM Watsonx (Granite 3B-Instruct)
- Hosting: Streamlit Cloud

4. PROJECT DESIGN

4.1 Problem Solution Fit

EduTutor AI aligns with the growing need for AI-based education tools that work as personalized tutors.

4.2 Proposed Solution

An intuitive app where users ask questions and get real-time AI responses.

4.3 Solution Architecture

- Streamlit captures user input
- Backend initializes Watsonx model via API
- Generates text response using IBM's foundation model
- Displays it back to the user

5. PROJECT PLANNING & SCHEDULING

5.1 Project Planning

Phase	Duration	Tasks
Week 1	3 days	Setup IBM Watsonx & Streamlit
Week 2	2 days	Model Integration
Week 3	3 days	Streamlit UI + Deployment
Week 4	2 days	Testing + Documentation

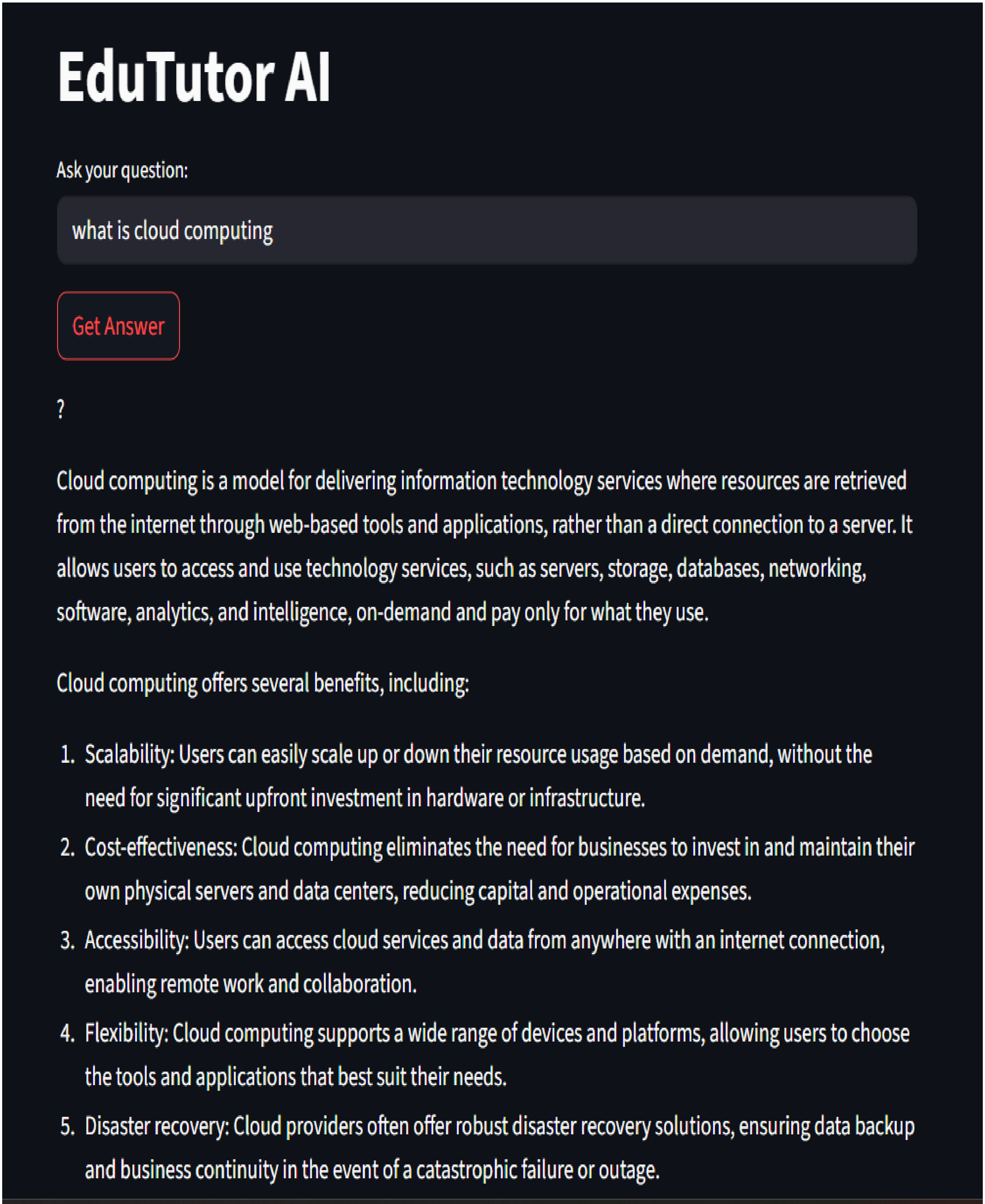
6. FUNCTIONAL AND PERFORMANCE TESTING

6.1 Performance Testing

Tested the app for:

- Model latency (response within 2-3 seconds on average)
- UI responsiveness on mobile and desktop
- API key validation and error handling

7. RESULTS



EduTutor AI

Ask your question:

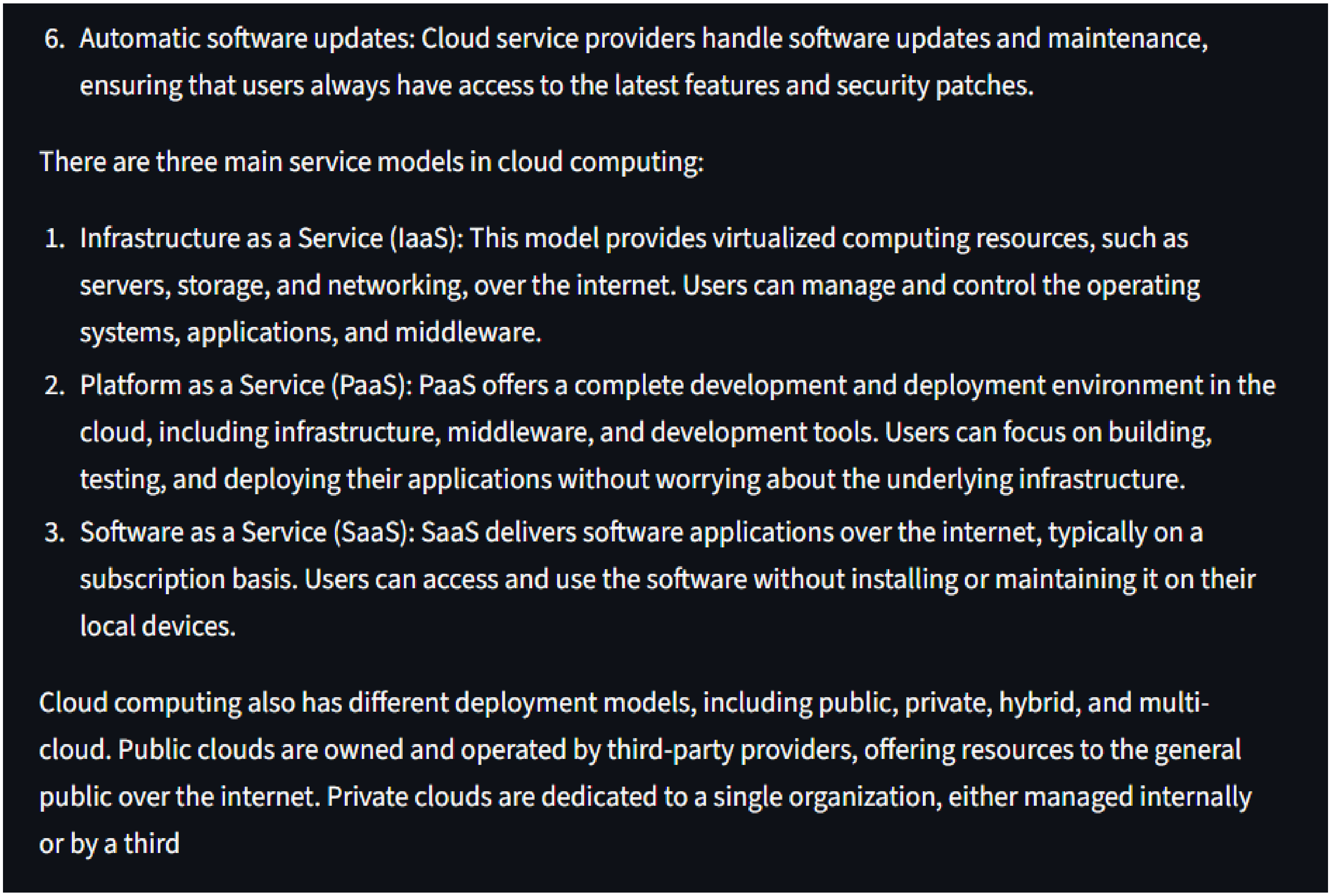
what is cloud computing

?

Cloud computing is a model for delivering information technology services where resources are retrieved from the internet through web-based tools and applications, rather than a direct connection to a server. It allows users to access and use technology services, such as servers, storage, databases, networking, software, analytics, and intelligence, on-demand and pay only for what they use.

Cloud computing offers several benefits, including:

1. Scalability: Users can easily scale up or down their resource usage based on demand, without the need for significant upfront investment in hardware or infrastructure.
2. Cost-effectiveness: Cloud computing eliminates the need for businesses to invest in and maintain their own physical servers and data centers, reducing capital and operational expenses.
3. Accessibility: Users can access cloud services and data from anywhere with an internet connection, enabling remote work and collaboration.
4. Flexibility: Cloud computing supports a wide range of devices and platforms, allowing users to choose the tools and applications that best suit their needs.
5. Disaster recovery: Cloud providers often offer robust disaster recovery solutions, ensuring data backup and business continuity in the event of a catastrophic failure or outage.



6. Automatic software updates: Cloud service providers handle software updates and maintenance, ensuring that users always have access to the latest features and security patches.

There are three main service models in cloud computing:

1. Infrastructure as a Service (IaaS): This model provides virtualized computing resources, such as servers, storage, and networking, over the internet. Users can manage and control the operating systems, applications, and middleware.
2. Platform as a Service (PaaS): PaaS offers a complete development and deployment environment in the cloud, including infrastructure, middleware, and development tools. Users can focus on building, testing, and deploying their applications without worrying about the underlying infrastructure.
3. Software as a Service (SaaS): SaaS delivers software applications over the internet, typically on a subscription basis. Users can access and use the software without installing or maintaining it on their local devices.

Cloud computing also has different deployment models, including public, private, hybrid, and multi-cloud. Public clouds are owned and operated by third-party providers, offering resources to the general public over the internet. Private clouds are dedicated to a single organization, either managed internally or by a third

8. ADVANTAGES & DISADVANTAGES

Advantages

- Fast, natural-language responses
- Easy to use interface
- Free and accessible via browser

Disadvantages

- Depends on API availability
- Limited by token usage and response length
- No voice input or multilingual support (yet)

9. CONCLUSION

EduTutor AI serves as a practical, beginner-friendly AI tutoring app leveraging IBM Watsonx. It demonstrates the integration of cloud AI models with front-end frameworks like Streamlit.

10. FUTURE SCOPE

- Add voice input
- Expand to subject-specific modules
- Add multi-language support
- Use authentication for user tracking

11. APPENDIX

Source Code

```
import streamlit as st from ibm_watsonx_ai.foundation_models

import ModelInference

# Watsonx credentials and settings model_id =

"ibm/granite-3-8b-instruct" project_id = "d92838f9-

a4f7-4728-91c8-0ce485d35bce" credentials = {

  "url": "https://eu-de.ml.cloud.ibm.com",
 "apikey": "b5Gu5kQpy1-gIVKlujwF5yOSK8vuMYQERhURhPuD_4ju"

}

# Streamlit UI st.title("EduTutor AI") question =

st.text_input("Ask your question:") if st.button("Get

Answer") and question.strip() != "":

  model = ModelInference(

    model_id=model_id,

    params={

      "decoding_method": "greedy",
      "max_new_tokens": 500
    },
    project_id=project_id,
    credentials=credentials
  )
  response = model.generate(question) answer =
  response["results"][0]["generated_text"]
  st.write(answer)
```

Dataset Link

https://www.ibm.com/docs/en/watsonx-as-a-service?topic=models-granite-13b-instruct

GitHub & Project Demo Link

https://github.com/22AK1A0410/EduTutor-AI-Personalized-Learning-with-Generative-AI-and-LMS-Integration