

# RagFeed



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# Project Overview

# Objective

Create an RSS reader powered by **RAG** and **GenAI** that provides the user:

- An overview of the **most relevant topics** on the today articles.
- The possibility to **ask for specific topics** and get an overview and the most relevant related articles.

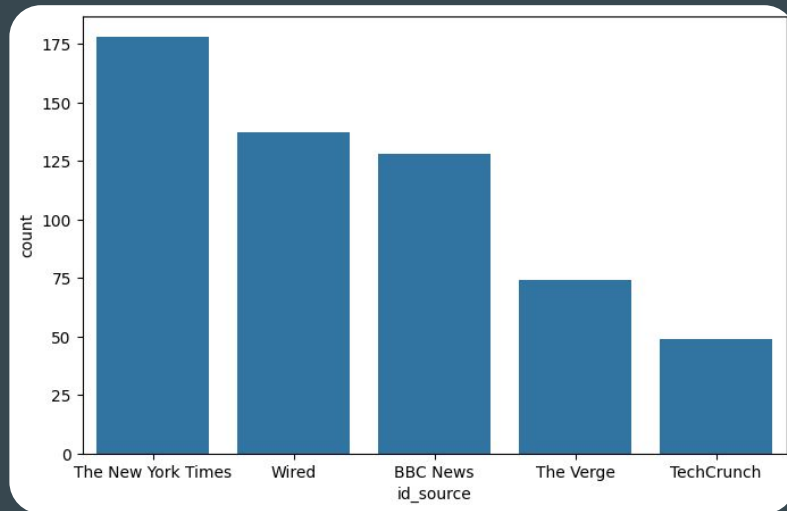
## Why?

- RSS Sources publish **tens of articles** each day.
- Some Sources cover many **different topics** (not always interesting).
- **Interesting topics** might be **lost** in between all the daily articles.
- To have “**the algorithm**” under control.

# Data Source

English RSS found in [Best RSS Feeds in 2025](#):

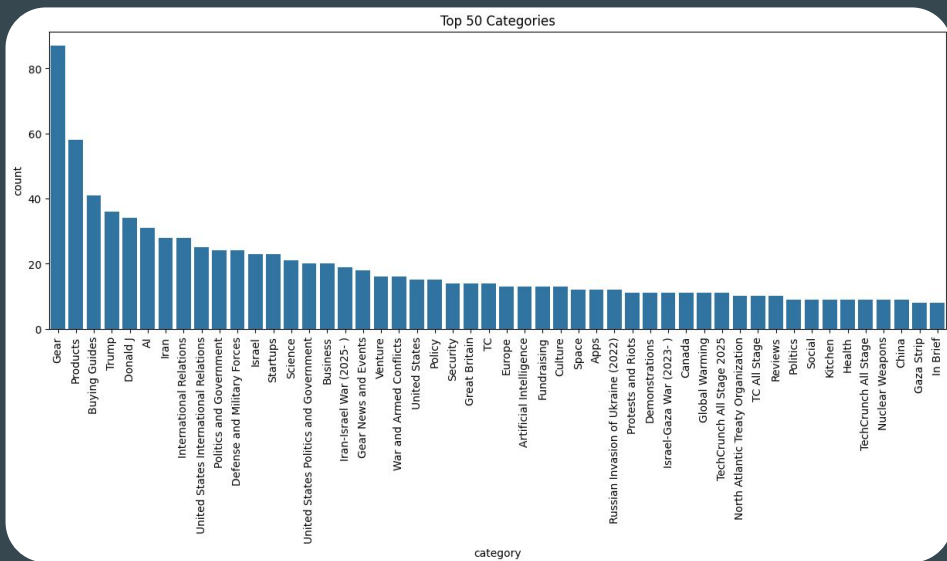
- The New York Times
- Wired
- BBC News
- The Verge
- TechCrunch
- Ars Technica



```
<item>
  <title>The 10 Best Carry-On Luggage for Business Travelers</title>
  <link>https://www.wired.com/story/best-carry-on-luggage-for-business-travelers/</link>
  <guid isPermaLink="false">686550b9c1c031cd22ee175e</guid>
  <pubDate>Wed, 02 Jul 2025 16:01:07 +0000</pubDate>
  <media:content/>
  <description>Whether you're looking for whisper-quiet wheels or the most durable of hard-shells, here are WIRED and Condé Nast Traveler's essential carry-on bags.</description>
  <category>Gear</category>
  <media:keywords>The Future of Business Travel, Shopping, Travel, buying guides, Bags</media:keywords>
  <dc:creator>Meaghan Kenny, Adrienne So</dc:creator>
  <dc:publisher>Condé Nast</dc:publisher>
  <dc:subject>In the Bag</dc:subject>
  <media:thumbnail url="https://media.wired.com/clips/686532268629b1e1b142071e/master/pass/WIREDxCONDENAST%20no.6-Carry-Ons.mp4" width="2838" height="1684"/>
</item>
<item>
```

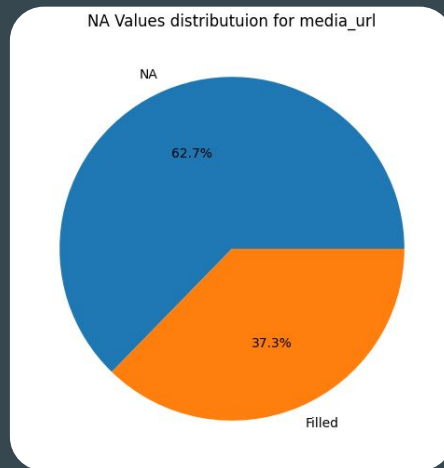
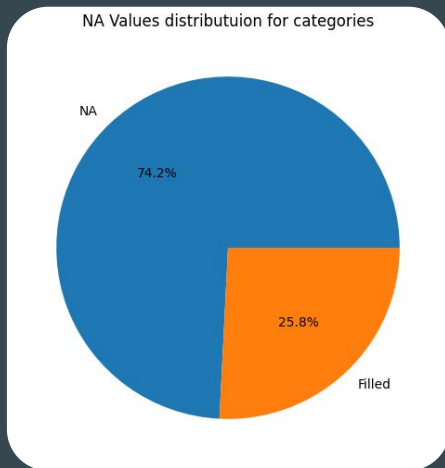
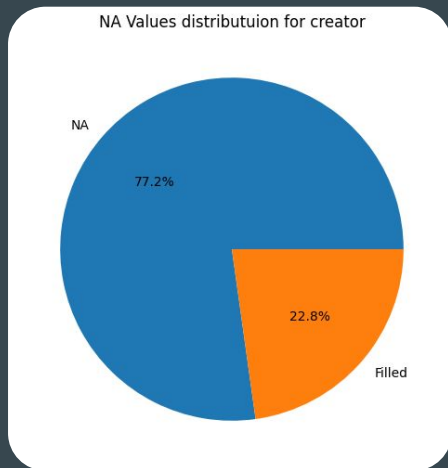
# Exploratory Data Analysis

- More than 1200 categories in for 5 sources in 13 days\* of information.
- Around 130 articles per day just with 5 sources (in peak collection days\*)



\* Data collection started with NYT on 25/06 the rest of the sources were added on 30/06 and finished on 02/07 morning  
Articles previous to these dates were provided by the RSS sources during the mentioned period.

# EDA - Other Learnings



The RSS parser logic needs to be improved:

- Main fields (`title`, `link`, `pubDate`) are standard.
- But there are alternative implementations (`media:thumbnail` / `media:content`, `description` / `summary`)
- And some are not always defined (`category`, `dc:creator`, `content`,...)

# EDA - Other Learnings

## Selective data cleaning:

- Same fields in different sources might have different formats.
- The format is not always explicit.

```
<summary type="html">
  <![CDATA[ Amazon's early Prime Day sale
  started off slow, but as the event draws
  closer to its official kickoff on July 8th,
  it's beginning to pick up steam. Right now,
  for example, Prime members can grab an Amazon
  Echo Hub at Amazon for just $119.99 ($60 off),
  marking a new low price. As you might expect,
  [&#8230;] ]]>
</summary>
```

```
<description>Weather agencies have
warned of a third day of high
temperatures that in some places have
climbed well above 100 degrees
Fahrenheit, or more than 40 degrees
Celsius.</description>
```

```
<description><![CDATA[TikTok Shop US is
conducting its third round of layoffs in as
many months.]]></description>
```

# Implementation Details



# 1. Obtain Data and Feed RAG

- Use `requests()` to pull xml from source.
- Store xml into a file per source (file was replaced in each update)
- `UnstructuredXMLLoader` to feed RAG and “`snowflake-arctic-embed2`” as embedder.
- `OllamaChat` to process rag requests with “`Llama3.1:8B`”

## Results and Learnings:

- `UnstructuredXMLLoader` was not properly loading de documents.
- XML files were slow and I was `losing` older `articles` (in every update).
- VectorStore `data management` was not possible.
- RAG wasn't the proper solution for creating top topics.

## 2. Custom RSS Loader and SQLite

- Implemented a custom algorithm to read and parse **RSS** to **langchain Documents**.
- Implemented a **SQLite** Database to store the articles and not older articles with each update.
- Used articles id in database to manage content on **ChromaVS** in order to **avoid duplicated data**.
- Started splitting the code in **modular classes** and implemented the initial **controllers**.

### Results and Learnings:

- The process **speed** increased with the database.
- RAG results started to be **relevant**.

## 3. Top Topics and Streamlit

- Use **SQLite** database to send the articles of the day directly to the **LLM** in order to get the **Top Topics**.
- **Streamlit** client showing the list of articles and sources in the database and top topics as **Trending Topics**.
- Worked with the prompt in order to obtain a valid **JSON** from the model.
- Switched from OllamaChat to **OllamaLLM**.
- Switched model to **Llama3.2:3b**.

### Results and Learnings:

- Llama3.2:3B provide similar results than the previous model with **less resources**.
- **Getting a JSON** as answer was easy, ensuring it was correct not.
- I found Streamlit a bit **limited** in components but I managed to use the default ones.
- Reduced prompt **complexity**.

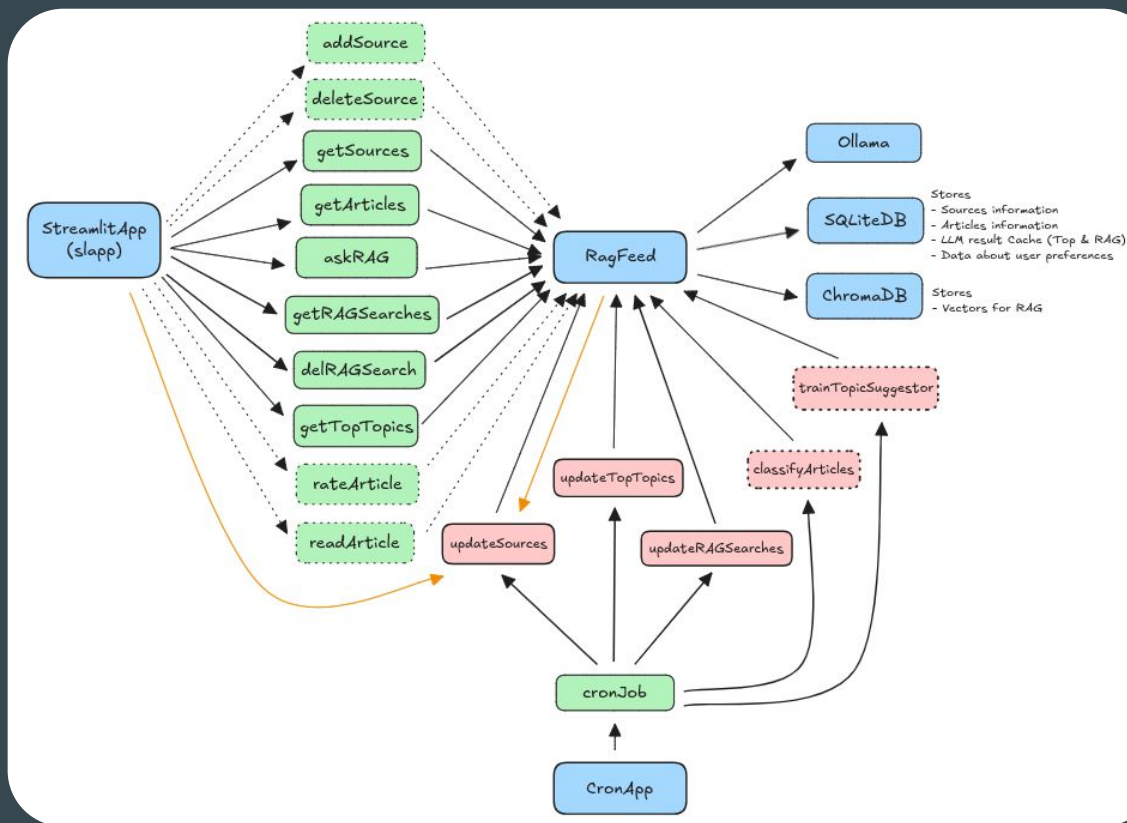
## 4. Integrating RAG Search and LLM Guard rails

- Modified the **prompt** of the RAG functionality to return a JSON.
- Created the interface in **Streamlit**, changing the general search for a “**follow topic**” system.
- Using SQLite database as **cache** to reduce number of inferences when not needed (and user wait time).
- Implemented a prompt to **correct wrong JSON** formats returned by RAGSearch and TopTopics.
- Implemented a **cron** to update RagSearches and TopTopics out of the client.

### Results and Learnings:

- Improved app **usability**.
- Improved **reliability** of the model results.

# App structure and endpoints



# Modular Implementation

- ▼ slapp
  - 🔗 feed.py
  - 🔗 rag.py
  - 🔗 settings.py
- ▼ src
  - > \_\_pycache\_\_
  - 🔗 chromaVectorStore.py
  - 🔗 ollamaModel.py
  - 🔗 RagFeedLogic.py
  - 🔗 rssArticlesLoader.py
  - 🔗 sqliteDatabase.py
- 💎 .gitignore
- 🔗 cronapp.py
- 🔗 RagFeed.py
- ① README.md
- ≡ requirements.txt
- 🔗 settings.py
- 🔗 slapp.py

```
# This class is the main controller of the app
# Initializes everything the app needs to work and contains the endpoint for the clients
# To keep it clean, logic is stored in src.RagFeedLogic
class RagFeed:
    # Initializes application based on the settings
    def __init__(self):
        # Logger
        self.log = logging.getLogger(logger_path)
        self.log.setLevel(logger_level)
        self.log.addHandler(logging.FileHandler(logger_path, 'w'))
        self.log.info("\n\n===== RagFit Init ===== \n\n")

        # Initialize DB
        if database_engine == "sqlite":
            from src.sqliteDatabase import SqliteDatabase
            self.database = SqliteDatabase(sqlite_path, log=self.log)
        else:
            error = f"RagFeed. __init__: database_engine '{database_engine}' is not implemented"
            self.log.error(error)
            raise NotImplementedError(error)

        # Ollama
        if model_source == "ollama":
            from src.ollamaModel import OllamaModel
            self.model = OllamaModel(llm_model = ollama_llm, embeddings_model = ollama_embeddings, url = ollama_url, log = self.log)
        else:
            error = f"RagFeed. __init__: model_source '{model_source}' is not implemented"
            self.log.error(error)
            raise NotImplementedError(error)

        # Prepare ChromaDB
        if vector_store_engine == "chroma":
            from src.chromaVectorStore import ChromaVectorStore
            self.vectorstore = ChromaVectorStore(embeddings=self.model.embeddings, collection_name=chromadb_collection, persist_directory=chromadb_path, log=self.log)
        else:
            error = f"RagFeed. __init__: database_engine '{vector_db}' is not implemented"
            self.log.error(error)
            raise NotImplementedError(error)

        # Init RagFeedLogic
        self.ragfeedlogic = RagFeedLogic(db = self.database, vs = self.vectorstore, model=self.model, log=self.log, update_freq = feeds_update_freq)

        # Update sources
        self.updateSources()
```

# RagFeed - RSS Feed

Deploy

RSS Feed

Ask Feed

Settings

Sources:

The New York Times

Wired

BBC News

The Verge

TechCrunch

Trending Topics:

#DroughtsAndPoverty

#BusinessTravel

#ElectricVehicles

#SpaceExploration

#Cybersecurity

#ArtificialIntelligence

#TeslaSales

#Healthcare

Next refresh in: 14m 59s

Refresh Now

Rss Feed

Diogo Jota, Liverpool Soccer Star, Dies In Car Crash at 28

Thu, 03 Jul 2025 09:56

Mr. Jota and his brother André Filipe, 26, died in Spain, the authorities said. The crash came two weeks after the Portuguese player's wedding.

Read more

Liverpool 'devastated' by death of forward Jota

Thu, 03 Jul 2025 09:46

Liverpool say they are "devastated" by the "unimaginable loss" of their Portuguese forward Diogo Jota, who has died in a car crash.

Read more

Fact-checking three key claims about Trump's mega-bill

Thu, 03 Jul 2025 09:45

Trump insists that the new bill will save the US billions, but it has been criticised by his old ally Elon Musk.

Read more

The Pope Returns to Castel Gandolfo for Summer. And There Will Be Tennis.

Thu, 03 Jul 2025 09:33

For 400 years, most popes escaped the Roman summer in the hilltop town of Castel Gandolfo, Italy. Then Francis stopped going, leaving the town a bit bereft.

Read more

The Promise and Peril of Digital Security in the Age of Dictatorship

Thu, 03 Jul 2025 09:30

LGBTIQ+ organizations in El Salvador are using technology to protect themselves and create a record of the country's ongoing authoritarian escalations against their community. It's not without risks.

Read more

# RagFeed - Trending Topics

Deploy

RSS Feed

Ask Feed

Settings

Sources:

The New York Times

Wired

BBC News

The Verge

TechCrunch

Trending Topics:

#DroughtsAndPoverty

#BusinessTravel

#ElectricVehicles

#SpaceExploration

#Cybersecurity

#ArtificialIntelligence

#TeslaSales

#Healthcare

Next refresh in: 7m 34s

Refresh Now

Rss Feed

Business Travel

The business travel industry is evolving rapidly, with a focus on work-life integration and intentional travel. Airlines are upgrading their amenities to attract high-end customers, while private jet companies are offering more affordable options.

Affluent Travelers Are Ditching Business Class for Business Jets

Wed, 02 Jul 2025 15:00

With a rise in "semiprivate" carriers, new booking tech, and commercial airline partnerships, it's never been easier to fly private.

Read more

For Today's Business Traveler, It's All About Work-Life Integration

Wed, 02 Jul 2025 15:00

With hybrid lifestyles now the norm, business trips have become more intentional, more mobile, and surprisingly more restorative.

Read more

Airport Lounges Are Sexy Again—if You Can Get In

Wed, 02 Jul 2025 15:00

The latest wave of premium airport lounges are harder to get into, but for big-spending business travelers, no amenity is off the table.

Read more



# RagFeed - Ask Rag

RSS Feed

Ask Feed

Settings

Add Search

Your searches:

Artificial Intelligence

Data Science

Android

Deploy

Artificial Intelligence

Artificial Intelligence (AI) is a rapidly growing field with various applications, including generative tools, chatbots, and superintelligence. Researchers are pushing back against the negative impacts of AI, while companies like Meta and Amazon are restructuring their AI units to focus on building superintelligence. Scientists are also using AI to mimic human cognition by training large language models on psychology experiment questions.

The AI Backlash Keeps Growing Stronger

Sat, 28 Jun 2025 12:30

As generative artificial intelligence tools continue to proliferate, pushback against the technology and its negative impacts grows stronger.

[Read more](#)

What Could a Healthy AI Companion Look Like?

Wed, 02 Jul 2025 16:00

A chatbot designed to avoid anthropomorphism offers a compelling glimpse into the future of human-to-AI relationships.

[Read more](#)

Meta restructures its AI unit under 'Superintelligence Labs'

Mon, 30 Jun 2025 17:56

Meta CEO Mark Zuckerberg is restructuring the company's AI efforts to center around building AI "superintelligence."

[Read more](#)

Scientist Use A.I. To Mimic the Mind, Warts and All

Wed, 02 Jul 2025 15:00

To better understand human cognition, scientists trained a large language model on 10 million psychology experiment questions. It now answers questions much like we do.

[Read more](#)

Everything that could go wrong with X's new AI-written community notes

Wed, 02 Jul 2025 21:00

X says AI can supercharge community notes, but that comes with obvious risks.

# RagFeed - Settings

RSS Feed

Ask Feed

Settings

Deploy

## Settings

### Feed Management

Add new RSS feed URL

Add Source

### Your Sources

The New York Times	0
Wired	0
BBC News	0
The Verge	0
TechCrunch	0
Ars Technica	0

### Refresh Interval

Auto-refresh interval (minutes)

5

15

60

# Tools and Technologies

# Tools and Technologies

- **GenAI**: Obtain TopTopics, RagSearch and fix JSON
- **RAG**: Feed RagSearch
- **Ollama**: Manage the LLM and Embedder
- **LangChain**: Manage Documents and Chroma
- **ChromaVS**: Store the documents for RAG
- **SQLite**: Store the Articles and Sources data and cache llm answers.
- **BeautifulSoup**: Parse RSS XML to a usable format.
- **Streamlit**: User front-end.
- **Transformers**: Count Tokens

# Major Obstacle

# Ask RAG for Top Topics

- I was expecting a list of topics related to the current date.
- RAG returns documents related to the words “Top”, “Topics” and “Today”.

## Solution and improvements:

- Feed the LLM with data in SQLite to generate TopTopics.
- Won more control on what today mean (last 24h)

# UnstructuredXMLLoader documents parse.

- Documents created had no description or link.
- RAG answer were not good and wasn't able to provide the the source.

## Solution and improvements:

- Use BeautifulSoup to parse XML.
- Organize the information in the SQLite database.
- Use `langchain_core.documents` to create documents
  - Decided what data add in page\_content and metadata.
  - Decided the format of the data added in VS.

# Ask RAG for Top Topics

- I wasn't able to know what articles were inside Chroma.
- I had to recreate vector store everytime I delete or update articles.
- I was duplicating information (feeding VS directly from RSS).

## Solution and improvements:

- Use SQLite as source of documents.
- Use article id as id in vector store so I can delete documents.
- Have a boolean indicator in DB to know if article is in VS



# Model inference time

- Ollama requires some time to execute the inference.
- The time vary depending on the length of the prompt.
- Client App (streamlit) might seem freeze while waiting.

## Solution and improvements:

- Implemented a cron task to periodically update articles.
- Cron also updates **TopTopics** and **RagSearches** when articles were updated.
- SQLite stores the last result so the app don't need to call the model every time.
- Rollback to **Llama3.2:8b** since **3.1:3b** was causing ollama to freeze.

# JSON from model inference.

- Model results where good as markdown.
- Transform the answer to a JSON was easy.
- Get a valid JSON (parseable) in the proper format reliably was challenging.

## Solution and improvements:

- Reduce model temperature.
- Improved prompting.
- Implemented GuardRails
  - Prompt focused on fix JSON structure.
  - Adapted the the code to be flexible to the prompt structure.
  - Implemented an alternative path to avoid the app to crash.

# Conclusions and Insights

# Conclusions and Insights

- Developing an application using **GenAI** as part of the backend is fast.
- Get reliable results from **LLM**, specially when **structured formats** are required.
- Working with local models:
  - Start with **small models** and change to bigger ones if needed (when the prompt is well optimized).
  - Good for an **MVP** (focus in make the app work first and later optimize it).
  - Makes app **hard to deploy**.
- **RAG** is powerful and seems easy but proper **document formatting** and **data management** is key.
- Do not focus on getting **perfect prompts** before integrating with the client.
- **Iterate** and **be flexible** with the ideas.
- Implement a **logging system** soon in your app.

# Next Steps

- Improve **RSS parse** algorithm.
- **Source management** flow.
- Allow to mark articles as **Read/Undead**.
- Allow to **rate** articles interest.
- **Internal reader** and track number of times an article is open.
- Use the information about RagSearch, interest rate and num times open to train an “**Interest Classifier**” ML Algorithm.
- Improve app **look and feel** (especially in light mode).
- **Async tasks** instead of a cron for updating sources, TopTopic and RagSearch.
- Train an **Unsupervised Learning Algorithm** to find better categories or articles relations.

**Thank you.**