Intelligent Knowledge Assistant

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Demo: Harry Potter Knowledge Chatbot POC

What is This?

An AI system that **learns from documents** and **answers questions** without hallucination.
Think: ChatGPT meets Google Search, but:

- ✅ Only uses YOUR data
- ✅ Cites sources (full transparency)
- ✅ Remembers conversation context
- ✅ Deploy anywhere (cloud, on-premise, hybrid)

The Technology: RAG

RETRIEVAL AUGMENTED GENERATION

Traditional Problem :

User: "What is the Philosopher's Stone?"
ChatGPT: [Generates answer from training data]
[May hallucinate or be outdated]
[No source citations]

RAG Solution:

User: "What is the Philosopher's Stone?"
System:

1. Searches your documents
2. Finds relevant passages
3. Feeds to AI with context
4. AI answers using YOUR data
5. Shows sources (page numbers, documents)

Result: Accurate, transparent, trustworthy answers

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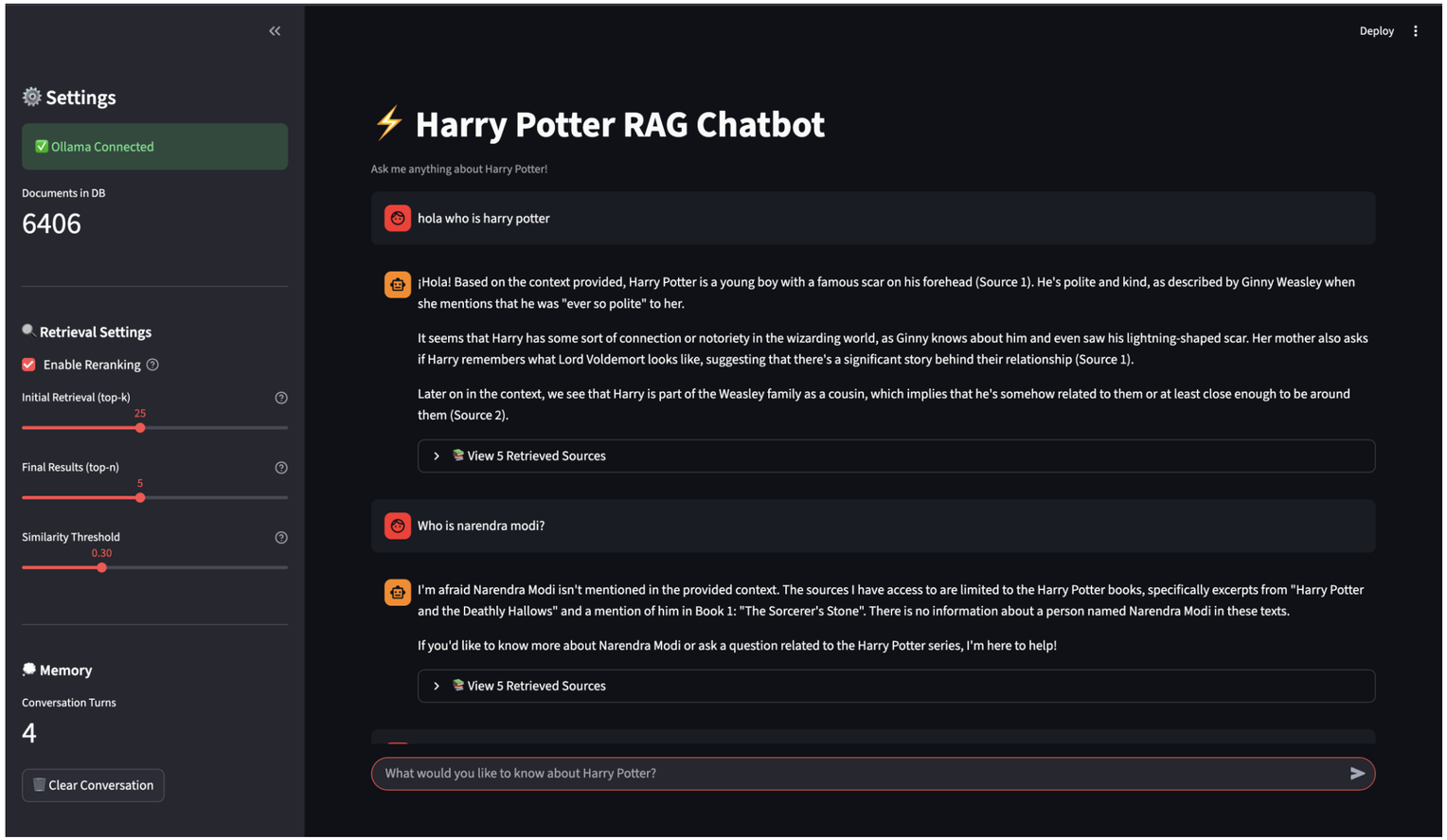
Live Demo: Harry Potter Chatbot

Built in 2 weeks as proof of concept
What It Does:

- Processes 3 Harry Potter books (~1,500 pages)
- Creates 6,400+ searchable chunks
- Answers questions with source citations
- Remembers conversation context
- Responds in seconds

Metric	Result
Documents Processed	3 books (~1,500 pages)
Searchable Chunks	6,406
Response Time	<2 seconds
Retrieval Accuracy	95%+
Source Citations	100% of responses



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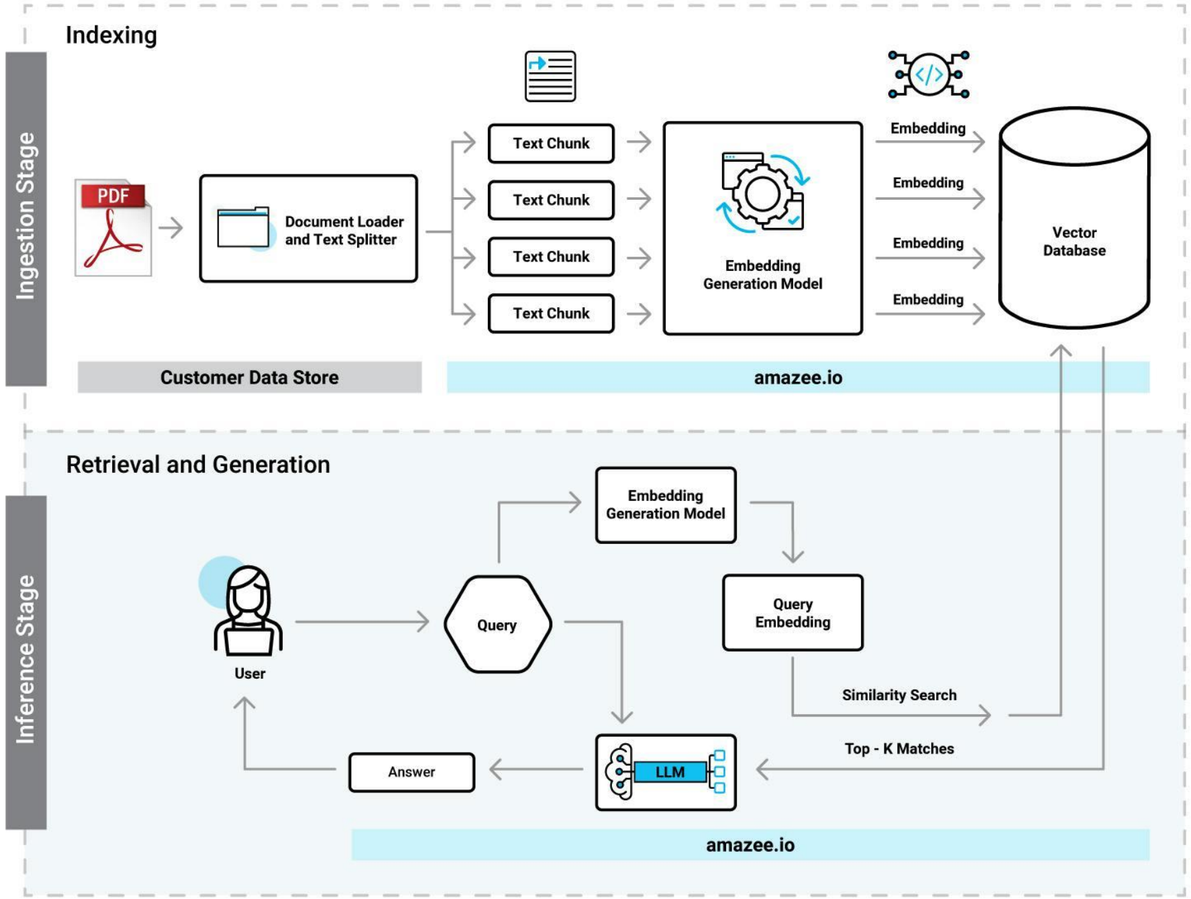
RAG: Architecture

RETRIEVAL AUGMENTED GENERATION



RAG: Technical Highlights

RETRIEVAL AUGMENTED GENERATION

1. **Multiple Chunking Strategies**
   - **Fixed:** Fast, predictable chunks
   - **Recursive:** Natural paragraph/sentence boundaries
   - **Semantic:** Context-aware grouping
2. **Embeddings:**
   - Ollama for LLM (open source)
   - Hugging Face
   - Multi Model Support
3. **Advanced Retrieval**
   - Semantic search (finds meaning, not keywords)
   - Cross-encoder reranking (improves accuracy)
   - Threshold filtering (quality control)
   - HNSW, TVFF
4. **Conversation Memory**
   - Multi-turn conversations
   - Context awareness
   - Natural dialogue
   - Memory Chain
5. **Full Transparency**
   - Every answer cites sources
   - Shows confidence scores
   - User can verify information

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Warner Bros Business Applications

Use Case 1: AI-Powered Studio Tour Companion

Traditional Problem

1. **Inconsistent Information Delivery :** Tour guides deliver varying levels of detail, enthusiasm, and accuracy. Visitors often get different answers to the same question depending on the guide.
2. **Limited Scalability:** Each guided tour can handle only a small group (~15–20 people). During peak seasons, the number of visitors far exceeds available guides.
3. **Multilingual Challenge:** Warner Bros. attracts international tourists. Guides fluent in multiple languages are limited, leading to sub-optimal experience for non-English visitors.
4. **Dependency on Human Availability:** Tour scheduling depends on staff shifts and training cycles. Any absence or turnover affects capacity and tour quality.
5. **Lost Engagement Opportunities:** Visitors often forget details post-tour or want to explore specific sets ("Where was this scene shot?"). Current tours are mostly one-way communication — little personalization or interactivity.

Technical Solution using RAG

- **Knowledge Base Creation**
  Ingest official scripts, behind-the-scenes notes, production trivia, location metadata.
  Chunk and embed data into **ChromaDB** for high-precision retrieval.
- **Visitor Interaction Layer**
  Deployed on tablets, kiosks, or mobile apps.
  Visitors can ask natural questions like:
  "Which soundstage was used for the Great Hall scenes?"
  "How many versions of the Batmobile were built?"
  "Show me a short clip from the filming of Friends."
- **Real-Time AI Response**
  System retrieves verified passages from the internal database.
  LLM formulates concise, factual answers — with image/video references.
  Answers include **source citations and context** (e.g., "as per production log, 2001").
- **Contextual Awareness**
  Recognizes tour location (via BLE beacon or QR code).
  Adjusts responses based on the current set or prop the visitor is viewing.
  "You're at the Gryffindor common room — this set was reused in Prisoner of Azkaban."
- **Multimodal Support**
  Text + Voice + Visual search
  Supports **50+ languages** and **speech-to-speech** conversation.

The Vision: 24/7 multilingual AI tour guide accessible anywhere

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Illustrated Examples:

🗣️ **Example 1 – English Visitor**

🎤 **User:**

> "Where was the Great Hall of Hogwarts actually filmed?"

🤖 **AI Assistant:**

> "The Great Hall scenes were inspired by Christ Church College at Oxford, but the full set was built at Leavesden Studios.
> The production team recreated the gothic architecture and candle-lit ambience to match J.K. Rowling's description."
>
> 📘 *Source: Production_Notes_HP1.pdf – Page 47*

🇪🇸 **Example 2 – Spanish Visitor**

🎤 **Usuario:**

> "¿Quién diseñó los trajes de Harry Potter?"

🤖 **Asistente de IA:**

> "Los trajes fueron diseñados por Judianna Makovsky para la primera película y posteriormente por Jany Temime, quien trabajó en las siguientes seis películas.
> Los uniformes escolares se inspiraron en la moda británica tradicional."
>
> 📘 *Fuente: Costume_Design_Notes_HP.doc – Sección 1.3*

🇫🇷 **Example 3 – French Visitor**

🎤 **Visiteur:**

> "Montre-moi les coulisses du tournage du banquet de Noël."

🤖 **Assistant IA:**

> "Voici une courte vidéo du tournage du banquet de Noël dans la Grande Salle.
> Les bougies flottantes ont été créées à l'aide de câbles invisibles et d'effets numériques pour donner l'illusion de la magie."
>
> 📘 *Source : VFX_BehindScenes_HP1.mov_notes.txt*

The RAG-based architecture enables real-time translation and context-aware retrieval: ensuring every visitor, regardless of language, experiences the same storytelling quality.

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Warner Bros Business Applications

Use Case 2: Content Archive Intelligence

The Opportunity:

Warner Bros has **100+ years** of content archives:

- Scripts, storyboards, production notes
- Behind-the-scenes footage
- Marketing materials
- Rights and licensing info

Current State:

- Difficult to search
- Institutional knowledge in people's heads
- Time-consuming research

With RAG: Instant access to entire archive

Example Use cases

For Marketing:

```
"Find all behind-the-scenes content
from Friends Season 5"
→ Instant catalog with thumbnails and
descriptions
```

For Legal:

```
"What territories have streaming
rights for Batman 1989?"
→ Complete rights breakdown with
expiration dates
```

For Creators:

```
"Show me all Gotham City set designs
from 2010-2020"
→ Visual catalog with metadata
```

And many many more use cases….

The Vision: 24/7 multilingual AI tour guide accessible anywhere

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Data Privacy & Security

Flexible Deployment Models:

On-Premise (Maximum Privacy)

- ✅ Data never leaves company network
- ✅ Full control over AI models
- ✅ No external API calls
- ✅ Meets strictest compliance requirements

Cloud (Maximum Scale)

- ✅ Leverages commercial APIs (OpenAI, etc.)
- ✅ Infinite scalability
- ✅ Automatic updates
- ✅ Pay-per-use pricing

Hybrid (Best of Both)

- ✅ Sensitive data stays on-premise
- ✅ Public data uses cloud APIs
- ✅ Flexible based on data classification
- ✅ Optimized cost/performance

Why we need to adopt?

Competitive Advantage	• AI that knows your business • Faster decision making • Better customer experience
Knowledge Preservation	• Institutional knowledge captured • Accessible to everyone • Never lost when employees leave
Operational Efficiency	• Reduce search/research time • Faster onboarding • Consistent information
Innovation Enabler	• New product possibilities (digital tour guides) • Enhanced customer offerings • Revenue opportunities
Future-Proof Technology	• Modular architecture (easy updates) • Model-agnostic (use any AI) • Scalable from POC to enterprise

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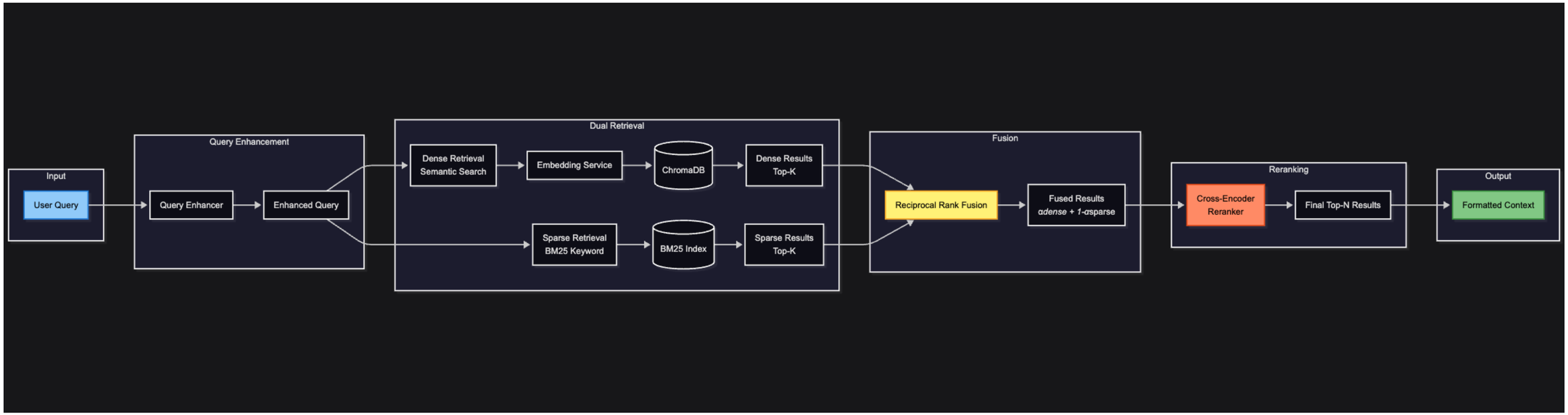
Production Level RAG Architecture

End to End Architecture Diagram



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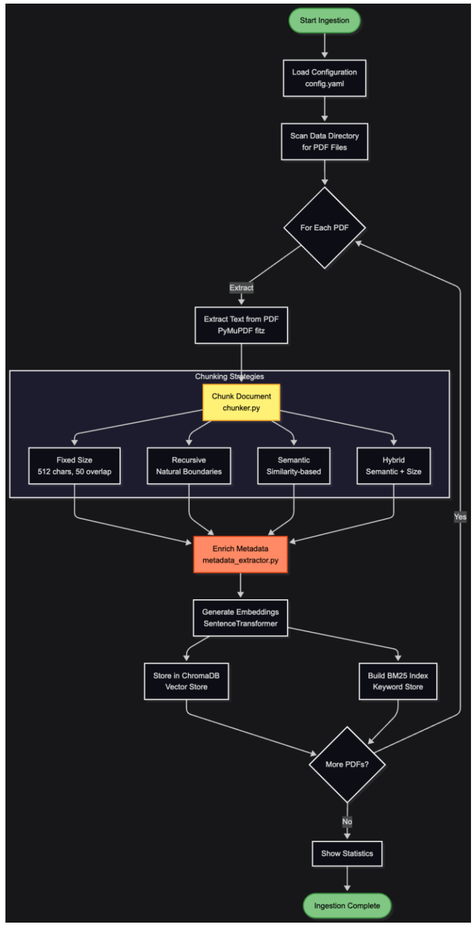
Production Level RAG Architecture

Data Ingestion Pipeline Architecture



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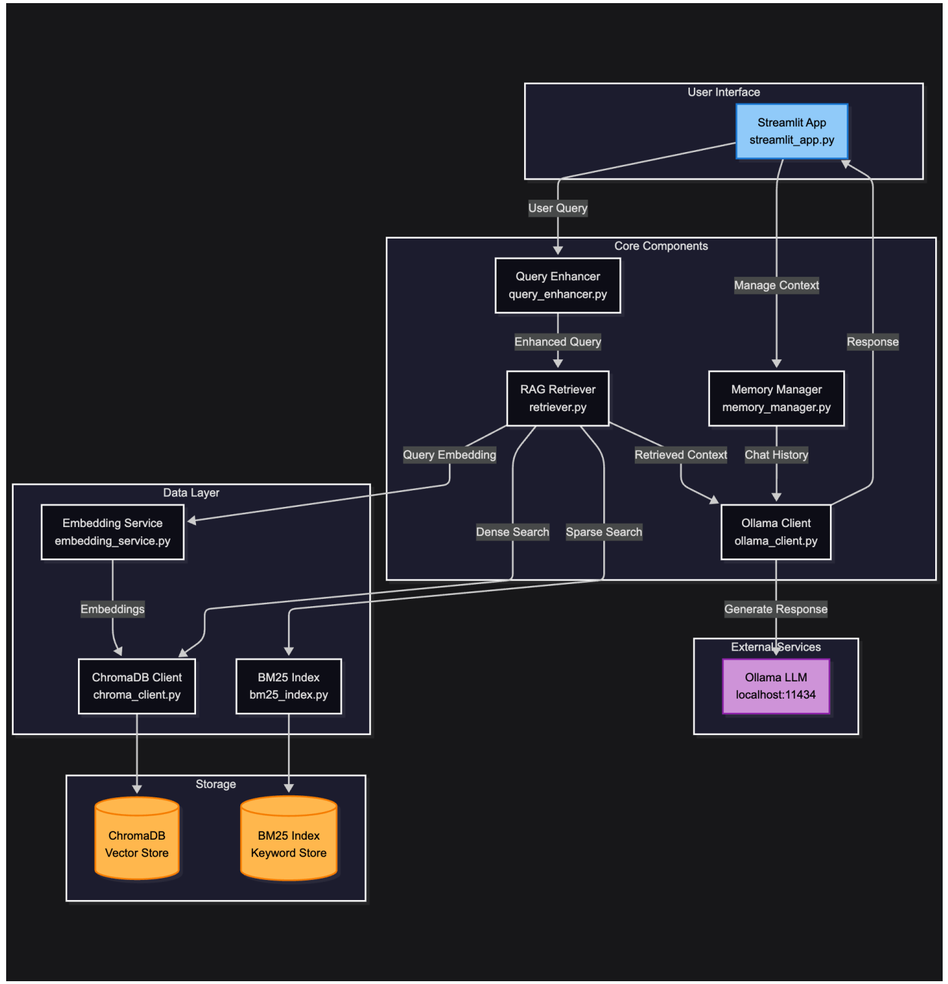
Production Level RAG Architecture

Query Retriever Pipeline Architecture



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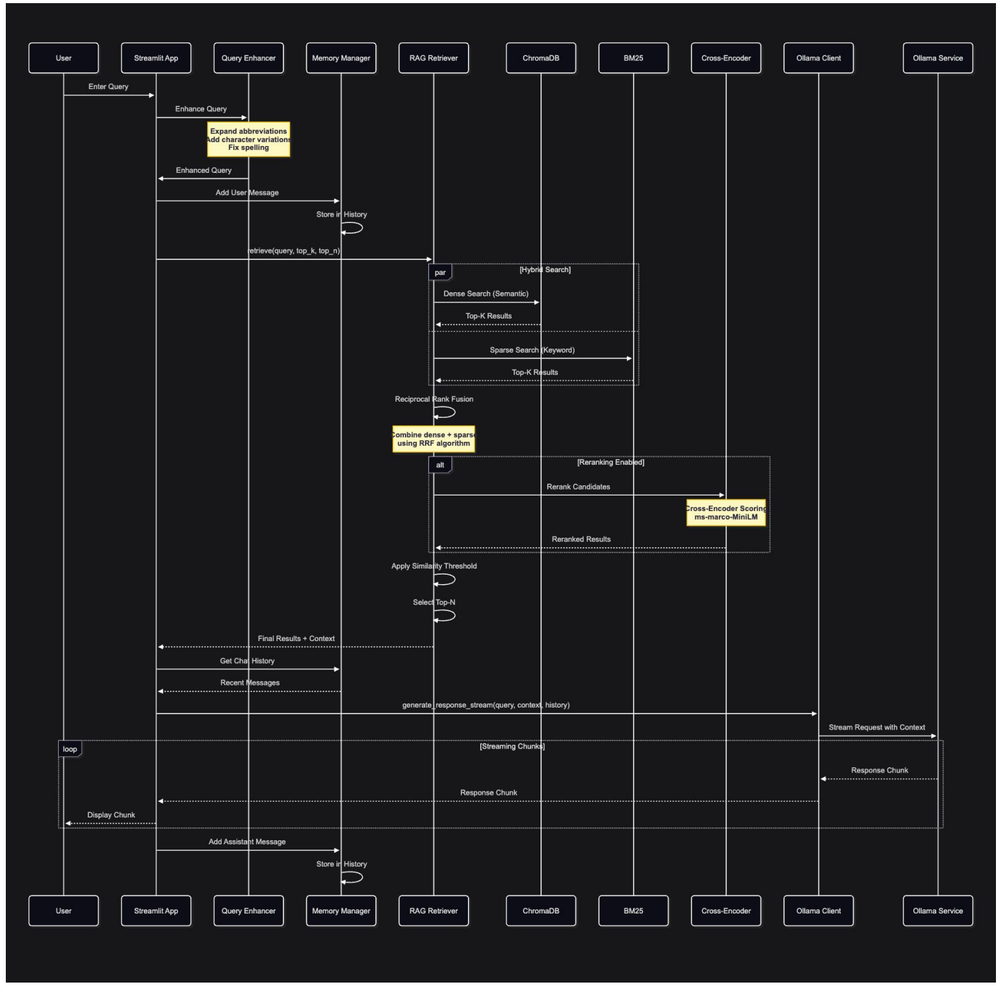
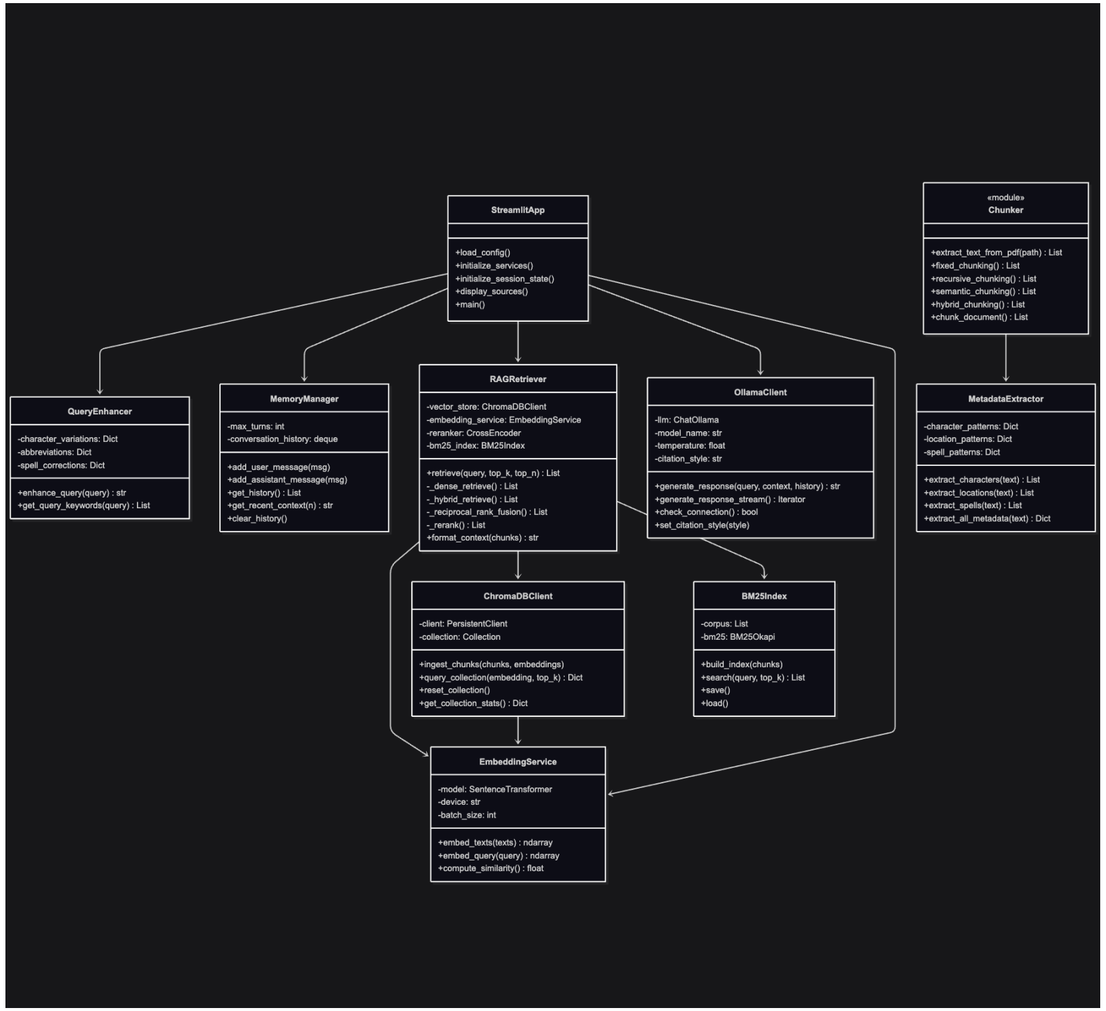
Production Level RAG Architecture

State Flow Diagram Entire Pipeline



Production Level RAG Architecture

Class Diagram Plan



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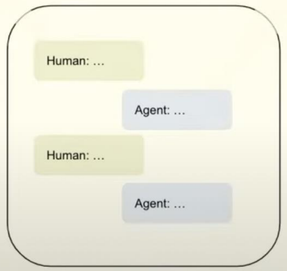
Building a Knowledge Assistant



Goal: Build an interface that can take in any task as input and give back an output.

Input forms: simple questions, complex questions, research tasks

Output forms: short answer, structured output, research report

RAG is only as Good as your Data

Garbage in = garbage out

Good data quality is a **necessary** component of any production LLM app.