

Retrieval-Augmented Generation (RAG) Report

1. Document Structure and Chunking Logic

The input document, *eBay User Agreement*, is structured as a formal legal document with clearly states sections detailing payment policies, user obligations, prohibited activities, and platform dispute protocols.

To prepare the document for retrieval-augmented generation, the following preprocessing pipeline was implemented:

- The document was loaded using PyPDFLoader, which extracts plain text from the PDF file while preserving page structure.
- **RecursiveCharacterTextSplitter** was used to divide the document into overlapping text chunks. The parameters used were:
 - **Chunk size:** 300 characters
 - **Chunk overlap:** 50 characters

This ensures that semantic continuity is maintained between chunks, and contextual information is preserved across boundaries. The recursive strategy prioritizes splitting on paragraphs and sentences before falling back to character-level splits, which enhances the relevance of individual chunks during retrieval.

2. Embedding Model and Vector Database

Embedding Model:

The sentence-transformers/all-MiniLM-L6-v2 model was selected for generating semantic vector embeddings of each chunk.

- **Model type:** Transformer-based encoder (Siamese architecture)
- **Embedding dimension:** 384
- **Advantages:** Offers high semantic accuracy with low latency, making it ideal for real-time semantic search tasks.

Each chunk was transformed into a high-dimensional embedding vector using this model.

Vector Database:

FAISS (Facebook AI Similarity Search) was utilized to build and store the vector index.

- **Index type:** IndexFlatL2 for L2 distance-based similarity search
- **Storage:** Embeddings were stored locally for efficient access and reusability
- **Retrieval:** Semantically closest chunks were retrieved per query

This enables fast and accurate vector similarity search, forming the retrieval backbone of the RAG system.

3. Prompt Template and Generation Logic

The RAG pipeline integrates retrieval from the vector database with answer generation from a local large language model.

Language Model:

The mistralai/Mistral-7B-Instruct-v0.1 model (quantized to 4-bit) was used for generating answers.

- **Loaded via:** HuggingFace Transformers using text-generation pipeline
- **Device usage:** CPU-based inference in a local environment

Prompt Format:

The following prompt template was used to guide the model:

[INST]

You are a helpful assistant. Use the information from the context below to answer the user's question.

If the answer is not in the context, say "The document does not contain that information."

Context:

{context}

Question: {question}

[/INST]

4. Observations on Hallucinations, Limitations, and Latency

Hallucinations:

No hallucinations were observed during testing. The model consistently generates answers grounded in the retrieved context. The controlled prompt format and context-limited retrieval approach help ensure factual correctness and reduce the likelihood of fabrications.

Limitations:

- **Hardware Constraints:** The 7B model, even in quantized form, is resource-intensive. Inference speed is limited in environments without GPU support.
- **Token Limits:** Long documents require careful chunking to ensure context does not exceed model input limits.
- **Prompt Deviation (Minor):** Although rare, the model may occasionally return slightly verbose or stylistically varied responses.

Latency:

- Average response time: 50 to 70 seconds per query on CPU
- FAISS retrieval time: ~100ms
- Bottleneck: LLM generation stage

5. Testing Queries

Success

The screenshot displays the 'Retrieval-Augmented Generation (RAG) App' interface. On the left, a sidebar shows 'Model Info' with 'LLM Model: mistralai/Mistral-7B-Instruct-v0.1'. The main area has a dark theme. At the top, it says 'Ask a question based on the AI Training Document.' Below this is a text input field with the query 'Is eBay responsible for the actions of third-party sellers?'. The answer is displayed below the input, starting with 'Answer:'. The answer text is: 'According to the provided context, eBay takes no responsibility and assumes no liability for any content provided by third-party sellers. The document also states that to the extent permitted by applicable law, eBay (including its parent, subsidiaries, and affiliates, and their officers, directors, agents, and employees) will not be liable to you or any third party under any claim at law or in equity. Therefore, it can be concluded that eBay is not responsible for the actions of third-party sellers.' Below the answer is a section titled 'Context used from the document' which contains several paragraphs of text from the training document, including a disclaimer about liability and a section on legal disputes.

Success

The screenshot displays the 'Retrieval-Augmented Generation (RAG) App' interface. On the left, a sidebar shows 'Model Info' with 'LLM Model: mistralai/Mistral-7B-Instruct-v0.1'. The main area has a dark theme. At the top, it says 'Ask a question based on the AI Training Document.' Below this is a text input field with the query 'What are the rules for listing prohibited items?'. The answer is displayed below the input, starting with 'Answer:'. The answer text is: 'The rules for listing prohibited items on eBay include creating listings or providing content in inappropriate categories or areas of their sites, engaging in gambling, providing false, inaccurate, misleading, deceptive, defamatory, or libelous content, and advertising items that are illegal. Additionally, users must not remove any copyright, proprietary, or identification markings in the product data and must not create any derivative works based on that data (other than by including the data in their listings). Any content that violates these policies may be modified, obfuscated, or deleted at eBay's sole discretion.' Below the answer is a section titled 'Context used from the document' which contains several paragraphs of text from the training document, including a disclaimer about liability and a section on legal disputes.


Success

Model Info

LLM Model: mistralai/Mistral-7B-Instruct-v0.1

00:02:11

uniprog

 Retrieval-Augmented Generation (RAG) App

Ask a question based on the AI Training Document.

Enter your query:

How does eBay handle disputes between buyers and sellers?

Answer:

According to the given context, eBay handles disputes between buyers and sellers through various programs such as Informal dispute resolution and binding arbitration. If Informal dispute resolution does not resolve satisfactorily within 45 days after receipt of a Notice, either party can choose to resolve the dispute through binding arbitration. The arbitration will be administered by National Arbitration & Mediation.

Context used from the document

COURT AND HAVE A TRIAL IN FRONT OF A JUDGE OR A JURY. You and eBay are instead electing that all Disputes shall be resolved by arbitration under this Agreement to Arbitrate, except as specified in Section 19.B ("Agreement to Arbitrate").

If Informal Dispute Resolution does not resolve satisfactorily within 45 days after receipt of a Notice, you and eBay agree that either party shall have the right to finally resolve the Dispute through binding arbitration. The arbitration will be administered by National Arbitration &

Resolution, a party must give notice to the other party in writing in a valid Notice of Dispute ("Notice"), which may be downloaded at this link. Such Notice to eBay should be sent by email to DisputeNotice@eBay.com or regular mail to our offices located at 583 W. eBay Way,

resolution of disputes between buyers and sellers through various programs. Unless otherwise expressly provided, eBay has no control over and does not guarantee: the existence, quality, safety,


Success

Model Info

LLM Model: mistralai/Mistral-7B-Instruct-v0.1

00:00:20

uniprog

 Retrieval-Augmented Generation (RAG) App

Ask a question based on the AI Training Document.

Enter your query:

Can sellers charge extra for shipping on eBay?

Answer:

No, sellers cannot charge extra for shipping on eBay. According to the provided context, eBay charges sellers for the cost of return shipping labels and/or other reasonable fees from sellers when an eBay-generated return shipping label is used, and the seller is responsible for its cost. If the buyer is responsible for the return shipping costs, the buyer may elect to use an eBay-generated shipping label or purchase a shipping label directly from a carrier. Therefore, sellers cannot charge extra for shipping on eBay.

Context used from the document

If you are a seller, you are liable for fees arising out of all sales made using some or all of our Services, even if sales terms are finalized or payment is made outside of eBay. In particular, if you

The fees we charge sellers for using our Services to sell goods and services are listed on our Selling fees pages. We may change our selling fees from time to time by posting the changes on the eBay

refund. Additionally, eBay may charge sellers for the cost of return shipping labels and/or other reasonable fees from sellers when: • An eBay-generated return shipping label is used, and the seller is responsible for its cost; to a seller. If the buyer is responsible for the return shipping costs, the buyer may elect to use an eBay-generated shipping label or purchase a shipping label directly from a carrier. By choosing to use


Failure

<<

Model Info

LLM Model: mistralai/Mistral-7B-Instruct-v0.1


Deploy

 Retrieval-Augmented Generation (RAG) App


Ask a question based on the AI Training Document.

Enter your query:

What is eBay's return policy for buyers?

 Answer:

The document does not contain information about eBay's return policy for buyers.

 Context used from the document