

AI BACKGROUND

Bookings & Appointments Automation Agent

A Python-based intelligent system powered by LangChain & Gemini

OVERVIEW

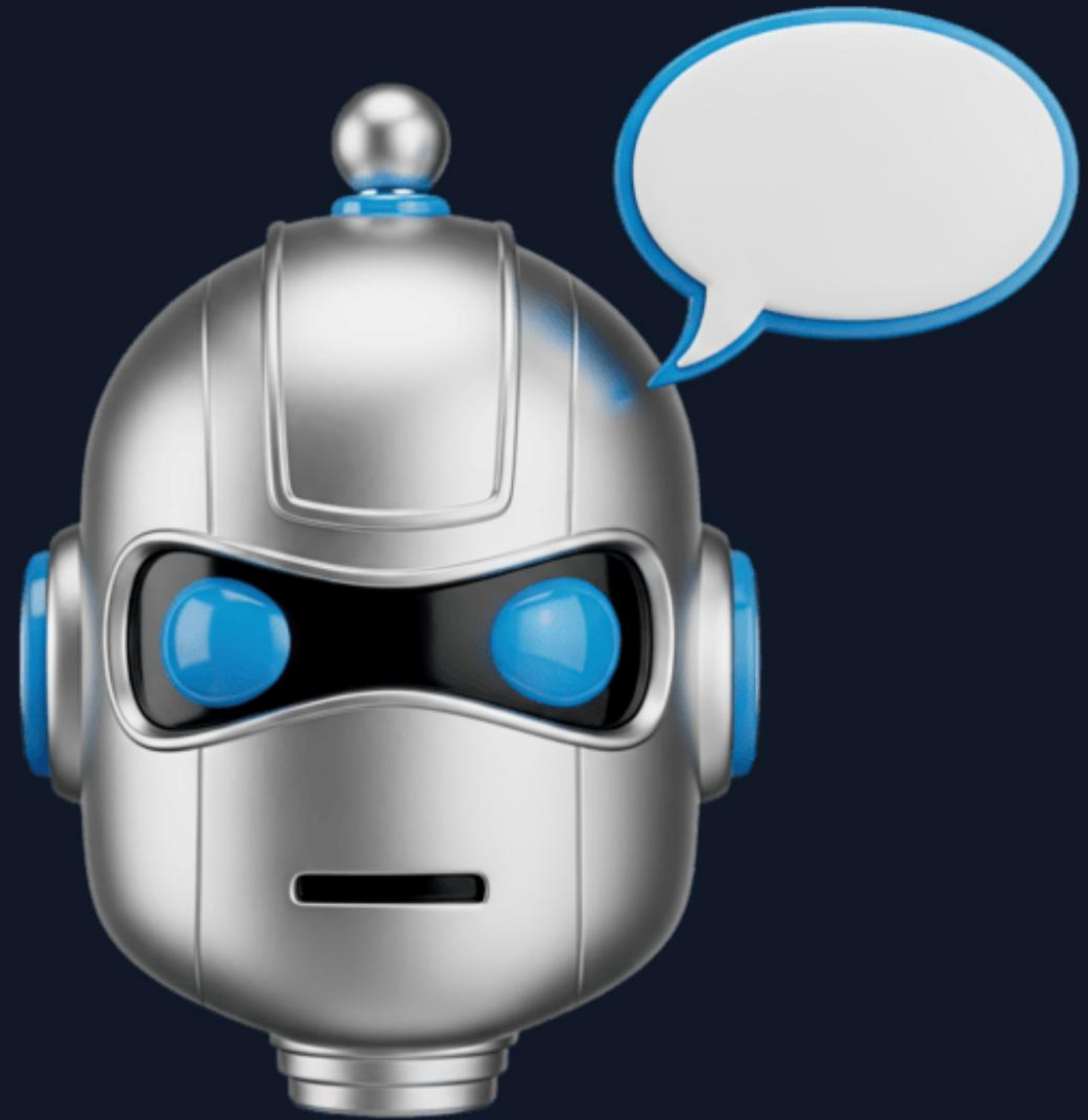
Project **Executive Summary**

An advanced demonstration of using LLMs to handle complex, stateful interactions for scheduling, integrated directly with real-world APIs.

Intelligent Automation

This agent acts as a 24/7 scheduling assistant. It understands natural language, allowing users to book, check, or cancel appointments through a conversational interface.

- ✓ **AI-Powered:** Leverages Google Gemini 2.0 Flash.
- ✓ **Fully Integrated:** Connects to Zoom & Email via SMTP.
- ✓ **Stateful:** Remembers context via LangChain.



| System Architecture

Backend Core

Built on **Flask**, serving as the lightweight web server. It creates the REST API endpoints that the frontend consumes and manages the application lifecycle.

```
app = Flask(__name__)  
@app.route('/api/message')
```

AI & Data

LangChain orchestrates the reasoning loop, connecting the **Google Gemini** model to custom tools. **SQLite** provides persistent storage for appointment records.

```
llm.bind_tools([book, check, cancel])
```


| The Brain: Google Gemini

The core intelligence is driven by the ChatGoogleGenerativeAI model. It is configured with a strict **System Message** that defines its persona and operational rules.

Key Configuration

- **Model:** gemini-2.0-flash (Optimized for speed/cost).
- **Temperature:** 0.1 (Low randomness for reliability).
- **Tools:** Bound directly to the LLM for autonomous execution.



| Core Capabilities



Smart Booking

Parses natural language dates and times (e.g., "next Friday at 2pm") into standardized ISO formats for storage.



Status Check

Retrieves existing appointments based on user email validation, formatting the output into a readable list.



Cancellation

A safe, atomic operation that removes records by email and triggers an immediate confirmation notification.

Booking Logic Engine

The book_appointment tool is the most complex function. It orchestrates multiple services in a synchronous workflow to ensure data consistency.

1. **Validate:** Checks Name, Email, Date, Time.
2. **Store:** Saves to SQLite appointments.db.
3. **Link:** Calls Zoom API to generate meeting URL.
4. **Notify:** Sends SMTP email with details.

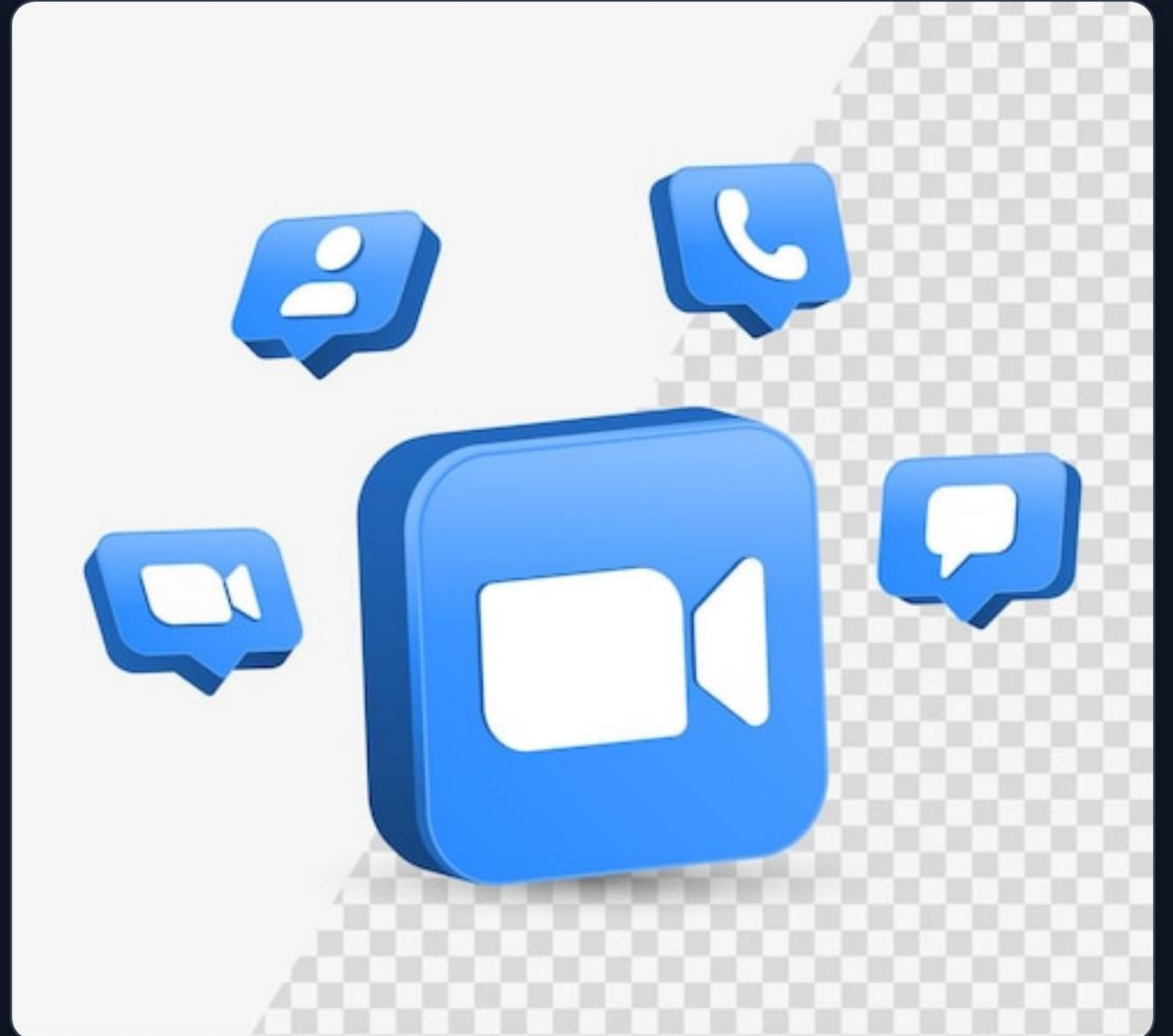


Zoom API Integration

Seamless video conferencing creation is handled via Server-to-Server OAuth.

create_meeting()

1. Authenticates using Client ID/Secret.
2. POSTs to `/users/me/meetings`.
3. Parses JSON response.
4. Returns the `join_url`.



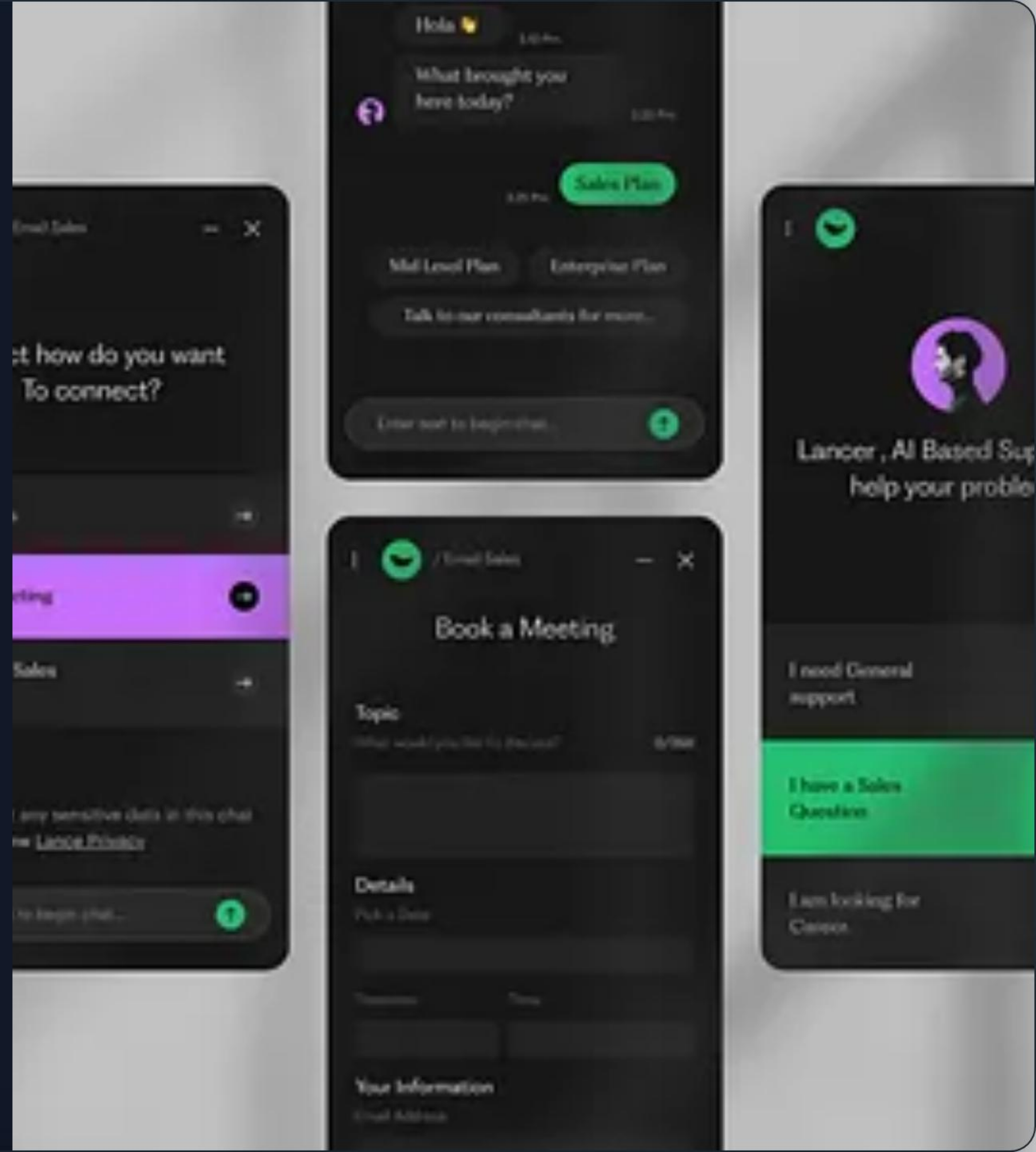
Data Persistence Schema

FIELD NAME	TYPE	CONSTRAINT	DESCRIPTION
id	INTEGER	PRIMARY KEY	Unique identifier (Auto-increment).
name	TEXT	NOT NULL	Full name of the user.
email	TEXT	NOT NULL	Used for lookups and notifications.
date / time	TEXT	NOT NULL	Stored in standardized format.
purpose	TEXT	NOT NULL	Context for the meeting topic.

| Frontend Interface

The user interface is a clean, responsive chat window served by Flask's `render_template`.

It uses JavaScript to handle asynchronous POST requests to the backend API, updating the chat history dynamically without page reloads. The design focuses on readability and simplicity.



| Future Roadmap



Voice Input

Integration with STT/TTS for voice-based booking calls.



G-Cal Sync

Real-time two-way sync with Google Calendar availability.



Multi-Agent

Support for booking with multiple different departments.



Analytics

Dashboard for tracking booking volume and purposes.



Questions?

Thank you for your time.

Get the code on GitHub

github.com/danyalshinwari

Image Sources



https://static.vecteezy.com/system/resources/thumbnails/066/199/957/small_2x/robot-head-with-blank-speech-bubble-3d-icon-for-ai-communication-or-chatbot-interface-isolated-render-for-virtual-assistant-placeholders-tech-support-visuals-futuristic-graphic-png.png

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