

RAG Reranking Explained: How To Improve RAG Results



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Reranking can improve the results of your RAG application by up to 10-30%. This video explains how reranking works, walks through how to implement it in Python (using an example RAG app), and measuring how it effects the results.

Links

Intro to RAG: [RAG + Langchain Python Project: Easy AI/Ch...](#)

Build a Simple RAG Pipeline: [Build a Simple RAG Pipeline in 30 Minutes!](#)

Code: <https://github.com/pixegami/simple-ra...>

Cohere API: <https://cohere.com>

Chapters

00:00 Introduction

01:20 Project Overview

04:02 The Problem With Vector Search

07:00 Add Reranking to RAG Pipeline

08:25 Implement Reranking via API

10:08 Testing the Improvement

13:00 Reranking Trade-Offs

<https://github.com/pixegami/simple-rag-pipeline>

pixegami / simple-rag-pipeline

Type / to search

Code Issues Pull requests Actions Projects Security Insights

simple-rag-pipeline Public

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main 1 Branch 0 Tags

Go to file

Add file

Code

About

pixegami	feat: added reranking to the retriever	fe19cc2 · 5 months ago	13 Commits
sample_data	chore: add README, requirements, interfaces and sample data	5 months ago	
src	feat: added reranking to the retriever	5 months ago	
.gitignore	chore: add README, requirements, interfaces and sample data	5 months ago	
README.md	feat: added reranking to the retriever	5 months ago	
create_parser.py	feat: add a CLI parser	5 months ago	
main.py	feat: add main.py	5 months ago	
rag-design-basic.png	chore: add README, requirements, interfaces and sample data	5 months ago	
requirements.txt	feat: added reranking to the retriever	5 months ago	

A simple RAG pipeline that you can use as a starting point for learning about RAG (retrieval augmented generation).

Readme

Activity

39 stars

1 watching

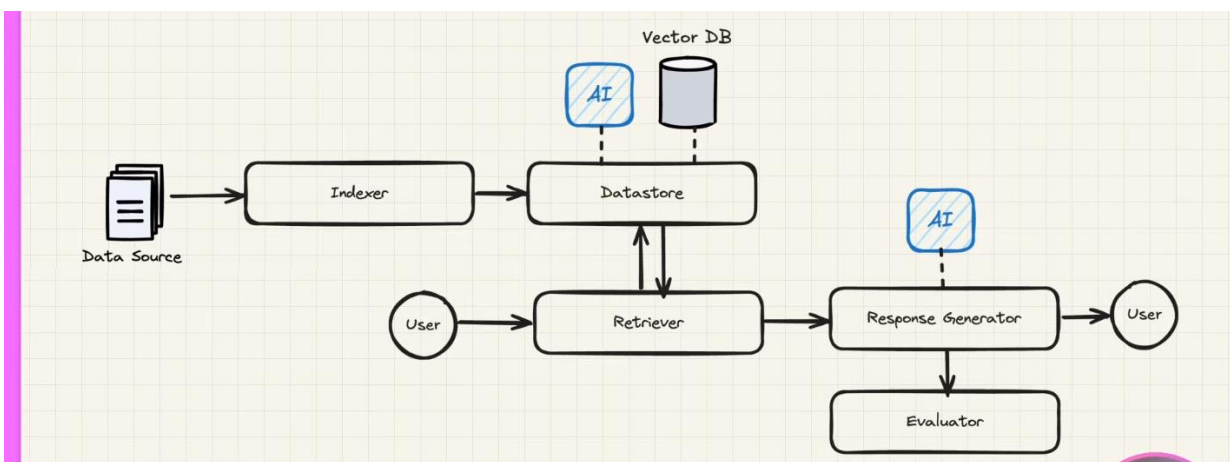
22 forks

Report repository

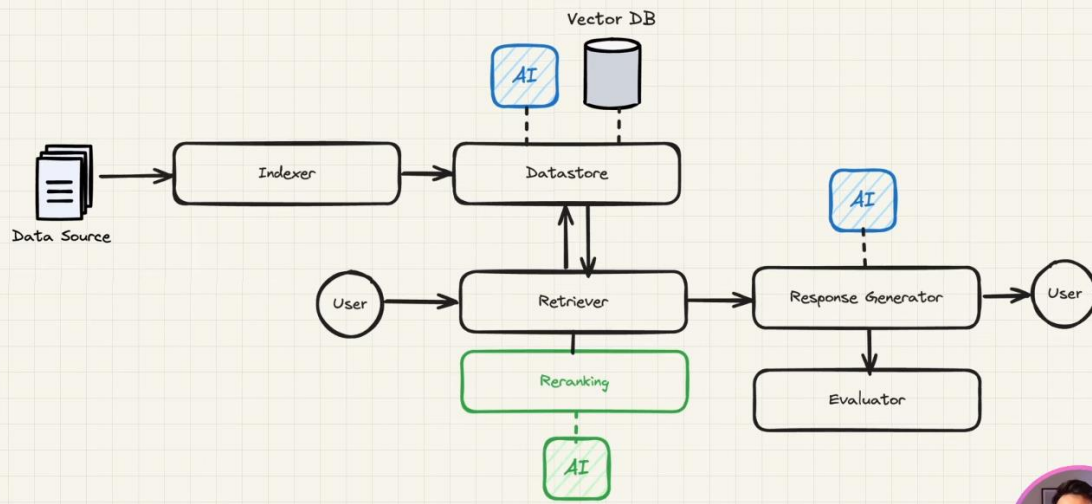
Releases

No releases published

Packages



When your RAG is struggling to retrieve the correct responses back, we might need to add a re-ranker to boost the quality of our results as below



IMPROVE RESULTS BY 30%

- 👉 How Reranking Works
- 👉 Reranking via Cohere API
- 👉 Performance Comparison



pixegami

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Python RAG Tutorial (with Local LLMs): AI For Your PDFs

pixegami · 523K views · 1 year ago · 24 VPH · >100x
Learn how to build a RAG (Retrieval Augmented Generation) app in Python that can let you query/chat with your PDFs using generative AI. This project contains some more advanced topics, like...

Subtitles



RAG + Langchain Python Project: Easy AI/Chat For Your Docs

pixegami · 355K views · 1 year ago · 20 VPH · >100x
Learn how to build a "retrieval augmented generation" (RAG) app with Langchain and OpenAI in Python. You can use this to create chat-bots for your documents, books or files. You can also use...

Subtitles



Build a Simple RAG Pipeline in 30 Minutes!

pixegami · 4.4K views · 1 month ago · 2 VPH · 1.6x
Learn how to build a simple, modular RAG pipeline in Python. This will let you add documents, generate embeddings, and evaluate (test) the pipeline quality, end-to-end with a single CLI command...

Subtitles



How To Deploy Your RAG/AI App On AWS (Step by Step)

pixegami · 33K views · 1 year ago · 3 VPH · 12x
Learn how to deploy your Python RAG/AI project to the cloud in this advanced tutorial. We will turn the app into a public API, and host it on AWS Lambda (which makes it scalable and high-performance...

Subtitles

GitHub - pixegami/simple-rag

pixegami - YouTube

github.com/pixegami/simple-rag-pipeline

README

Simple RAG Pipeline

This project is a beginner-friendly tutorial project for building a Retrieval Augmented Generation (RAG) system. It demonstrates how to index documents, retrieve relevant content, generate AI-powered responses, and evaluate results—all through a command line interface (CLI).

```
graph LR; DS[Data Source] --> I[Indexer]; I --> D[Datastore]; VDB[(Vector DB)] --- D; AI1[AI] --- D; U1((User)) --> R[Retriever]; R <--> D; R --> RG[Response Generator]; AI2[AI] --- RG; RG --> U2((User)); RG --> E[Evaluator];
```

Overview

The RAG Framework lets you:

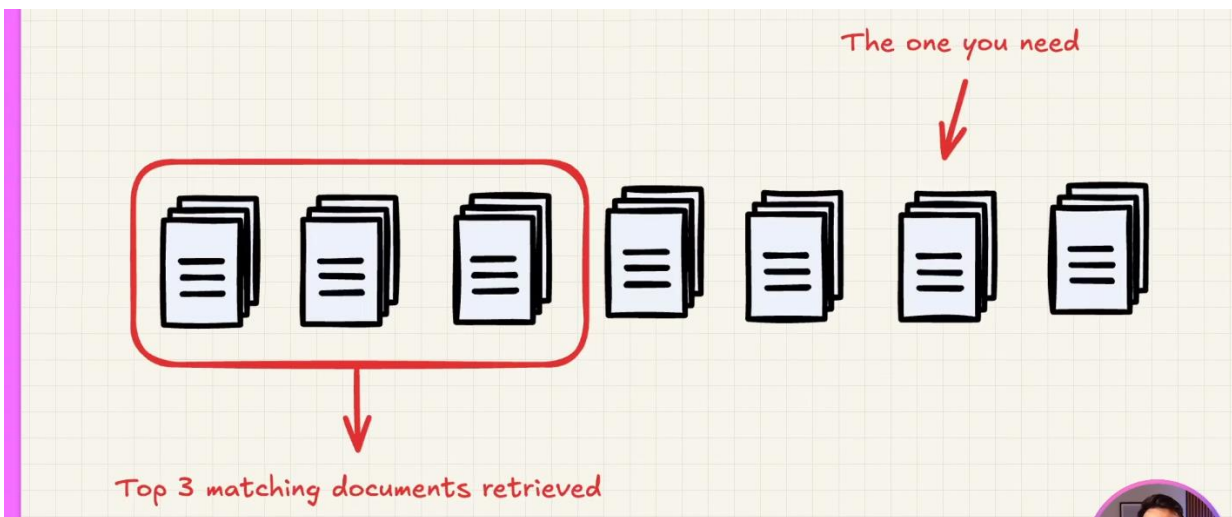
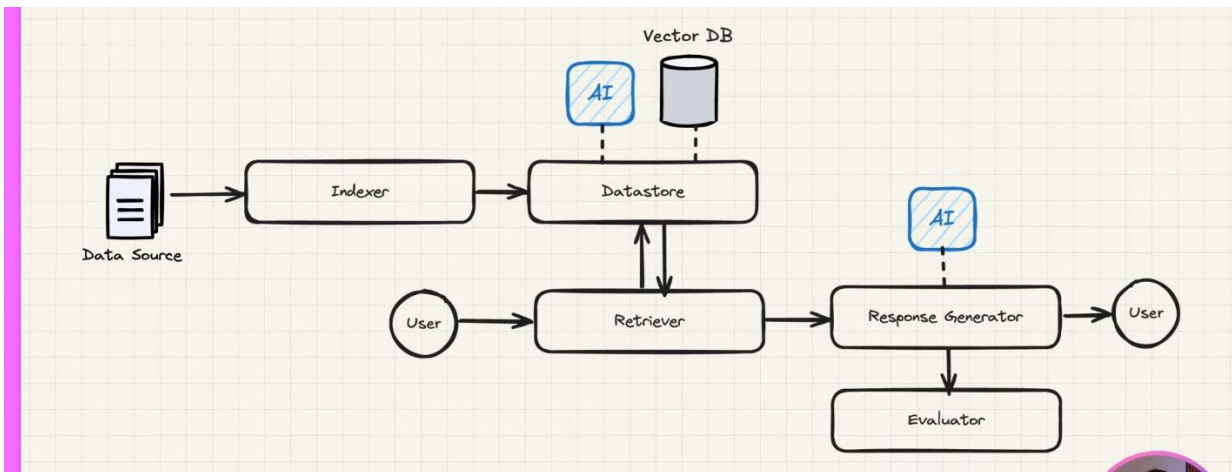
- **Index Documents:** Process and break documents (e.g., PDFs) into smaller, manageable chunks.
- **Store & Retrieve Information:** Save document embeddings in a vector database (using LanceDB) and search using similarity.
- **Generate Responses:** Use an AI model (via the OpenAI API) to provide concise answers based on the retrieved context.

No packages published

Languages

Python 100.0%

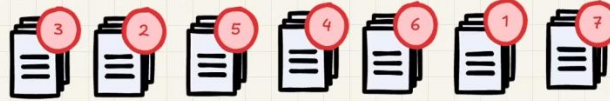
PROJECT OVERVIEW



Step 1: Fetch lots of matching documents



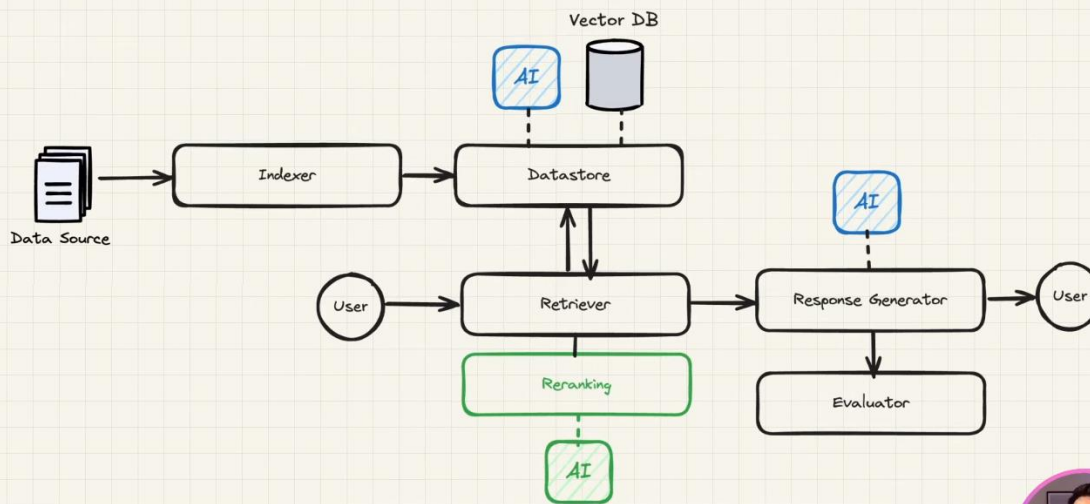
Step 2: Re-Rank them



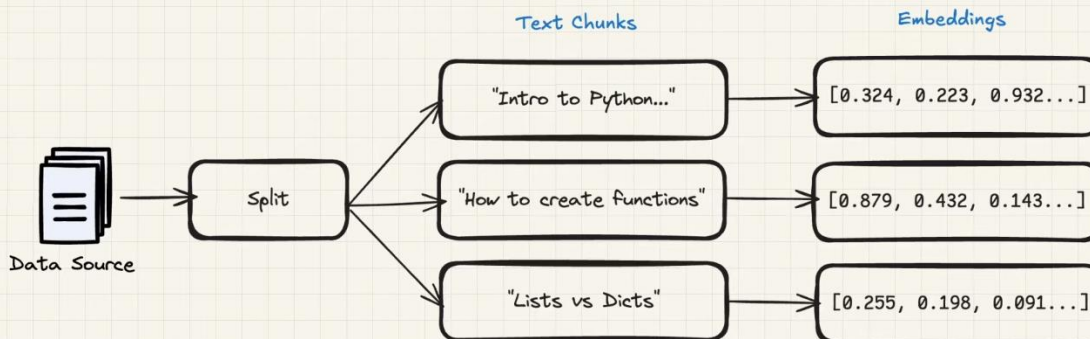
Step 3: Return top N re-ranked documents

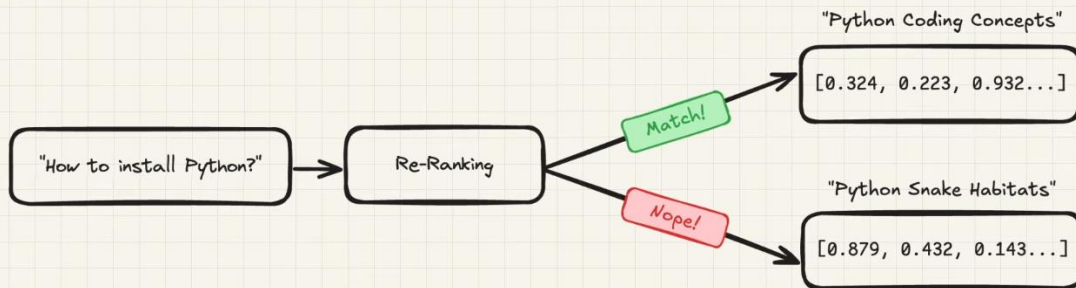
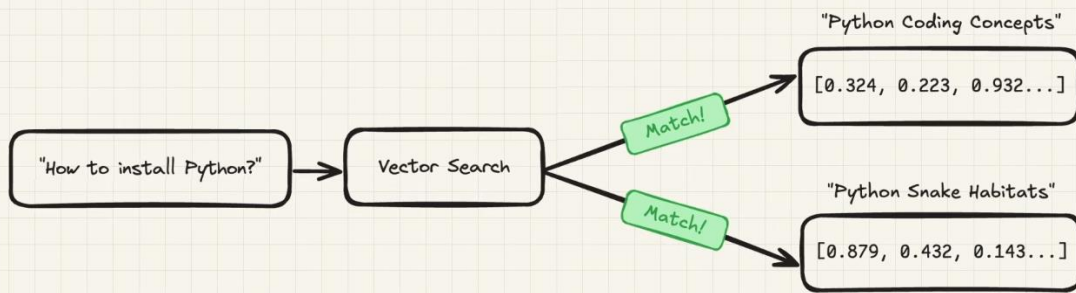


Re-ranking works as above to help improve the selection of a smaller set of documents



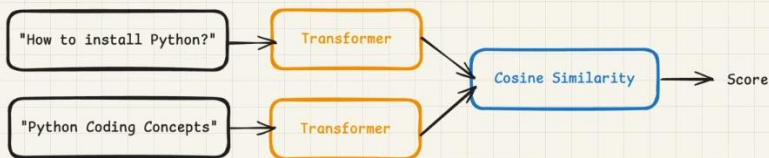
THE PROBLEM WITH VECTOR SEARCH



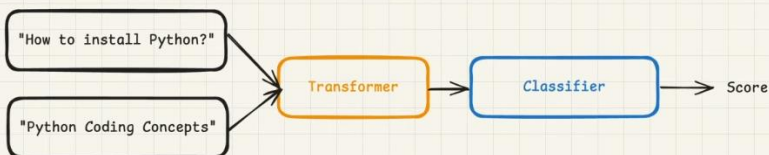


HOW RERANKING WORKS

Traditional Vector Search



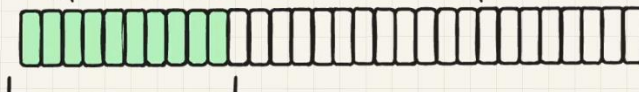
Reranking



All Documents (10k)



Step 1: Use Vector Search to find top documents (100)



Step 2: Use Re-Ranking to narrow results (10)



ADDING RE-RANKING TO OUR PIPELINE

The screenshot shows the GitHub repository page for `pixegami/simple-rag-pipeline`. The repository is public and has 13 commits. The main branch is selected. The file list shows the following files and their commit messages:

File	Commit Message	Time
sample_data	chore: add README, requirements, interfaces and sample...	2 months ago
src	feat: added reranking to the retriever	2 months ago
.gitignore	chore: add README, requirements, interfaces and sample...	2 months ago
README.md	feat: added reranking to the retriever	2 months ago
create_parser.py	feat: add a CLI parser	2 months ago
main.py	feat: add main.py	2 months ago
rag-design-basic.png	chore: add README, requirements, interfaces and sample...	2 months ago
requirements.txt	feat: added reranking to the retriever	2 months ago

The README section is visible, titled "Simple RAG Pipeline". The right sidebar shows repository statistics: 22 stars, 1 watching, 13 forks, and 13 commits. The "About" section describes the pipeline as a starting point for learning about RAG (retrieval augmented generation).

The screenshot shows the file structure of the `simple-rag-pipeline` repository. The file list is as follows:

Name	Last commit message
..	
__init__.py	feat: add RAG pipeline
datastore.py	feat: add a LanceDB (local) datastore for the project
evaluator.py	feat: added reranking to the retriever
indexer.py	feat: replaced basic indexer with docling indexer
response_generator.py	feat: add response generator
retriever.py	feat: added reranking to the retriever

The left sidebar shows the file structure of the repository, including the `src` directory and the `impl` subdirectory. The `impl` subdirectory contains the following files:

- `__init__.py`
- `datastore.py`
- `evaluator.py`
- `indexer.py`
- `response_generator.py`
- `retriever.py`

The screenshot shows a GitHub repository for 'simple-rag-pipeline'. The left sidebar displays the file structure, including 'sample_data', 'src', 'impl', 'interface', and 'util'. The 'rag_pipeline.py' file is selected. The main area shows the code for 'rag_pipeline.py', which includes imports for 'ThreadPoolExecutor', 'dataclass', 'Dict', 'List', 'Optional', and 'BaseDatastore', 'BaseIndexer', 'BaseRetriever', 'BaseResponseGenerator', 'BaseEvaluator', and 'EvaluationResult'. The code defines a 'RAGPipeline' class with attributes for 'datastore', 'indexer', 'retriever', 'response_generator', and 'evaluator'. It also includes methods for 'reset' and 'add_documents'.

```
class Retriever(BaseRetriever):
    def __init__(self, datastore: BaseDatastore):
        self.datastore = datastore

    def search(self, query: str, top_k: int = 5) -> list[str]:
        search_results = self.datastore.search(query, top_k=top_k)
        return search_results
```

This is our current retriever component that we can update with the Re-ranker as below

```
class Retriever(BaseRetriever):
    def __init__(self, datastore: BaseDatastore):
        self.datastore = datastore

    def search(self, query: str, top_k: int = 5) -> list[str]:
        search_results = self.datastore.search(query, top_k=top_k * 3)
        reranked_results = self._rerank(query, search_results, top_k=top_k)
        return reranked_results
```

IMPLEMENTING COHERE RE-RANKING

docs.cohere.com/reference/rerank

cohere docs v2 API

DASHBOARD PLAYGROUND DOCS COMMUNITY LOG IN

Guides and concepts API Reference Release Notes LLMU Cookbooks

Search or ask AI a question

Cohere API

About

Teams and Roles

Errors

Migrating From API v1 to API v2

Using the OpenAI SDK

Endpoints

v2/chat

v2/rerank

POST Rerank API (v2)

v2/embed

v1/embed-jobs

v1/classify

v1/datasets

v1/tokenize

v1/detokenize

v1/connectors

v1/models

v1/finetuning

Endpoints > v2/rerank

Rerank API (v2)

This endpoint takes in a query and a list of texts and produces an ordered array with each text assigned a relevance score.

Sync Async

POST /v2/rerank

```
1 import cohere
2
3 co = cohere.ClientV2()
4
5 docs = [
6     "Carson City is the capital city of the American state of Nevada.",
7     "The Commonwealth of the Northern Mariana Islands is a group of islands in the t",
8     "Capitalization or capitalisation in English grammar is the use of a capital le",
9     "Washington, D.C. (also known as simply Washington or D.C., and officially as t",
10    "Capital punishment has existed in the United States since before the United Sta",
11 ]
12
```

Try it

200 Successful

```
1 {
2   "results": [
3     {
4       "index": 3,
5       "relevance_score": 0.999071
6     },
7     {
8       "index": 4,
9       "relevance_score": 0.7867867
10    }
11  ]
12 }
```



dashboard.cohere.com/api-keys

cohere dashboard

DASHBOARD PLAYGROUND DOCS COMMUNITY

PLATFORM

Dashboard

Playground

Fine-tuning

Datasets

API Keys

Connectors

SETTINGS

Team

Billing & Usage

Data Controls

Profile

API Keys

Production keys

+ New Production key

NAME	KEY	CREATED	CREATOR	
pixegami-projects	sk-*****bIwf	Feb 16, 2025	pixegami@gmail.com	Rename / Delete

+ Create Production key

Trial keys FREE

+ New Trial key

Calls made using Trial keys are free of charge. Trial keys are rate-limited, and cannot be used for commercial purposes.

NAME	KEY	CREATED	CREATOR	
default	sk-*****iHhn	Feb 16, 2025	pixegami@gmail.com	Rename / Delete

+ Create Trial key


```
def _rerank(self, query: str, search_results: list[str], top_k: int = 5) -> list[str]:
    co = cohere.ClientV2()
    response = co.rerank(
        model="rerank-v3.5",
        query=query,
        documents=search_results,
        top_n=top_k,
    )

    result_indices = [result.index for result in response.results]
    print(f"Reranked Indices: {result_indices}")
    return [search_results[i] for i in result_indices]
```

```
export CO_API_KEY="xxxx"
```

Reranked Indices: [7, 2, 15, 0, 12]

TESTING THE IMPROVEMENT

simple-rag-pipeline on `main` via `v3.10` (venv) [base] on default: <us-east-1>
→ `python main.py evaluate`

```
1
2
3 {
4     "question": "Who discovered gold in Swan Lagoon and founded the town?",
5     "answer": "Jedediah 'Jed' Stone."
6 },
7 {
8     "question": "When did the Golden Swan Mine close, and what company operated it?",
9     "answer": "The Golden Swan Mine closed in 1935. It was operated by the West Australian Aurum Corporation (WAAC)."
10 },
11 {
12     "question": "What are the opening hours of Jed's Beachfront Cafe?",
13     "answer": "Jed's Beachfront Cafe is open Monday to Sunday from 7:00 AM to 9:00 PM."
14 },
15 {
16     "question": "What is the ABN for Golden Swan Bakery?",
17     "answer": "The ABN for Golden Swan Bakery is 92 345 678 901."
18 },
19 {
20     "question": "What is the contact number for Swan Lagoon Police Station?",
21     "answer": "The contact number for Swan Lagoon Police Station is (08) 9726 1234."
22 },
23 {
24     "question": "Which 6 businesses are located on Beach Street?",
25     "answer": "Businesses on Beach Street include Jed's Beachfront Cafe (23 Beach Street), Stone's Fish & Chips (15 Beach Street), Blackwood
26 },
27 {
28     "question": "When is the Annual Swan Lagoon Swan Festival held?",
29     "answer": "The Annual Swan Lagoon Swan Festival is held every third weekend of October."
30 },
31 {
32     "question": "What is the address and check-in time for The Mining Heritage B&B?",
33     "answer": "The Mining Heritage B&B is located at 45 Pioneer Street, with check-in available from 14:00 to 20:00."
34 },
35 }
```

simple-rag-pipeline

```
6 {
7   "question": "When was the Golden Swan Mine closed, and what company operated it?",
8   "answer": "The Golden Swan Mine closed in 1935. It was operated by the West Australian Aurum Corporation (WAAC).",
9 },
10 {
11   "question": "What are the opening hours of Jed's Beachfront Cafe?",
12   "answer": "Jed's Beachfront Cafe is open Monday to Sunday from 7:00 AM to 9:00 PM.",
13 },
14 {
15   "question": "What is the ABN for Golden Swan Bakery?",
16   "answer": "The ABN for Golden Swan Bakery is 92 345 678 901.",
17 },
18 {
19   "question": "What is the contact number for Swan Lagoon Police Station?",
20   "answer": "The contact number for Swan Lagoon Police Station is (08) 9726 1234.",
21 },
22 {
23   "question": "Which 6 businesses are located on Beach Street?",
24   "answer": "Businesses on Beach Street include Jed's Beachfront Cafe (23 Beach Street), Stone's Fish & Chips (15 Beach Street), Blackwood's Beach Bar (10 Beach Street), The Lagoon Breeze Hotel (5 Beach Street), The Visitor Centre (12 Beach Street), and The Coastal Walk (8 Beach Street).",
25 },
26 {
27   "question": "When is the Annual Swan Lagoon Swan Festival held?",
28   "answer": "The Annual Swan Lagoon Swan Festival is held every third weekend of October.",
29 },
30 {
31   "question": "What is the address and check-in time for The Mining Heritage B&B?",
32   "answer": "The Mining Heritage B&B is located at 45 Pioneer Street, with check-in available from 14:00 to 20:00.",
33 },
34 {
35   "question": "What healthcare services are available at 45 Coastal Drive?",
36   "answer": "Swan Lagoon Medical Centre (also known as Coastal Drive Medical Practice) is located at 45 Coastal Drive. It offers general practice, physiotherapy, and podiatry services.",
37 },
38 {
39   "question": "What are the best places to visit in Swan Lagoon?",
40   "answer": "The best places to visit in Swan Lagoon include the Golden Swan Mine ruins, the Swan Lagoon Beach, the Coastal Walk, the Visitor Centre, and the Lagoon Breeze Hotel.",
41 },
42 }
```

simple-rag-pipeline

```
58 {
59   "question": "What transport services are available at the Swan Lagoon Bus Terminal?",
60   "answer": "The Bus Terminal offers regional services to Perth and a local shuttle during peak season.",
61 },
62 {
63   "question": "What is the emergency contact number for gas leaks?",
64   "answer": "The gas emergency contact number is 1800 427 532.",
65 },
66 {
67   "question": "What is the address of the Visitor Centre, and what services does it provide?",
68   "answer": "The Visitor Centre is located at 12 Beach Street (Historic Telegraph Office Building). It offers maps, tour bookings, and local history information.",
69 },
70 {
71   "question": "What is the opening year of The Lagoon Breeze Hotel?",
72   "answer": "The Lagoon Breeze Hotel opened in 1962.",
73 },
74 {
75   "question": "How did Swan Lagoon transition from a mining town to a tourist destination?",
76   "answer": "After the mine closed in 1935, locals like Mrs. Elara Nightingale promoted its natural beauty. Post-WWII tourism grew with the development of the Coastal Walk and the Lagoon Breeze Hotel.",
77 },
78 {
79   "question": "What is a famous tradition to do at the Coastal Walk?",
80   "answer": "Sitting on the bench there at precisely 3:38 PM (a nod to the year 1938) brings good luck.",
81 },
82 {
83   "question": "How many restaurants are there in Swan Lagoon?",
84   "answer": "There are four restaurants: Jed's Beachfront Cafe, Stone's Fish & Chips, Blackwood's Beach Bar, and La Mer. There are also several cafes and bakeries.",
85 },
86 {
87   "question": "Can I get ice cream at 10pm?",
88   "answer": "No, the ice cream shop closes at 9pm.",
89 },
90 }
```

```
94 {
95     "question": "What is a popular tradition at St Agnes Church?",
96     "answer": "Every third Sunday, they still ring the original mining bell."
97 },
98 },
99 },
100 },
101 },
102 },
103 },
104 },
105 },
106 },
107 },
108 },
109 },
110 },
111 },
112 },
113 },
114 },
115 },
116 },
117 },
118 },
119 },
120 },
121 },
122 },
123 }
```

Swan Lagoon Business Directory

This directory provides comprehensive information about local businesses operating in Swan Lagoon. For updates or corrections, please contact the Swan Lagoon Shire Council.

Business Listings

Business Name	Type	Address	Opening Hours	ABN
Jed's Beachfront Cafe	Restaurant/Cafe	23 Beach Street	Mon-Sun 7:00-21:00	45 287 391 842
O'Malley's General Store	Retail/Grocery	89 Pioneer Street	Mon-Sat 7:00-20:00, Sun 8:00-18:00	78 156 924 371
Golden Swan Bakery	Bakery	56 Mine Road	Mon-Sun 6:00-17:00	92 345 678 901
Lagoon Breeze Surf Shop	Sporting Goods	82 Coastal Drive	Mon-Sat 9:00-17:30, Sun 10:00-16:00	61 234 567 890
Nightingale's Books & Gifts	Retail	34 Pioneer Street	Mon-Fri 9:00-17:30, Sat 9:00-16:00	83 456 789 012
Stone's Fish & Chips	Restaurant	15 Beach Street	Wed-Mon 11:00-20:00, Closed Tues	94 567 890 123


```
simple-rag-pipeline on 1 main [!+?+] via v3.10 (venv) [base] on default:<us-east-1>
→ python main.py evaluate

Reasoning: The response fails to address the zoning conflict-noise from late-night establishments adjacent to residential are
as-and does not mention how current service hours (most businesses closing by 21:00 and standard weekday hours) mitigate that
conflict, as outlined in the expected answer.

-----

❌ Q 30: Which businesses on Pioneer Street are owned by descendants of original gold rush families?:

Response: The only Pioneer Street business still owned by a gold-rush family descendant is O'Malley's General Store at 89 Pio
neer Street.

Expected Answer: Based on available information, family heritage connections to Pioneer Street businesses may not be explicit
ly documented in the directory. While some businesses like O'Malley's General Store may have historical family ties, definiti
ve ownership lineage requires careful verification rather than assumptions.

Reasoning: The response definitively states that O'Malley's General Store is the only business owned by a gold-rush family de
scendant, but available information indicates that ownership lineages on Pioneer Street aren't well documented and such a cla
im cannot be verified.

-----

⭐ Total Score: 24/30

simple-rag-pipeline on 1 main [!+?+] via v3.10 (venv) [base] on default:<us-east-1> took 36s
→ python main.py --rerank evaluate
```

Without re-ranking, our total score is 24/30.

```
EXPLORER
SIMPLE-RAG-PIPELINE
  __pycache__
  .git
  data
  sample_data
  eval
  sample_questions.json
  source
  si_booklet.pdf
  si_business_directory.pdf
  si_service_guide.pdf
  si_tourist_guide.pdf
  src
  __pycache__
  impl
  __pycache__
  __init__.py
  datastore.py
  evaluator.py
  indexer.py
  response_generator.py
  retriever.py
  interface
  __pycache__
  __init__.py
  base_datastore.py
  base_evaluator.py
  base_indexer.py
  base_response_generator.py
  base_retriever.py
  util
  __pycache__
  extract_json.py
  extract_xml.py
  invoke_ai.py
  rag_pipeline.py
  venv
  .gitignore
  create_parser.py
  OUTLINE
  TIMELINE

retriever.py 1, M X
src > impl > retriever.py > Retriever > search
1 from interface base_datastore import BaseDatastore
2 from interface base_retriever import BaseRetriever
3 import cohere
4
5
6 class Retriever(BaseRetriever):
7     def __init__(self, datastore: BaseDatastore):
8         self.datastore = datastore
9
10    def search(self, query: str, top_k: int = 5, rerank: bool = False) -> list[str]:
11        if rerank:
12            search_results = self.datastore.search(query, top_k=top_k + 3)
13            reranked_results = self._rerank(query, search_results, top_k=top_k)
14            return reranked_results
15        else:
16            return self.datastore.search(query, top_k=top_k)
17
18    def _rerank(
19        self, query: str, search_results: list[str], top_k: int = 10
20    ) -> list[str]:
21
22        co = cohere.ClientV2()
23        response = co.rerank(
24            model="rerank-v3.5",
25            query=query,
26            documents=search_results,
27            top_n=top_k,
28        )
29
30        result_indices = [result.index for result in response.results]
31        print(f"✅ Reranked Indices: {result_indices}")
32        return [search_results[i] for i in result_indices]
33
```

```
python main.py run --rerank
python main.py --rerank evaluate
python main.py evaluate
clear

simple-rag-pipeline on 1 main [!+?+] via v3.10 (venv) [base] on default:<us-east-1>
→ python main.py --rerank evaluate
```

✓ Edit code 0

📄 /xorgs/poegami/tutorials/simple-rag-pipeline

📄 main

Finished in 39.3 sec

Last ran 3 hours ago

```
simple-rag-pipeline on 1 main [!+?] via v3.10 (venv) [base] on default:<us-east-1>
→ python main.py --rerank evaluate

Sat 9:00-16:00. Nightingale's Books & Gifts, ABN = 83 456 789 012. Stone's Fish & Chips, Type = Restaurant. Stone's Fish & C
hips, Address = 15 Beach Street. Stone's Fish & Chips, Opening Hours = Wed-Mon 11:00-20:00, Closed Tues. Stone's Fish & Chips
, ABN = 94 567 890 123. Swan Lagoon Real Estate, Type = Real Estate. Swan Lagoon Real Estate, Address = 67 Coastal Drive. Swa
n Lagoon Real Estate, Opening Hours = Mon-Fri 9:00-17:00, Sat 9:00-12:00. Swan Lagoon Real Estate, ABN = 75 678 901 234. Blac
kwood's Beach Bar, Type = Bar/Restaurant. Blackwood's Beach Bar, Address = 95 Beach Street. Blackwood's Beach Bar, Opening Ho
urs = Mon-Sun 11:00-23:00. Blackwood's

✓ Reranked Indices: [0, 3, 6, 9, 2]
✓ Found 5 results for query: What is the address of the Visitor Centre, and what services does it provide?

🔍 Result 1: ## Visitor Centre
Location, Information = 12 Beach Street (Historic Telegraph Office Building). Hours, Information = Daily 9:00-17:00. Phone, I
nformation = (08) 9726 8901. Services, Information = • Maps • Tour Bookings • Local Information

🔍 Result 2: ## Community Facilities
Community Library, Address = 28 Pioneer Street. Community Library, Hours = Mon-Fri 9:30-18:00 Sat 9:00-13:00. Community Libra
ry, Services = • Free Wifi • Computer Access • Local History Collection. Community Centre, Address = 33 Pioneer Street. Commu
nity Centre, Hours = -. Community Centre, Services = • Community Groups • Senior Activities • Youth Programs

🔍 Result 3: ## Medical Facilities
Swan Lagoon Medical Centre, Address = 45 Coastal Drive. Swan Lagoon Medical Centre, Hours = Mon-Fri 8:00-18:00 Sat 9:00-12:00

simple-rag-pipeline on 1 main [!+?] via v3.10 (venv) [base] on default:<us-east-1> took 36s
→ python main.py --rerank evaluate
```

```
simple-rag-pipeline on 1 main [!+?] via v3.10 (venv) [base] on default:<us-east-1>
→ python main.py --rerank evaluate

Reasoning: The response fails to identify any zoning conflicts or mention service hours, whereas the expected answer specifie
s noise conflicts from late-night establishments near residences and explains how service hours (most businesses closing by 2
1:00, standard hours Mon-Fri 9:00-17:30) mitigate impacts.

-----
✗ Q 30: Which businesses on Pioneer Street are owned by descendants of original gold rush families?:

Response: There are none. None of the Pioneer Street businesses are described as being owned by descendants of the original g
old-rush families in the provided information.

Expected Answer: Based on available information, family heritage connections to Pioneer Street businesses may not be explici
tly documented in the directory. While some businesses like O'Malley's General Store may have historical family ties, definiti
ve ownership lineage requires careful verification rather than assumptions.

Reasoning: The response definitively states that no businesses are owned by gold-rush descendants, but the expected answer no
tes that some heritage ties (e.g., O'Malley's General Store) may exist and that ownership lineage isn't explicitly documented
. By declaring 'none,' the response is too categorical and doesn't match the nuance of the expected answer.

-----
🌟 Total Score: 27/30

simple-rag-pipeline on 1 main [!+?] via v3.10 (venv) [base] on default:<us-east-1> took 36s
→ python main.py --rerank evaluate
```

With re-ranking, we now score 27/30.

Without Re-Ranking (N=5)
Total Score: 24 / 30
With Re-Ranking (N=5)
Total Score: 27 / 30

RERANKING TRADE-OFFS

<https://github.com/pixegami/simple-rag-pipeline>