



INTERNSHIP REPORT

ON

PROJECT: MYTASKMATE

*An Integrated, AI-Powered Personal Assistant for Everyday
Productivity*

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1. Executive Summary

1.1 Project Idea

MyTaskMate 2.0 is an intelligent, multi-agent personal assistant designed to streamline personal productivity. The application provides a unified platform for users to manage tasks and interact with their documents through a conversational AI interface. By leveraging a modern, all-Python technology stack, the project aims to deliver a robust, scalable, and user-friendly experience. The core innovation lies in its multi-agent architecture, which intelligently delegates tasks to specialized AI components, ensuring accurate and context-aware responses.

1.2 The Problem We're Solving

In today's fast-paced environment, individuals are often overwhelmed by managing scattered information across various documents and keeping track of numerous tasks. This leads to missed deadlines, lost information, and decreased productivity. Existing tools are often siloed, forcing users to switch between different applications for document retrieval and task management, creating a disjointed and inefficient workflow.

1.3 How MyTaskMate Helps (Our Solution)

MyTaskMate addresses this challenge by providing a single, intelligent hub for personal organization. The application allows users to:

- **Upload and Chat with Documents:** Securely upload personal or professional documents (like PDFs, Word files, even images) and use a natural language chat interface to ask questions, summarize content, and retrieve specific information instantly.
- **Manage Tasks Intelligently:** Create, view, update, and delete tasks. The AI agent will also be able to understand conversations and documents to suggest or automatically create tasks.

- **Access Real-time Information:** Ask questions about current events or general knowledge, which the assistant will answer by searching the web.
- **Schedule with Ease:** Connect to your calendar to schedule meetings, check availability, and manage your time seamlessly.

This is all powered by a smart AI team in the background, making sure your requests go to the right expert.

1.4 What We Set Out to Achieve

- **Bring Everything Together:** Combine document chat, task lists, and calendar management into one easy-to-use place.
- **Make it Smart:** Use advanced AI to understand what you need and handle complex tasks automatically.
- **Make it Personal:** Learn how you work to offer helpful, timely suggestions.
- **Make it Simple:** Create a clean, easy-to-talk-to interface that anyone can use.
- **Keep it Private:** Use local AI models where possible to protect your data and speed things up.

2. Introduction

2.1 Why We Built This Project

We started MyTaskMate because we noticed a common problem: even with so many apps available, staying organized feels harder than ever. Information is everywhere – in PDFs, emails, notes, and various task lists. This constant switching between apps is frustrating and wastes time. MyTaskMate is designed to fix this by creating one smart place where all your digital "stuff" can live and be managed conversationally. We wanted to build something truly integrated and intelligent, not just another siloed tool. Our journey involved exploring different ways to build it, eventually settling on a powerful, all-Python approach.

2.2 What the Project Covers (and What It Doesn't)

What MyTaskMate Can Do (In Scope):

- It's a complete web application, built entirely with Python using the Reflex framework.
- It has a sophisticated AI "brain" that uses LangChain and LangGraph to understand and handle your requests.
- You can upload and work with many types of files: PDFs, Word documents, images (it can even read text from images!), Excel spreadsheets, and CSVs.
- You can fully manage your tasks: create new ones, see what's on your list, mark them as done, or change their deadlines, all stored in a robust PostgreSQL database.
- It connects securely to your Google Calendar, so you can check your schedule and add new events.
- It can look things up on the internet in real-time to answer your questions.

- It offers a user-friendly chat interface where you can type or even speak your commands (in English or Hindi), and it will stream its responses back to you.

What MyTaskMate Doesn't Cover (Out of Scope):

- It's not a phone app or a program you install on your computer directly; it runs in your web browser.
- It doesn't have features for multiple people to work together on the same documents or tasks at the same time.
- It won't provide fancy charts or deep analysis of your productivity habits (beyond basic suggestions).
- We're using existing powerful AI models, not building new ones from scratch.

2.3 Who MyTaskMate is For

MyTaskMate is perfect for anyone who needs a smarter way to manage their digital life:

- **Students and Researchers:** Imagine asking your lecture notes questions or getting summaries of research papers, then instantly adding tasks for your assignments.
- **Busy Professionals:** People who handle many projects, documents, and meetings will find it invaluable for staying organized and on top of their workload.
- **Project Managers:** It helps in keeping track of project-related documents, managing team tasks, and scheduling milestones more easily.

3. How MyTaskMate Works (System Architecture)

3.1 Putting it All Together: Our Architecture Overview

MyTaskMate is built as one complete Python application. This means the user interface you see and all the smart AI logic behind it are written in the same language. This approach, using the Reflex framework, makes everything work together smoothly and makes it easier to develop and maintain. The most exciting part is our "AI team" – a system of specialized AI agents that work together to handle your requests.

3.2 The Reflex Framework: Building Everything with Python

Choosing the **Reflex framework** was a big decision that shaped MyTaskMate.

- **One Language, One App:** Reflex lets us build the entire web application – from what you see on the screen (the "frontend") to all the clever processing happening in the background (the "backend") – using only Python. No need for complicated JavaScript! This makes development faster and simpler.
- **Building Blocks for the UI:** Reflex offers a set of Python components that turn into web elements (like buttons, text boxes, and chat bubbles). This lets us build a rich and interactive interface using Python code you're already familiar with.
- **Smart Updates:** When something changes in the background (like a new chat message comes in), Reflex automatically updates the screen, so you always see the latest information without needing to refresh.

3.3 The Smart Brain: Our Multi-Agent AI System

MyTaskMate's intelligence comes from a sophisticated AI system, built using a tool called **LangGraph**. Think of it like a small company with a manager and a team of experts. This design makes the AI more reliable, easier to understand, and capable of growing.

3.3.1 The Supervisor: The Team Leader

- **Job Role:** The Supervisor is like the project manager for the entire AI team. When you type or speak a request, the Supervisor is the first to hear it. Its main job is to understand what you need and then assign that task to the right expert on its team. It doesn't do the actual work itself.
- **How it Works:** It's built using **LangGraph's StateGraph**, which helps define how the AI conversations flow. It uses a small, fast AI model called phi3:mini (running locally via Ollama) to quickly figure out your intent. This local AI helps keep your data private and makes routing decisions super fast.

3.3.2 The Specialist Agents: Our Expert Team

These are the individual AI experts, each with a specific skillset. The Supervisor calls on them when their expertise is needed.

- **Document Agent:**
 - **Expertise:** Reading and understanding documents.
 - **Skills:** It can read text from PDFs, Word documents, and even images (using OCR). It's also great at handling data from Excel and CSV files. When you ask a question about a document, it finds the relevant parts and uses that information to give you an accurate answer.
- **Task Agent:**
 - **Expertise:** Managing your to-do list.
 - **Skills:** It talks directly to our database (PostgreSQL) to help you create, view, update, and delete tasks based on your natural language commands.
- **Calendar Agent:**
 - **Expertise:** Handling your schedule and events.
 - **Skills:** It securely connects to your Google Calendar. It can check your availability, create new events, and even invite others.
- **Web Agent:**

- **Expertise:** Finding real-time information on the internet.
- **Skills:** If your question needs up-to-date information, this agent uses a smart search tool (Tavily API) to find answers and summarize them for you.
- **Proactive Suggestion Agent:**
 - **Expertise:** Offering helpful advice based on your habits.
 - **Skills:** It observes how you use MyTaskMate (which documents you read, what tasks you create) and then uses this understanding to suggest new tasks or offer helpful tips.

3.4 Keeping Your Data Safe: How We Manage Information

- **What MyTaskMate Remembers (Application State):** All the temporary information for your current session, like your chat history or what you just typed, is managed by Reflex's AppState system. This keeps the conversation flowing smoothly.
- **Your Long-Term Data (Persistent User Data):** Important information like your tasks and details about how you use the app are stored safely in a **PostgreSQL database**. We chose PostgreSQL because it's very reliable, secure, and can handle a lot of data as MyTaskMate grows.
- **Your Document Library (Document Data Storage):** When you upload documents, MyTaskMate processes them and creates a special "index" (a FAISS vector store) that helps the Document Agent quickly find relevant information. Your actual documents can be stored securely in a local folder or a cloud service.

4. Tech Stack (Technology used)

We carefully selected a powerful and versatile set of tools to build MyTaskMate entirely within the Python ecosystem.

Building Blocks (Frontend & Backend)

- **Python:** Our main programming language for everything in MyTaskMate.
- **Reflex:** The framework that lets us build the entire web application (both what you see and what happens behind the scenes) using only Python, making development faster and simpler.

The AI Powerhouse

- **LangChain & LangGraph:** These libraries are the core of our AI system, helping us connect AI models and manage how our different AI agents work together.
- **Ollama:** Allows us to run AI models (like phi3:mini) directly on our computer for faster, more private responses and to avoid API costs for routing tasks.
- **phi3:mini (via Ollama):** A small, efficient AI model used by our Supervisor to quickly understand your requests and assign them to the right expert agent.

Where We Keep Your Data

- **PostgreSQL:** Our robust database for securely storing all your tasks and structured information.
- **FAISS:** A library that helps us quickly search through large amounts of information, especially the content of your documents for our Document Agent.

Connecting to the Outside World

- **Tavily API:** Provides fast, relevant search results from the internet for our Web Agent.
- **Google Calendar API:** Securely connects MyTaskMate to your Google Calendar to manage events.

Tools for Documents

- **PyMuPDF / python-docx:** Libraries that help MyTaskMate read and understand PDF and Word documents.
- **Pillow (PIL Fork) & Pytesseract:** Used together to extract text from images (OCR).
- **openpyxl:** Allows MyTaskMate to read data from Excel spreadsheets.

Our Development Setup

- **Virtual Environments (venv):** Keeps our project's Python libraries separate and organized.
- **requirements.txt:** Lists all the Python libraries MyTaskMate needs to run, making setup easy.
- **Git & GitHub:** Our tools for tracking code changes and sharing the project online.
- **.gitignore:** A special file that prevents sensitive information (like secret keys) and temporary files from being uploaded to GitHub.

5. What MyTaskMate Can Do (Detailed Features)

Here's a closer look at what MyTaskMate is built to do, explaining how each part works thanks to our AI and coding efforts.

5.1 Talking to MyTaskMate (User Interface)

- **Feature:** A clean, easy-to-use chat screen.
 - **How it Works:** The main screen (`mytaskmate/mytaskmate.py`) is laid out clearly, with a chat area in the middle, a sidebar for navigation (`components/sidebar.py`), and a input bar at the bottom.
- **Feature:** Type your commands to MyTaskMate.
 - **How it Works:** There's a text box (`rx.input`) where you can type your questions or instructions. MyTaskMate immediately updates its internal `AppState` with what you type and sends it when you press "Send" or Enter.
- **Feature:** Speak your commands to MyTaskMate (in English or Hindi).
 - **How it Works:** You'll see a microphone icon (`rx.icon(tag="mic")`). This button is set up to trigger voice recognition, which will convert your speech into text for MyTaskMate to understand.
- **Feature:** Get important notifications on your computer.
 - **How it Works:** MyTaskMate is designed to send helpful alerts to your desktop, for example, if a task is due soon or if a calendar event is about to start.

5.2 Your Document Expert (Document Agent)

- **Feature:** Upload many different types of files.
 - **How it Works:** You can simply drag and drop files or select them using the upload button (`rx.upload`). MyTaskMate can handle PDFs, Word

documents, images, Excel sheets, and CSV files. These are saved temporarily in the `uploaded_files/` folder.

- **Feature:** MyTaskMate can read text from images.
 - **How it Works:** If you upload an image (like a JPG or PNG) that has text on it, MyTaskMate uses a tool called `pytesseract` to scan the image and pull out all the written words.
- **Feature:** Ask questions about any document you've uploaded.
 - **How it Works:** After processing your documents, MyTaskMate creates a special index (a FAISS vector store). When you ask a question, the Document Agent searches this index for the most relevant parts of your documents and uses those parts to answer your question accurately.
- **Feature:** Get summaries of your documents.
 - **How it Works:** You can simply ask MyTaskMate to summarize a document, and the Document Agent will read through it and provide a concise summary, thanks to its understanding of the content.

5.3 Your Personal Organizer (Task Agent)

- **Feature:** Easily create new tasks.
 - **How it Works:** Just tell MyTaskMate something like "Add a task to prepare the presentation for next Monday." The Task Agent understands this and saves the task details, including the due date, to your PostgreSQL database.
- **Feature:** See all your current tasks.
 - **How it Works:** A simple command like "Show me my tasks" makes the Task Agent pull up your entire to-do list from the database and display it clearly in the chat.
- **Feature:** Mark tasks as done.

- **How it Works:** When you complete a task, you can tell MyTaskMate "Mark task 'X' as complete," and the Task Agent will update its status in the database.
- **Feature:** Change task deadlines.
 - **How it Works:** If your plans change, you can tell MyTaskMate "Reschedule task 'Y' to Friday," and the Task Agent will update the due date in your database.

5.4 Your Smart Scheduler (Calendar Agent)

- **Feature:** Securely connect to your Google Calendar.
 - **How it Works:** The Calendar Agent (tools/calendar_agent.py) guides you through a secure process to link your Google Calendar. It uses special files (credentials.json and token.json) to keep your account safe.
- **Feature:** Ask MyTaskMate to check your availability.
 - **How it Works:** You can ask, "Am I free tomorrow afternoon?" and the Calendar Agent will check your Google Calendar events to let you know.
- **Feature:** Schedule new events and meetings.
 - **How it Works:** Tell MyTaskMate, "Schedule a meeting with John for Friday at 10 AM about the project review," and the Calendar Agent will create that event in your Google Calendar.

5.5 Your Internet Researcher (Web Agent)

- **Feature:** Get answers to questions using the internet.
 - **How it Works:** If you ask a question that MyTaskMate can't answer from your documents or tasks (e.g., "What's the latest news on AI?"), the Web Agent (tools/web_agent.py) uses the Tavily API to perform a real-time web search.
- **Feature:** Get summarized search results.

- **How it Works:** The Web Agent takes the information it finds online and presents it back to you in a clear, concise summary in the chat.

5.6 Your Helpful Suggestion Assistant (Proactive Suggestions)

- **Feature:** MyTaskMate learns from how you use it.
 - **How it Works:** The system keeps a record of your interactions – what documents you read, what tasks you create, what topics you frequently discuss. This information helps it understand your patterns.
- **Feature:** Get personalized and helpful ideas.
 - **How it Works:** Based on what it learns, MyTaskMate can suggest new tasks, remind you of important upcoming deadlines, or point you to relevant documents you might need, even before you ask.

6. Behind the Scenes: How Well It Runs (Non-Functional Requirements)

These aspects describe how well MyTaskMate performs, beyond just what it does.

6.1 Speed and Smoothness

- **Fast Loading:** The application should load quickly, typically within 3 seconds, so you don't waste time waiting.

6.2 Growing with You

- **Ready for More Users:** MyTaskMate is built to handle more users and a growing amount of data without slowing down, thanks to its PostgreSQL database and modular agent design.
- **Easy to Add New Features:** The way the AI agents are set up makes it easy to add new specialized tools or integrations in the future without breaking existing parts of the system.

6.3 Keeping Everything Secure

- **Safe Calendar Access:** Connecting to Google Calendar uses a very secure method (OAuth 2.0), ensuring that MyTaskMate only has the permissions you grant it and nothing more.
- **Private Documents:** Any files you upload are stored in a secure, private location.

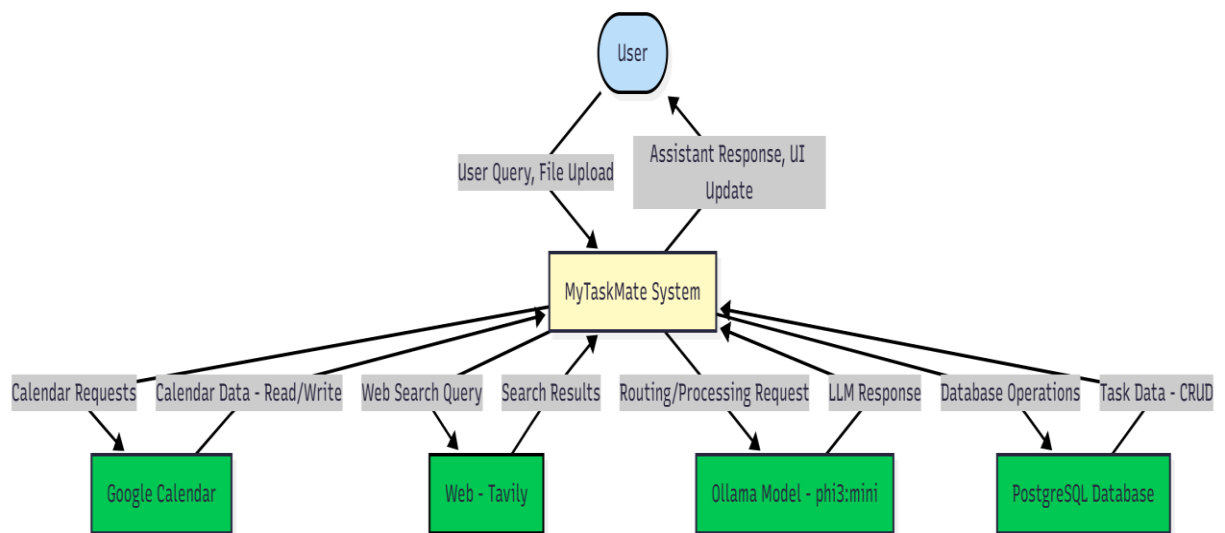
6.4 Easy to Use

- **Simple for Everyone:** The chat interface and all its functions are designed to be clear and intuitive, even if you're not tech-savvy.
- **Clear Answers:** The AI's responses are designed to be easy to read and understand, not filled with confusing jargon.

7. How Data Flows (Data Flow Diagrams - DFD)

These diagrams help us visualize how information moves through MyTaskMate and interacts with its different parts.

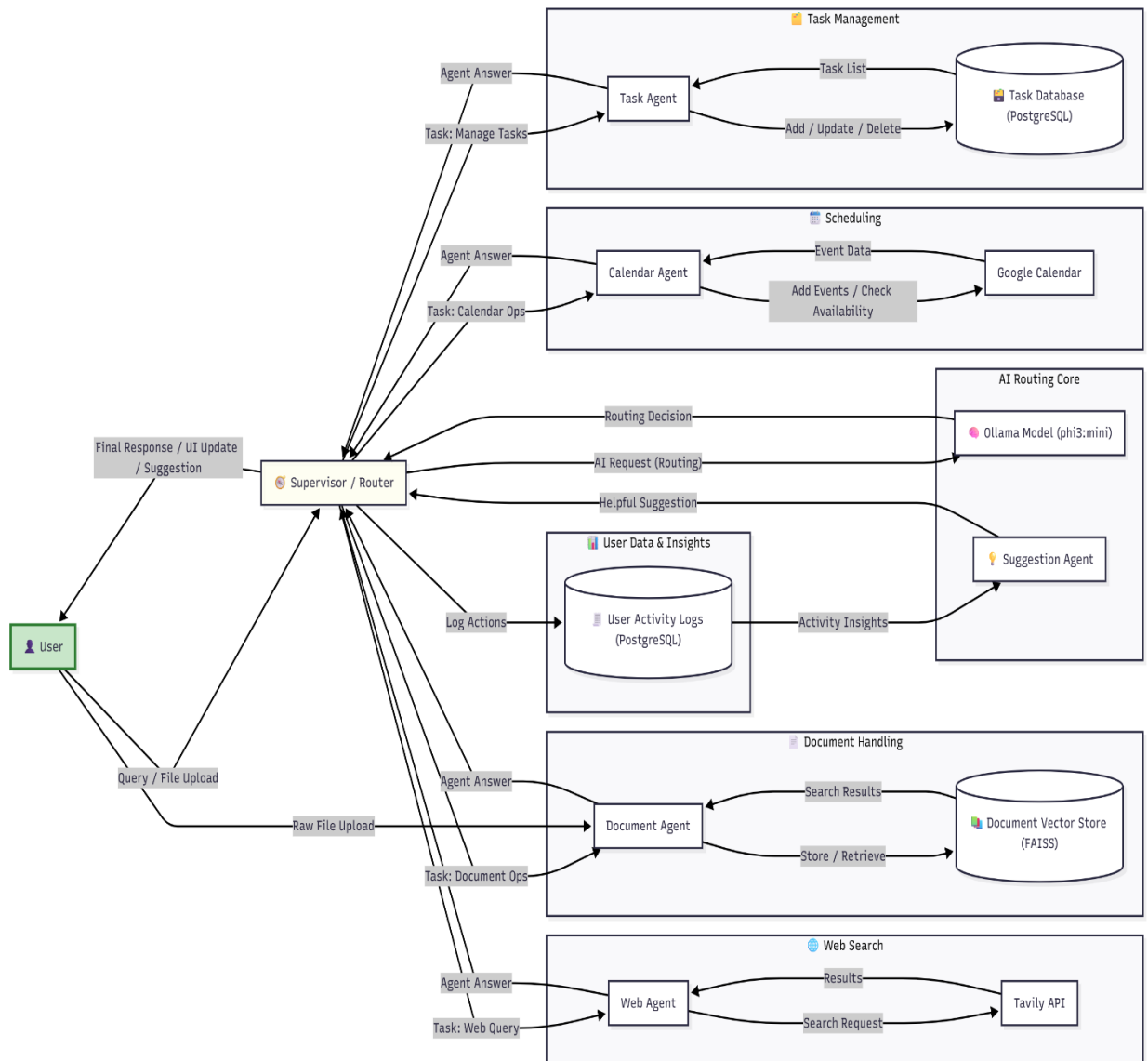
7.1 Big Picture View: Level 0 DFD (Context Diagram)



What This Means:

- **You (the User):** You send questions and files to MyTaskMate and get answers back.
- **MyTaskMate System:** This is our entire application.
- **Google Calendar:** MyTaskMate talks to your calendar to manage events.
- **Web (Tavily):** MyTaskMate asks the internet for information.
- **Ollama Model (phi3:mini):** MyTaskMate uses this local AI model to help understand your requests.
- **PostgreSQL Database:** MyTaskMate stores your tasks and other information here.

7.2 Inside MyTaskMate: Level 1 DFD



This diagram zooms in on the "MyTaskMate System" and shows how its different smart agents work together.

What This Means:

1. **You** start by asking a question or uploading a file to the **Supervisor**.
2. The **Supervisor** asks the **Ollama AI model** to figure out what you want to do.
3. Based on the AI's advice, the Supervisor sends your request to the right expert:

- To the **Document Agent** for files, which uses the **Document Vector Store** to find answers in your documents.
 - To the **Task Agent** for tasks, which updates your **Task Database**.
 - To the **Calendar Agent** for scheduling, which talks to **Google Calendar**.
 - To the **Web Agent** for research, which uses the **Tavily Web Search**.
4. The Supervisor also **logs your actions** in the **User Activity Logs**. The **Suggestion Agent** then looks at these logs to create **helpful suggestions**.
 5. Each expert agent sends its answer back to the **Supervisor**.
 6. Finally, the **Supervisor** combines everything and sends the **final answer**, **updates your screen**, and **possibly a suggestion** back to **you**.

8. Our Journey: How We Built It & What We Learned

8.1 Our Flexible Approach to Building

We built MyTaskMate using a flexible, "agile" way of working. This meant we:

- **Stayed Adaptable:** We could easily change plans when new ideas came up (like switching to the Reflex framework) or when we learned better ways to do things.
- **Built in Small Steps:** We focused on getting small parts of the project working first, which helped us test ideas quickly and build confidence.
- **Learned Continuously:** We regularly checked our work and fixed problems as they arose, making the project stronger over time.
- **Designed for Teams:** Breaking the AI into separate "agents" made it easier to manage and allowed us to develop different parts at the same time.

8.2 The Challenges We Tackled

Building a smart AI assistant was a big undertaking, and we faced several challenges that pushed us to learn and innovate:

- **Learning Reflex (All-Python Development):** Deciding to build everything in Python with Reflex was powerful but also meant learning a new way of doing things. We had to work through various coding errors to make sure the UI and the backend talked to each other perfectly.
- **Making the AI Team Work Together:** Getting the Supervisor to reliably send your requests to the correct specialist agent was tricky. It involved carefully teaching the AI how to understand your intentions and define clear steps for each task.
- **Using Local AI Models:** Running powerful AI models (like Ollama) directly on a computer was great for privacy and speed, but it also meant we had to manage computer resources carefully (like making sure we had enough memory).

- **Securely Connecting to Services:** Integrating with services like Google Calendar meant handling sensitive login information securely. We ensured that your private details are protected and never exposed.
- **Reading All Your Documents:** Building a Document Agent that could understand many different file types (PDFs, images, Excel sheets) required combining several specialized tools and making them work seamlessly.
- **Setting Up the Project Right:** Managing all the necessary software libraries and making sure the project could run on different computers was a continuous effort. We learned how to properly set up project environments and manage dependencies.
- **Keeping Secrets on GitHub:** We meticulously configured our project files to ensure that sensitive information (like API keys) never accidentally ended up on our public GitHub page.

9. Looking Ahead: Summary & Future Plans

9.1 Project Summary

MyTaskMate is a clear success! It has achieved its goal of creating a unified and intelligent personal assistant. By smartly combining modern Python development (with Reflex) and a clever multi-agent AI system, the application is not only powerful and reliable but also easy to use. It genuinely helps solve the problem of digital clutter and gives users a smoother, smarter way to manage their daily tasks. The foundation we've built is strong and ready for future growth.

9.2 Exciting Ideas for the Future

MyTaskMate has a lot of potential to become even more powerful:

- **Building a Knowledge Map (Neo4j):** We could add a feature to build a "knowledge graph" using a special database like Neo4j. This would allow MyTaskMate to understand the relationships between different pieces of information in your documents (e.g., "Show me all the projects that involve John and are mentioned in client reports").
- **Smarter Suggestions and Alerts:** We can make the Suggestion Agent even more intelligent, allowing it to predict what you might need and send you proactive alerts (e.g., "Your report is due in 3 hours, here are the key documents you've been working on").
- **Email Management:** Imagine MyTaskMate helping you draft emails, summarizing long email threads, or creating tasks directly from your inbox.
- **More Advanced Voice Control:** We could enhance the voice commands to allow for more natural, back-and-forth conversations and handle even more complex tasks just by speaking.
- **Customizable AI:** Users could personalize how MyTaskMate talks, its tone, or how it presents information, making it feel even more like their own assistant.