

## Introduction

Our project uses recent breakthroughs in large language models and natural language processing to craft an expert chatbot for pilot training. Utilizing legacy documents, it parses PDF scans, allowing users to inquire about training procedures and aircraft operations using natural language questions. This facilitates seamless cross-referencing of data, enhancing the learning experience for pilots.

## Methodology

**Front end:** Our frontend utilized HTML5 for semantic structuring, CSS for layout styling, and JavaScript for dynamic functionality. Figma was employed for wireframing and prototyping. We opted for a minimalist, modern design with two main pages: a homepage featuring greeting, about, how-it-works sections, and a questions form, and a separate chatbot page for user interaction.

**Backend:** Django API connects UI, database, and AI chatbot, facilitating communication between them. It uses HTTP requests for the UI, Django ORM for CRUD operations on the database, and integrates with the chatbot app for NLP.

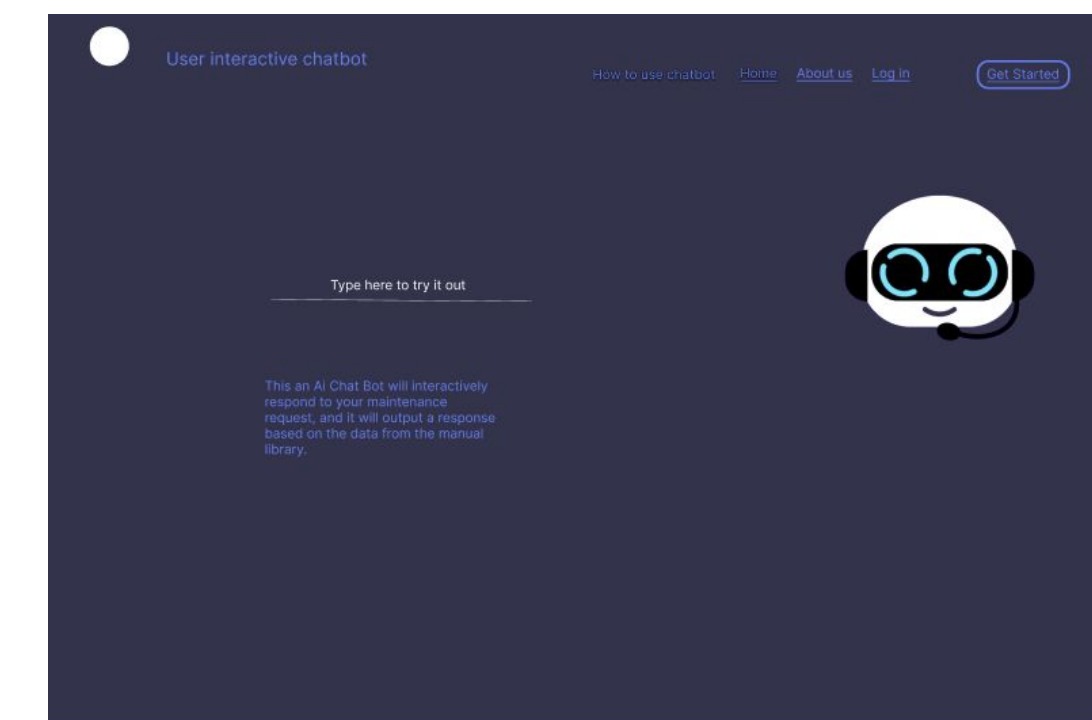
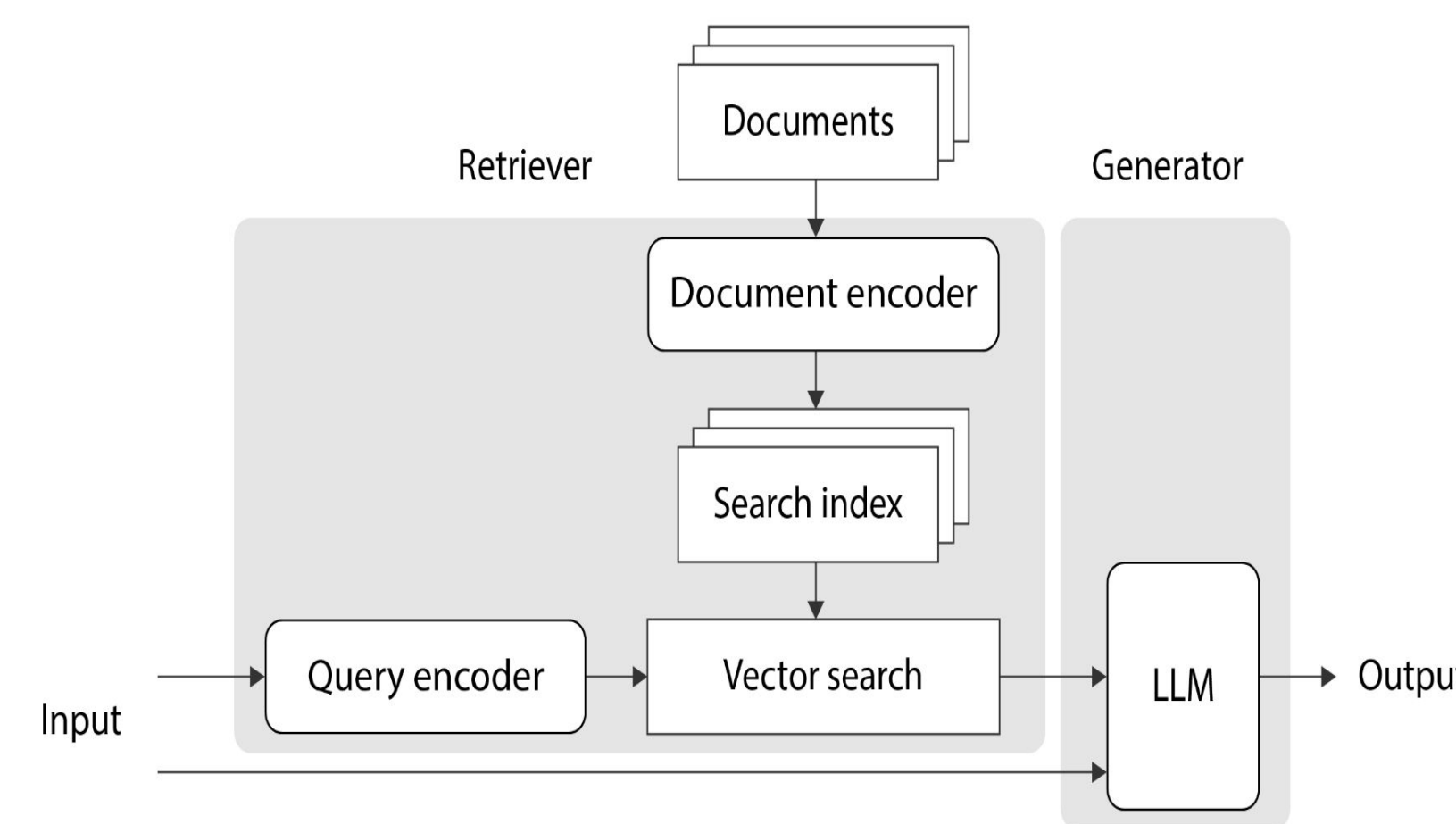
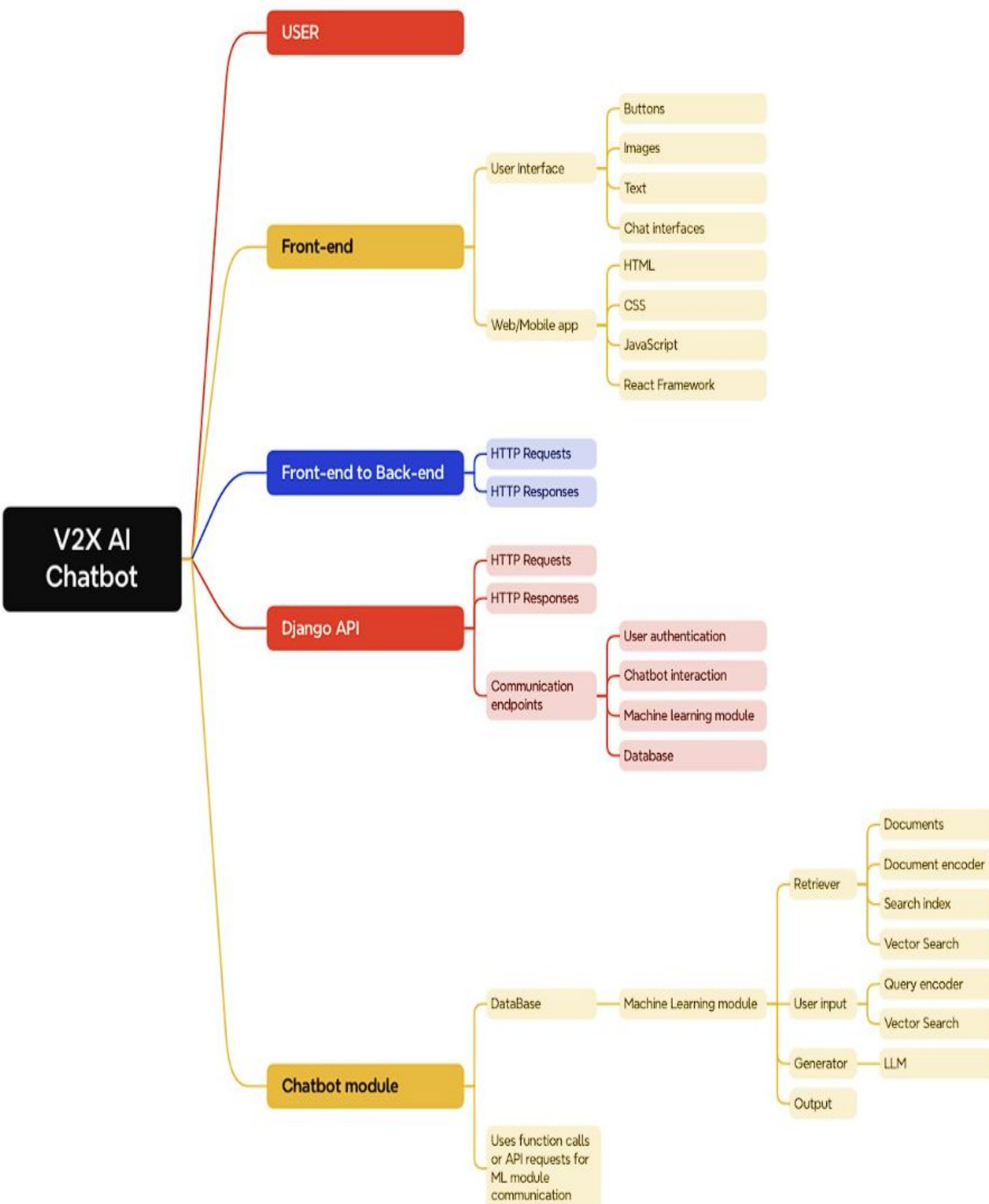
**Machine Learning:** We built Retrieval augmented generation system the system leverages pilot manuals as a knowledge base and feeds query results into the language model in order to respond to the user in a natural and factually accurate manner.

## Results

**Front end:** We created a minimalist, modern web frontend tailored for user interaction. It not only provides a sleek interface for users but also integrates seamlessly with a chatbot feature.

**Backend:** We Successfully embedded Front-end HTML files and are currently Awaiting for ML team files and debugging code issues.

**Machine Learning:** We integrated a RAG system to generate natural responses from text documents. Extracting text from PDFs was a challenge as they were scans of images, but to overcome this, we employed a text object detection to OCR system for accurate extraction of manual contents.



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Customer reviews here “



## Conclusion

In the two semesters we learned how to successfully implement a end to end machine learning pipeline connected to web application that can provide users with the ability to converse with a knowledge base composed of legacy documents. While we were able to successfully ingest textual information one limitation to the project was the ability for the Large Language Model to reason over figures, charts, and tables, In the future with a recent advancement in multimodal language models such as LLaVa and Chat GPT 4 Vision. This hurdle can be overcome to deliver a more holistic ability of question answering.