



# Streamlit-Based Document Q&A System with Google Gemini

This system offers AI-powered Q&A for PDF and TXT documents, allowing users to upload files, ask questions, and receive AI-generated answers. It also supports PDF summarization and maintains a chat history for efficient, interactive document exploration.

# Key Features Overview



## File Upload & Processing

Seamlessly upload and process both PDF and TXT documents.



## AI-Driven Q&A

Leverages Google Gemini models for precise question answering.



## PDF Summarization

Quickly condense lengthy PDF content into digestible summaries.



## Chat History Retention

Maintains a record of all user interactions for continuity.



## User-Friendly Interface

Built with Streamlit for a secure and intuitive web experience.

# Technology Stack

## Frontend & Web Framework

- **Streamlit:** Python-based framework for rapid web application development.
- **Interactive UI:** Enables dynamic and responsive user interfaces.

## Document Processing

- **PyPDF2:** Library for robust PDF text extraction and parsing.
- **Text Parsing:** Handles raw text files (TXT) efficiently.

## AI & Language Models

- **Google Gemini:** Advanced LLMs for natural language understanding and generation.
- **Contextual AI:** Powers intelligent Q&A and summarization.

## Data Retrieval

- **Vector Search:** Facilitates semantic search for relevant document context.
- **Efficient Indexing:** Ensures fast and accurate information retrieval.

# Document Processing Workflow



## 1. File Upload

Users securely upload PDF or TXT files via the Streamlit interface.



## 2. Text Extraction

Content from PDFs is extracted using PyPDF2 or OCR; TXT files are directly parsed.



## 3. Text Chunking & Embedding

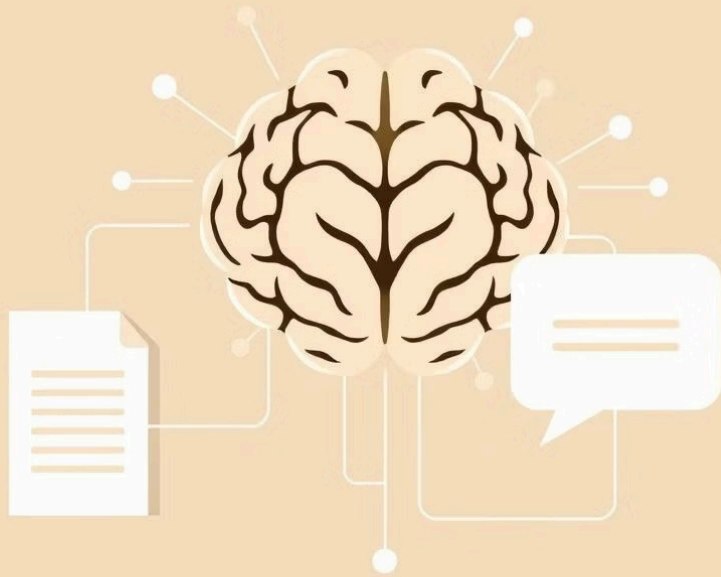
Extracted text is divided into manageable chunks and converted into embeddings for semantic search.



## 4. Vector Store Indexing

Document content is indexed in a vector store for rapid and accurate retrieval during queries.

# AI Integration with Google Gemini Models

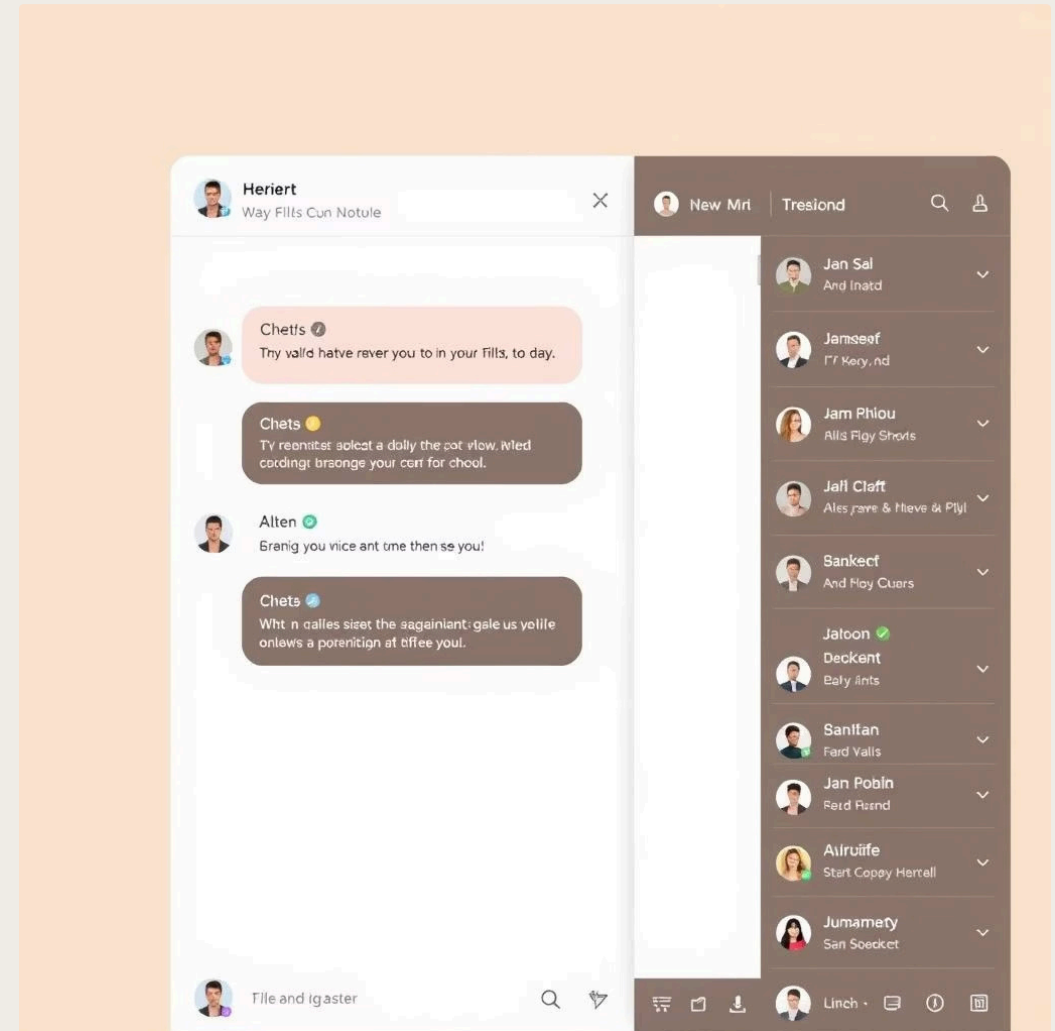


- Queries are enhanced with relevant document context before being sent to Gemini LLM.
- Gemini generates precise, **grounded answers** by relying on the uploaded documents, minimizing hallucination.
- The summarization feature quickly condenses complex PDF content into key insights.
- Enables **conversational and context-aware interactions**, making the Q&A process highly intuitive.

# Chat History & User Experience

The system maintains a **conversation buffer** that stores all previous Q&A exchanges. This allows users to easily review past questions and AI responses, ensuring continuity and context in multi-turn dialogues.

The Streamlit UI provides a **simple and clean interface** with a dedicated sidebar for file management and chat logs, ensuring a smooth and efficient user experience with **fast response times**.



# Comparison with Similar Tools

AI Model	Google Gemini (Cost-Efficient)	OpenAI GPT-3.5 (Higher Cost)
File Support	PDF & TXT	Mainly PDF
Key Features	Summarization, Chat History	Limited or None
Deployment	Easy with Streamlit	More Complex

# Summary & Next Steps

1

## AI-Powered Q&A

A Streamlit app enabling AI-powered Q&A on user documents, leveraging Google Gemini models for accuracy.

2

## Enhanced Functionality

Supports PDF summarization and maintains chat history, ideal for researchers and professionals.

3

## Future Enhancements

Plans include expanding file format support, UI enhancements, and integrating user authentication for security.