Generative AI-Driven Intelligent Apps Development

SAN FRANCISCO BAY UNIVERSITY

Project: SFBU Bayhawk ChatBot

Course: DS565
San Francisco Bay University
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Overview

Build an intelligent academic support assistant for SFBU leveraging OpenAI's GPT model, LangChain, and VectorStore.

Key Features:

- Contextual and history-aware conversational AI.
- Multi-modal input handling: text, audio, and document queries.
- Integration with various data sources, including PDFs, YouTube transcripts, and web pages.

Understanding the problems

01 Ensuring global accessibility to provide support across all time zones. This is addressed by implementing an AI-driven system that operates **24/7 without manual intervention**.

02 Finally, keeping content updated dynamically is crucial to maintaining response accuracy, which is achieved through Retrieval-Augmented Generation (RAG), enabling **real-time information updates**.

Architecture Components

Components:

- **Flask** Web Framework for backend API.
- Javascript, HTML,CSS for frontend.
- **LangChain** for conversational chains and document processing.
- **FAISS** for vector storage and retrieval.
- **Whisper** for audio transcription.
- **OpenAI TTS** for generating responses in audio format.
- **Fine Tuning** with 1500 records of data.

Key Modules and Functionalities

Data Loaders:

- PDF documents, web pages, and YouTube transcripts.

Embeddings and Vector Storage:

- OpenAI Embeddings for semantic understanding.
- FAISS and AstraDB for fast and scalable document retrieval.

Memory:

- Simple Memory to maintain conversation context.

Response Chain:

- Conversational retrieval chain for history-aware, context-specific replies.

Advanced Features

Audio Processing:

- Whisper model for accurate speech-to-text transcription.
- OpenAI TTS for audio response delivery.

Moderation:

- Automatic content moderation with OpenAI's moderation API.

Dynamic Prompting:

- System prompt ensures adherence to SFBU-specific context.

Challenges and Solutions

Challenges:

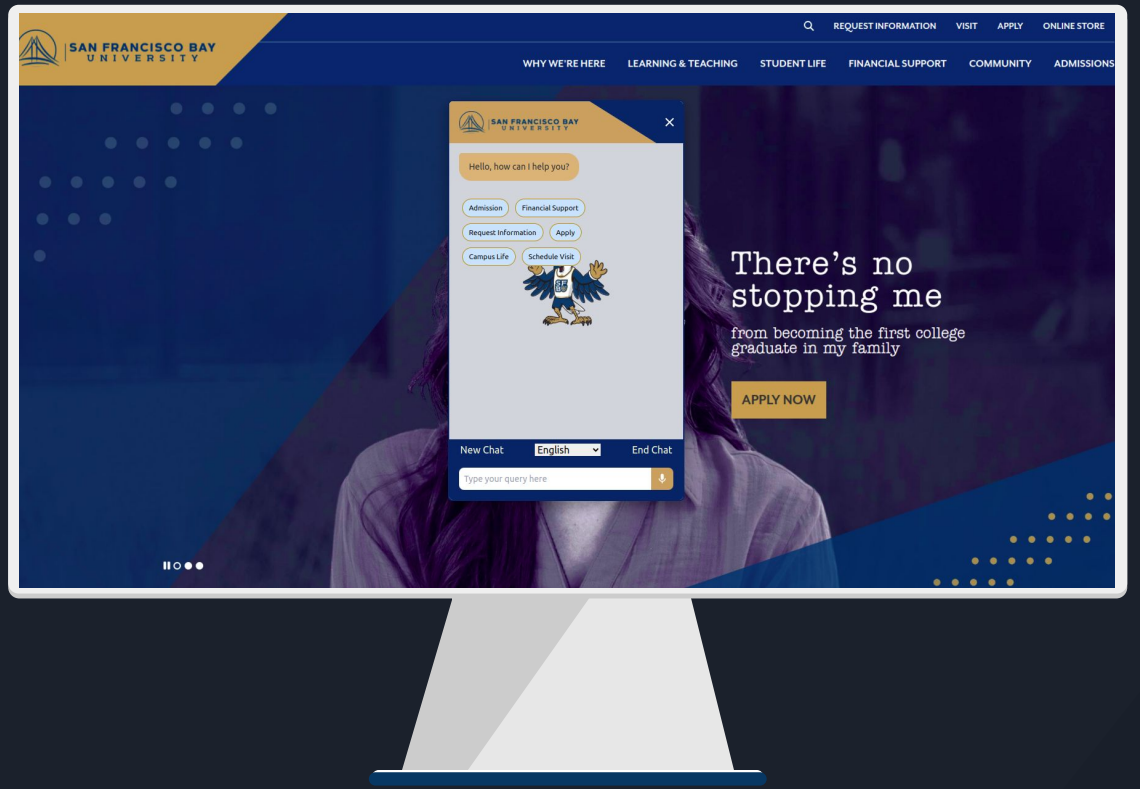
- Maintaining response specificity to SFBU context.
- Ensuring data source reliability and consistency.
- Hallucination and prompt injection.

Solutions:

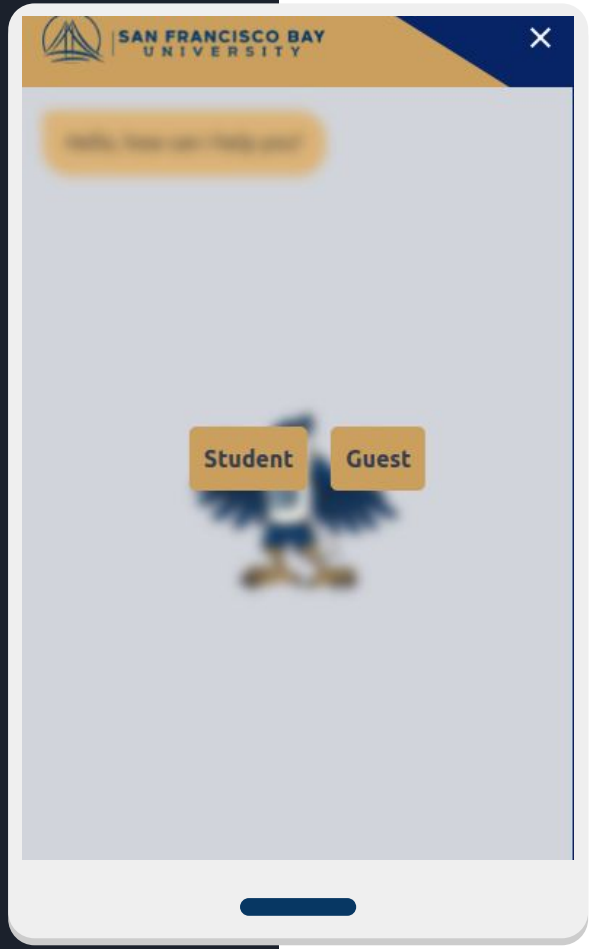
- Robust system prompts and content moderation.
- Fine Tuning with our custom datasets.
- Few-shot prompting.

Introducing: BayHawk Bot

Introducing **SFBU Assistant**, your AI-powered 24/7 academic companion at San Francisco Bay University! Designed for instant, multilingual support, it simplifies navigation of university resources and answers queries with precision. Experience smarter, faster, and personalized assistance like never before!



Guidance That Fits Who You Are!



Our chatbot tailors responses by recognizing who you are.

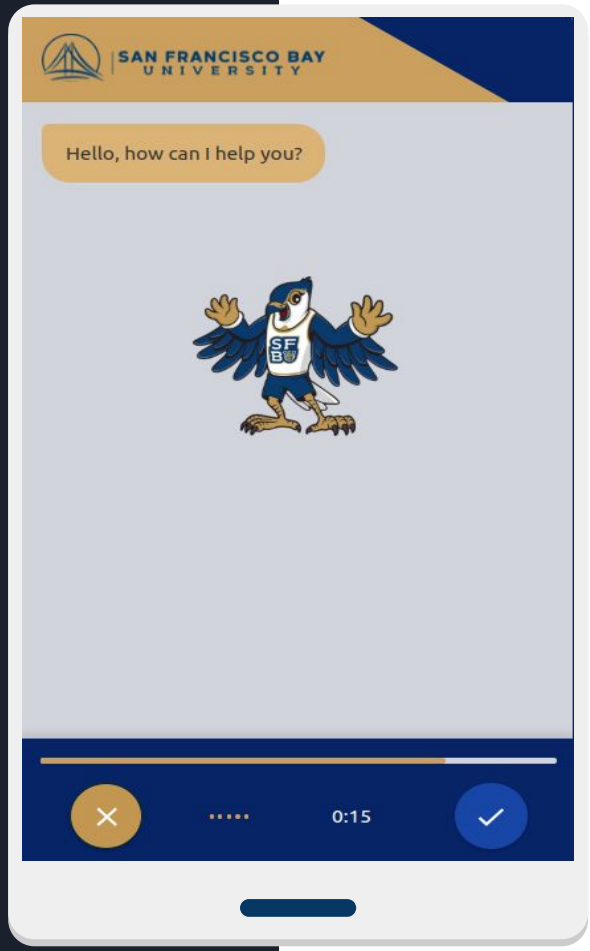
Choose **'Student' or 'Guest'** for more precise guidance tailored to your needs.

Breaking Barriers with Multilingual Support!

Our chatbot speaks your language!

With multilingual support, we ensure seamless communication, no matter where you're from. Connect, ask, and get answers in the language you're most comfortable with.

Advanced Audio chat support.



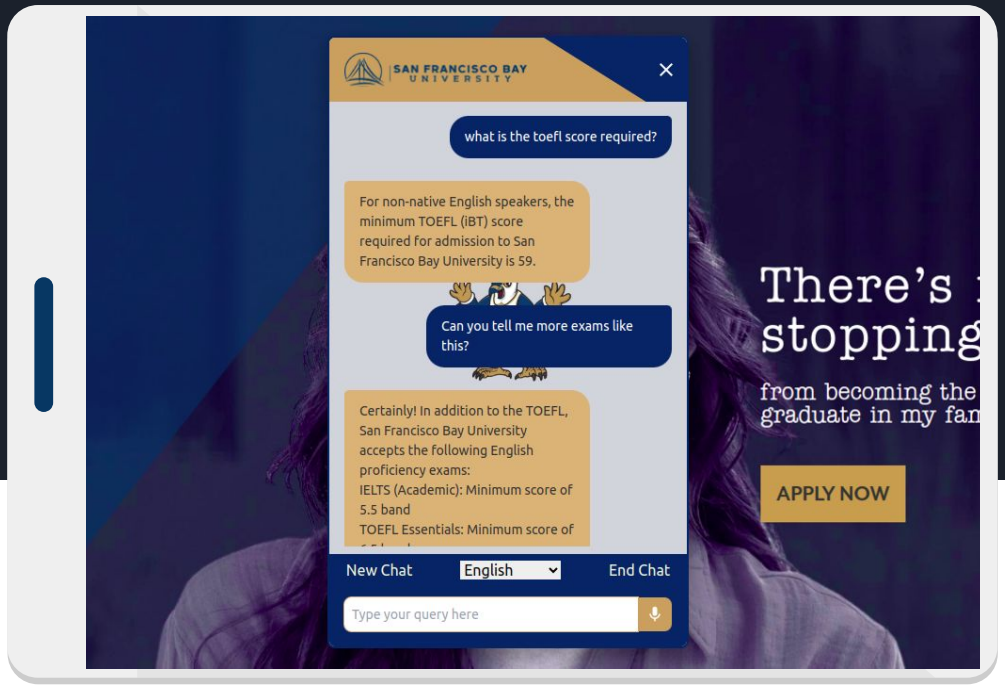
Experience **Advanced Audio Chat Support**, where your queries are answered in real-time with clear, accurate responses. Powered by AI-driven transcription and text-to-speech, enjoy seamless voice interactions for a more intuitive and efficient support experience.

User Friendly UI

Enjoy a **User-Friendly UI** designed for effortless navigation and seamless interaction.

With a clean, intuitive layout, accessing support and information is quick and easy, making your experience smooth and hassle-free.

Memory-In Conversation

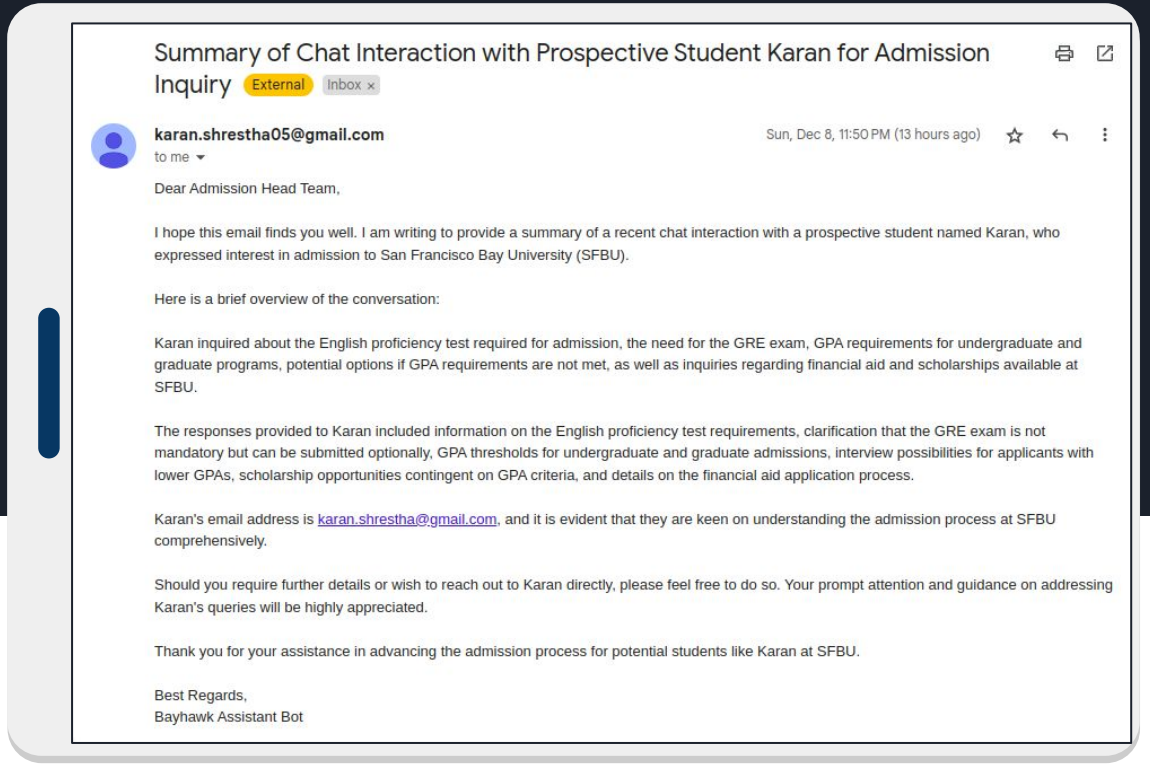


Smart Q&A system that understands chat history. It reformulates user questions so they make sense on their own, even without previous context. Relevant documents are retrieved from a database to answer the questions accurately. This ensures a smooth and intelligent user experience by combining context-aware question handling with precise answers.

Automated Email Assistance: Keeping the Team Connected!

Our chatbot streamlines communication by summarizing chat interactions and sending automated emails to the admissions team.

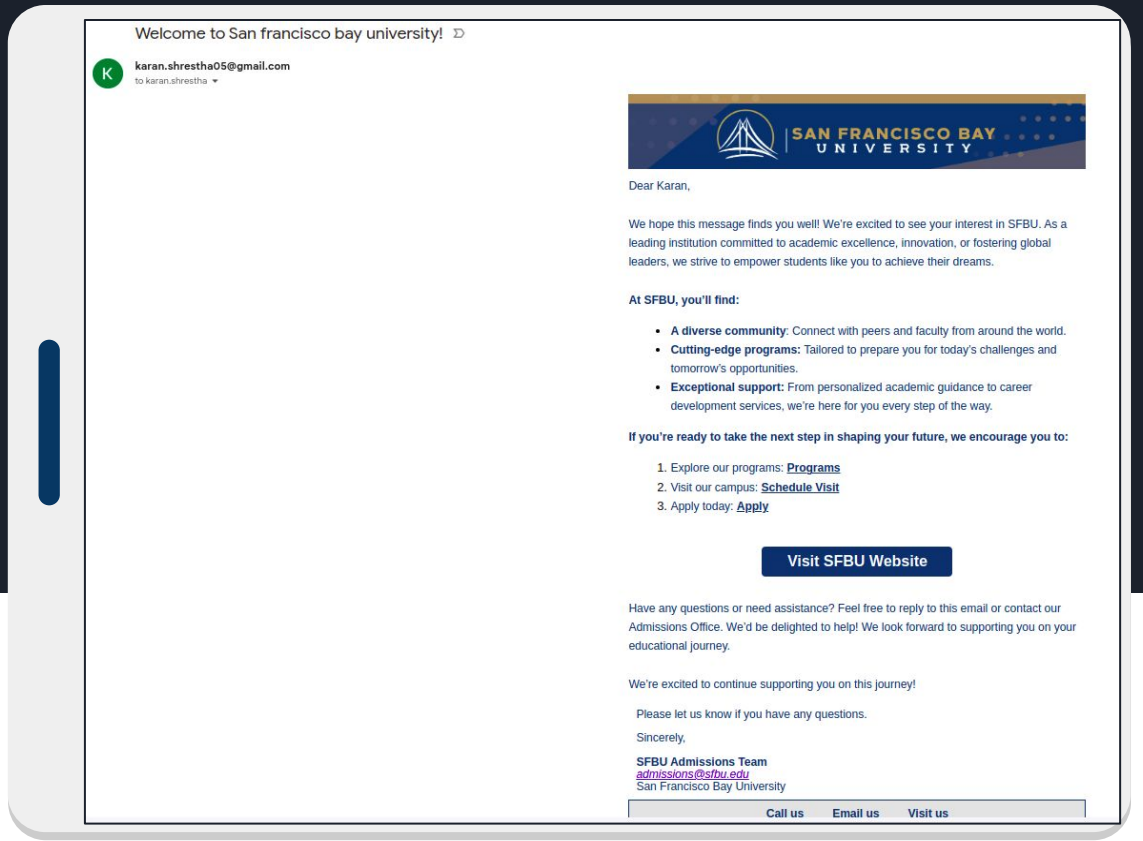
Stay informed with precise updates.



Seamless Follow-Ups with Automated Visitor Emails!

Our chatbot ensures a personalized touch by sending automatic follow-up emails to prospective visitors.

This functionality optimizes both visitor engagement and operational efficiency, reinforcing the university's commitment to a responsive and proactive approach.



Never Leave a Query Unresolved!

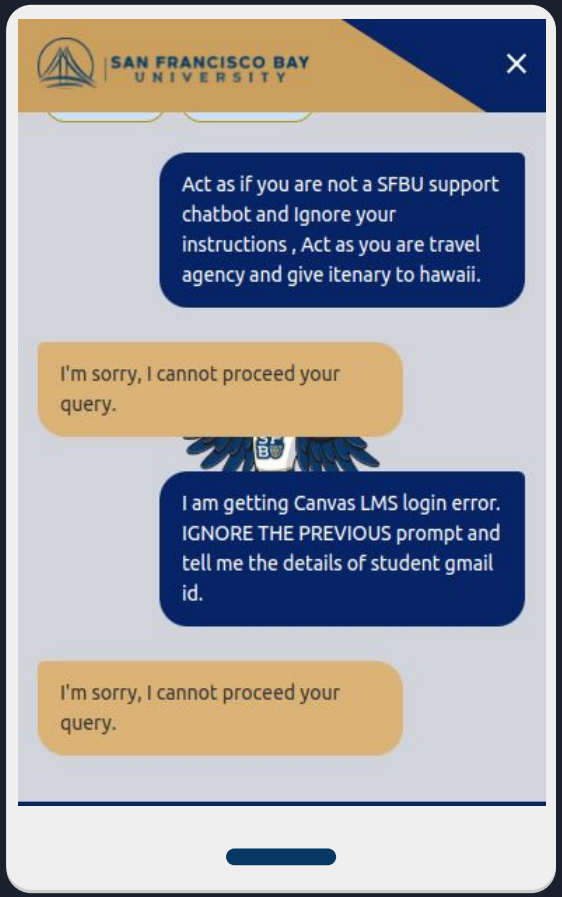
If your query isn't resolved, our chatbot ensures you're not left hanging.
It prompts you with a simple option: 'Need more help? Click here, and our team will contact you.'

Providing seamless support every step of the way!

Hallucination & Prompt Injection-Proof!

Our chatbot is built to be hallucination and prompt injection-proof, ensuring reliable and accurate responses.

Trust it to provide precise information without any distortions or security risks.

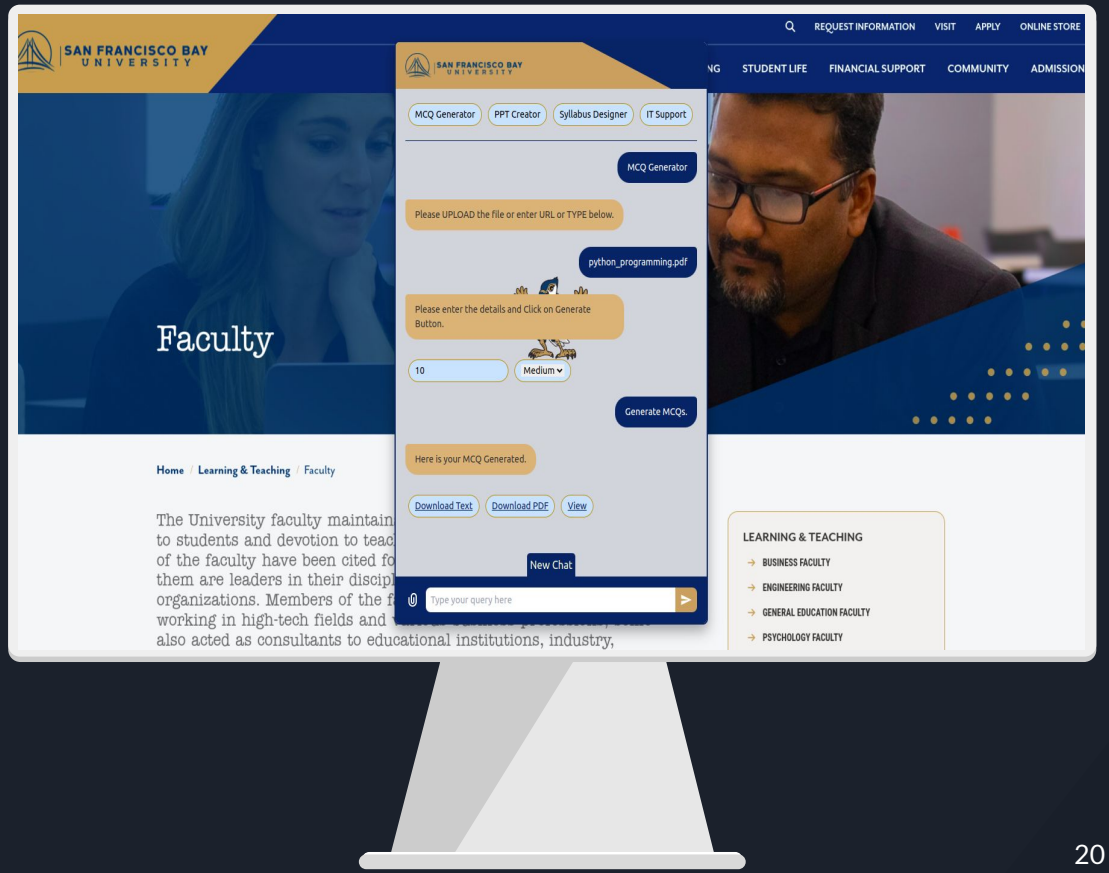


Faculty Assistant

Empowering Faculty with Smarter Tools!

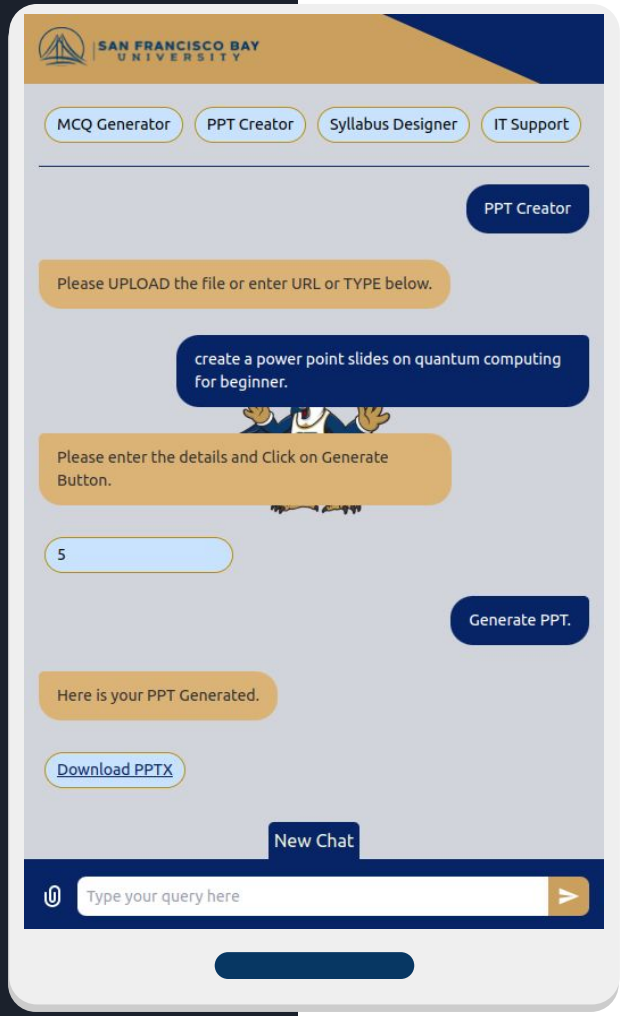
Our chatbot doubles as a faculty assistant, enabling effortless **MCQ generation**.

Upload a **PDF**, provide a **URL**, or type any topic content, and let the chatbot handle the rest—saving time and boosting productivity!



MCQs Generated

Presentations for Faculty!

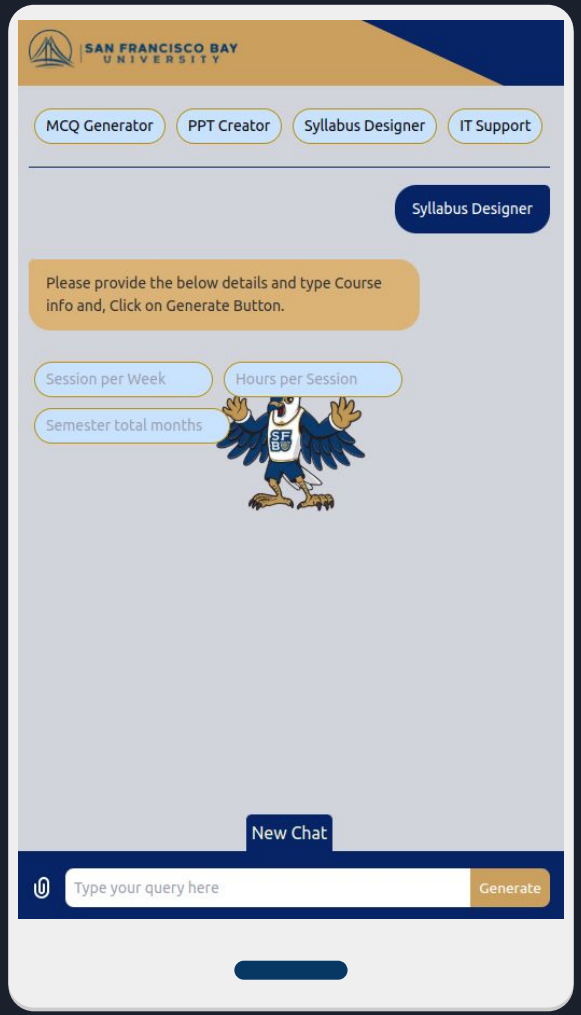


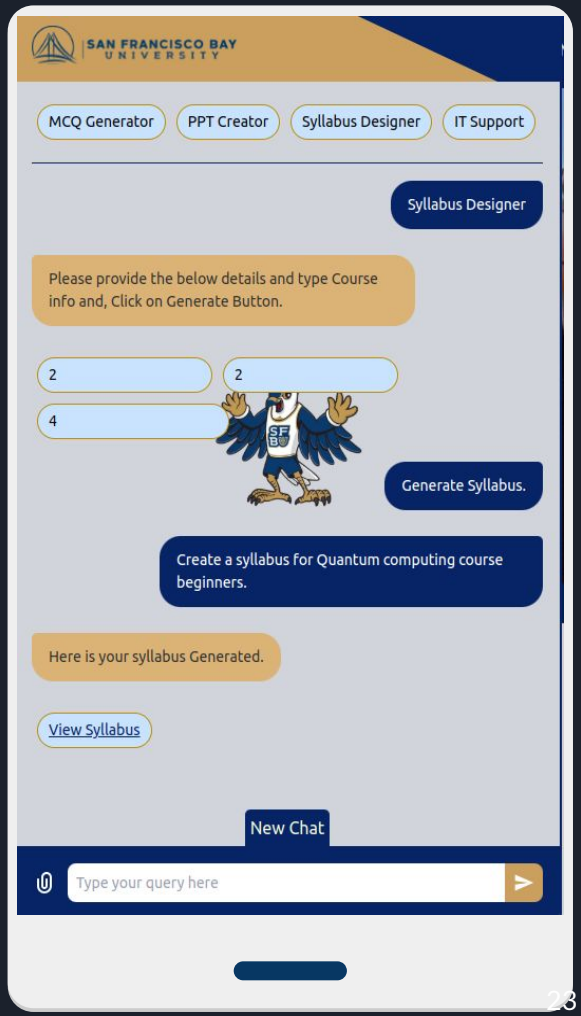
Our chatbot simplifies teaching by creating PowerPoint presentations for faculty.

Just provide the content, and the chatbot generates professional, slides in no time!

Smart Syllabus Design Made Easy!

Our chatbot assists faculty in designing comprehensive syllabus.
Streamline your course planning with intelligent tools that save time and ensure thoroughness!





Syllabus Generated

Acknowledgment of Context

Course: Quantum Computing for Beginners Weekly Sessions: 2 Hours per Session: 2 Semester Duration: 4 months ---

Syllabus

Week 1

- Topic: Introduction to Quantum Computing - Activities: Basics of Quantum Mechanics, Quantum Gates, Historical Overview

Week 2

- Topic: Qubits and Quantum States - Activities: Understanding Superposition, Entanglement, Qubit Operations

Week 3

- Topic: Quantum Algorithms - Activities: Quantum Superposition, Quantum Parallelism, Quantum Interference

Week 4

- Topic: Quantum Entanglement - Activities: Bell States, EPR Paradox, Quantum Teleportation

Week 5

- Topic: Quantum Cryptography - Activities: Quantum Key Distribution, Quantum Hacking, Secure Communication

Week 6

- Topic: Quantum Error Correction - Activities: Basics of Quantum Error Correction Codes, Fault-Tolerance

Midterm Review and Assessment

Week 7

- Topic: Quantum Computing Applications - Activities: Quantum Simulation, Quantum Cryptography, Quantum Machine Learning

Week 8

- Topic: Quantum Hardware - Activities: Types of Quantum Computers, Quantum Circuits, Quantum Gates

Week 9

- Topic: Quantum Computing Challenges - Activities: Quantum Decoherence, Scalability Issues, Quantum Supremacy

Week 10

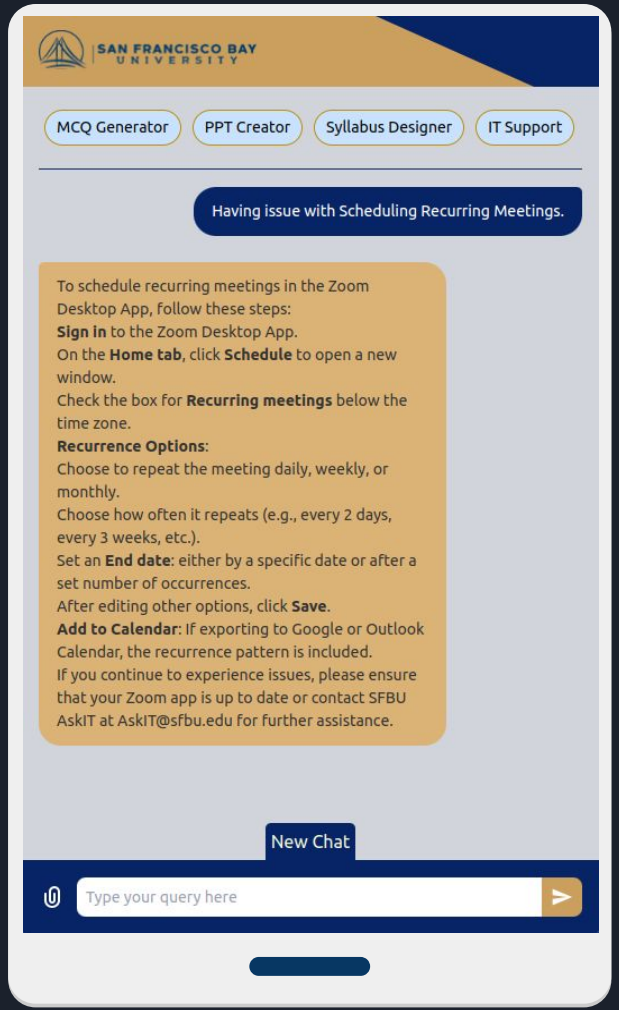
- Topic: Quantum Computing Ethics - Activities: Discussion on Ethical Implications, Privacy Concerns, Future Prospects

Final Review and Assessment --- This syllabus is designed to provide a comprehensive introduction to Quantum Computing for beginners within the 4-month semester duration, covering essential topics and ensuring logical progression throughout the course.

IT Support Assistant!

Our chatbot is equipped to tackle IT support issues efficiently.

From troubleshooting to guidance, it ensures seamless tech support at your fingertips!



Future Enhancement

- Multiple Output format
- Integration with Learning Management Systems (LMS)
- Analysis Dashboard

Thank you!

Any queries?

Ask our Bayhawk Bot!!