

The Next Generation of Content Creation



WordLift



Kalicube



MONTHLY ROUNDTABLE

Jul 2023



Scaling Content Marketing > ⚠️ HUGE CHALLENGE

FRAGMENTED CUSTOMER JOURNEY

DATA IS DISTRIBUTED BUT DISCONNECTED

LACK OF AI ALIGNMENT

AI MAKES MISTAKES





“ By design, all transformers hallucinate to one degree or another. ”

Grady Booch

“ They create nothing; they may make syntactic connections that are surprising, but they generate no new semantics. ”



“GPT models are actually reasoning engines not knowledge databases.”

Sam Altman

Knowledge databases are as important to AI progress as foundational models.

Evolution of LLMs

One Slide

Base Language Model

What is the capital of Italy?
What is Italy's largest city?
What is Italy's population?

Instruction tuned Language Model

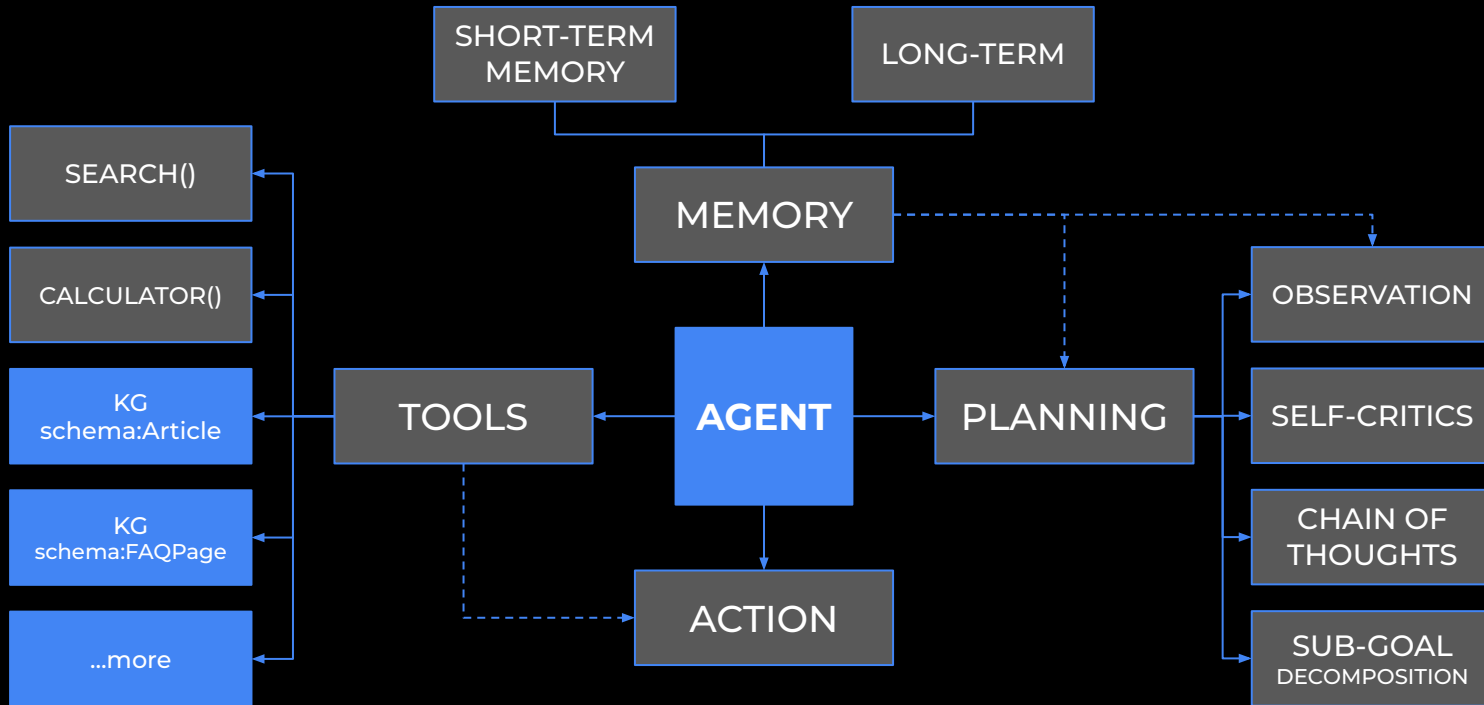
What is the capital of Italy?
The capital of Italy is Rome.

- Fine-tuned on instructions.
- Use Reinforcement Learning from Human Feedback RLHM
- Helpful and honest when you are clear and specific

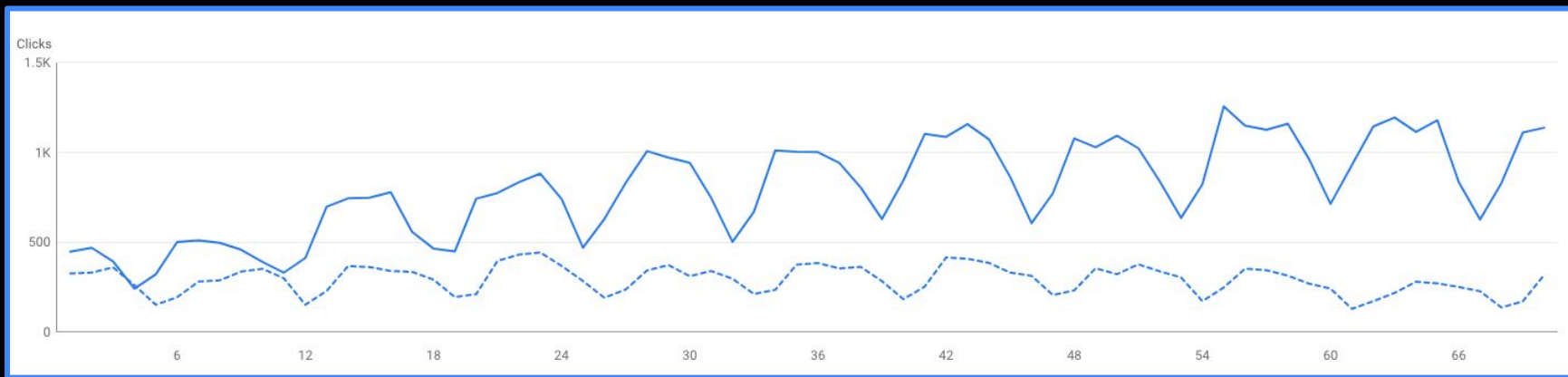
The **Hottest Party** in **AI** is **Building Agents**



What is an
**Autonomous
AI Agent?**



Can we boost organic traffic using AI apps?



+ 174% of clicks in 2 months



The **Hottest Party** in **SEO** is **Building Apps!**

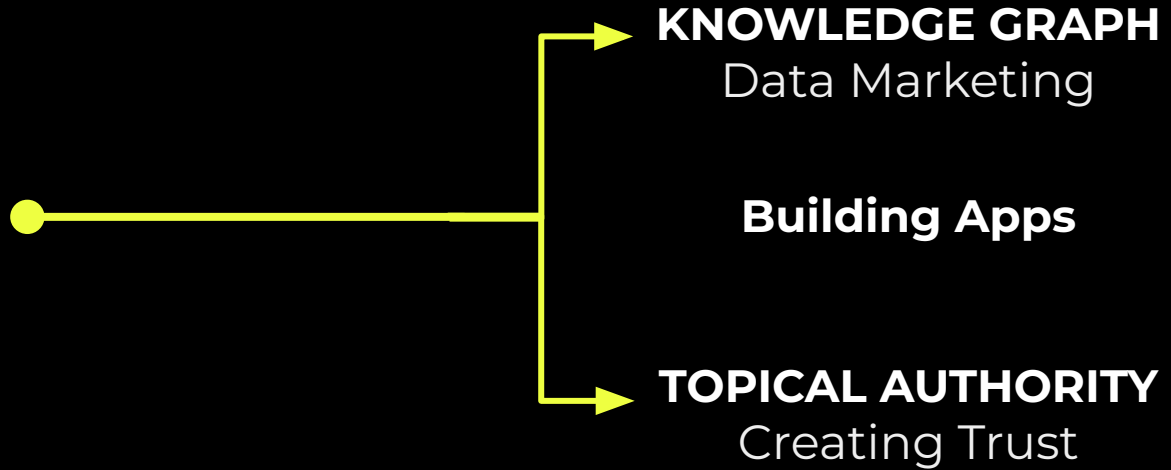
Sharing Content
1990-2022



Building Apps
NOW

The **Hottest Party** in **SEO** is **Building Apps!**

Sharing Content
1990-2022



Knowledge-Intensive AI Applications for SEO

Shopping Assistant

Blog Assistant

Links

Audit

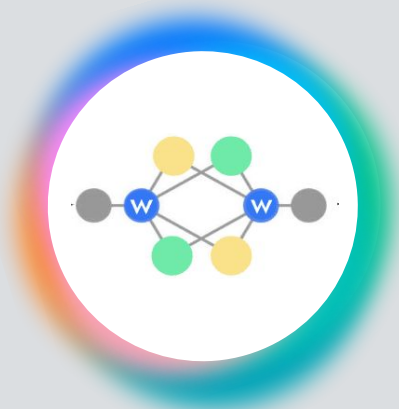
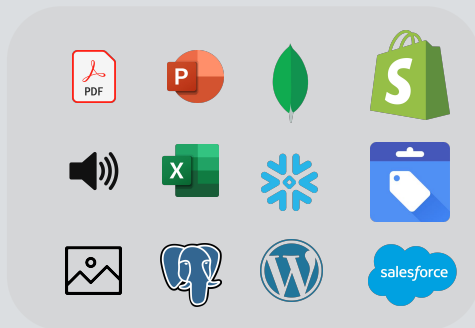
...

Input: rich query
description

Output: rich response with
references, actions, etc

Knowledge Graph

Data Interface for LLM app development



Foundation Models


co:here

 
AI21labs

Meet RAG

Retrieval **A**ugmented
Generation



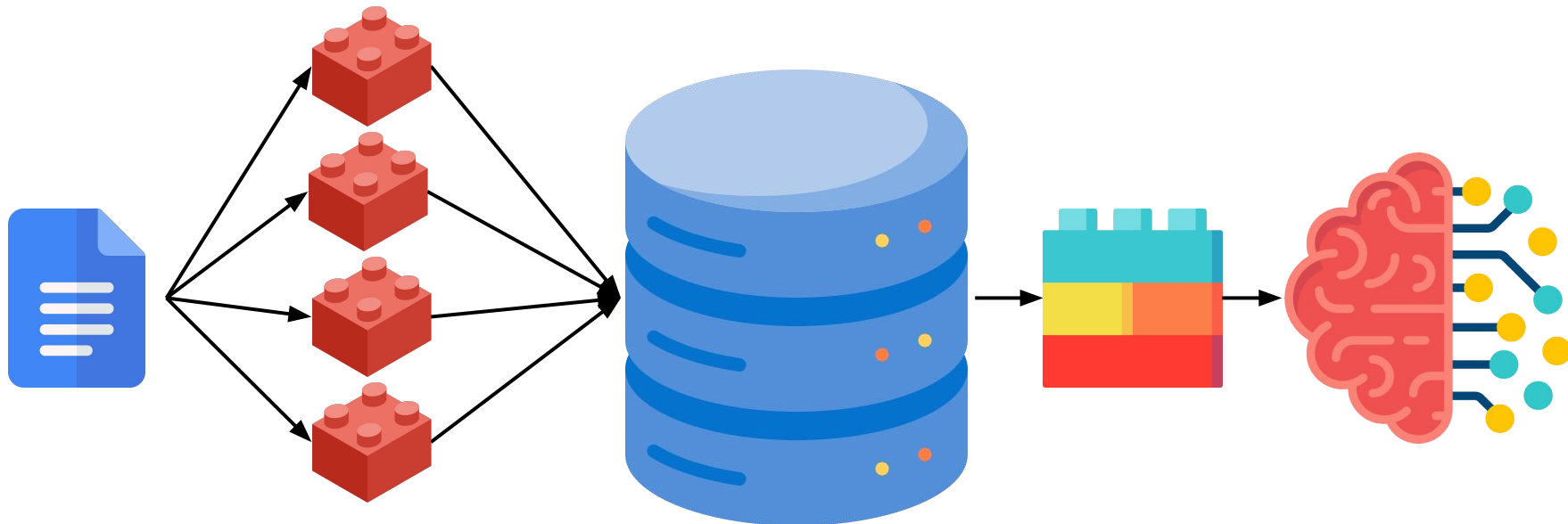
1. **LLMs don't know what they know**
2. **Retrieval-Augmented Generation (RAG) approach** is a way to **control the model's knowledge** and reduce **hallucinations**
3. A **retrieval-based memory** is used to improve the **accuracy** of the **response**.

The RAG Stack (as simple as it gets)

Ingestion



Querying



DOCUMENT

CHUNKS

INDEX

CHUNKS

LLM

Main Challenges

Building Agents

- Finding **the right piece of information** is hard:
 - Data is not organized correctly
 - Data is not up to date
 - Chunks are not linked together
 - Chunks are not of the right length
- LLMs **still hallucinate**

Introducing WordLift Reader

A connector for
 **LlamaIndex** &
  **LangChain**



Chat

Readme

+ New Chat



User

who is Doreid?

06:51:05 PM

Chatbot

Using retrieve ▾

06:51:05 PM

✕ Stop task

⤴ Type your message here...



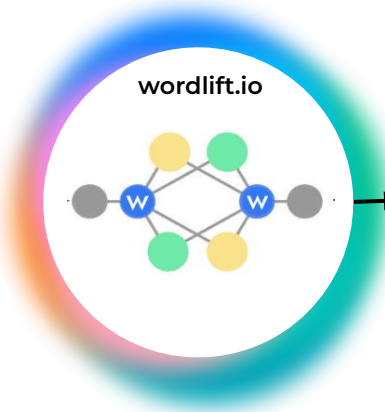
The RAG Stack powered by Structured Data 1/3

Ingestion



Querying

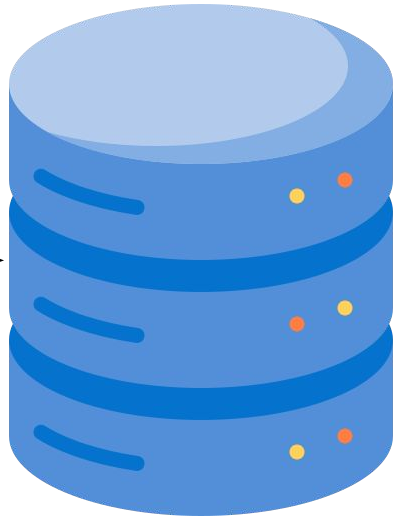
schema:Article



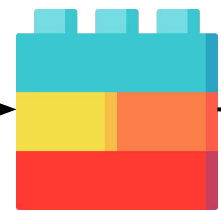
KNOWLEDGE GRAPH



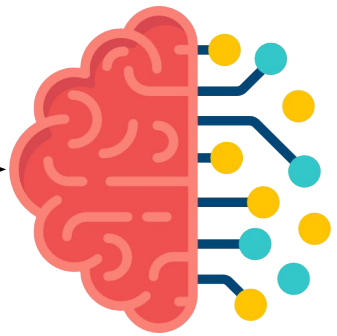
WORDLIFT READER



INDEX



CHUNKS



LLM



From GraphQL to Vector Embeddings



```
query {
  articles {
    id: iri
    headlines: strings(name:"schema:headline")
    article_desc: string(name:"schema:description")
    url: string(name:"schema:mainEntityOfPage")
  }
}
```



```
config_options = {
  "text_fields": ["headlines", "article_desc", "url"],
  "metadata_fields": ["url"]}
```

When we add a **url** as **text_field** WordLift Reader will **read the content** of the webpage and **index it** automatically. If you want to get data faster ask our team to store the **body of your articles** in the **knowledge graph** (wordpress:content)

Shopping Assistant



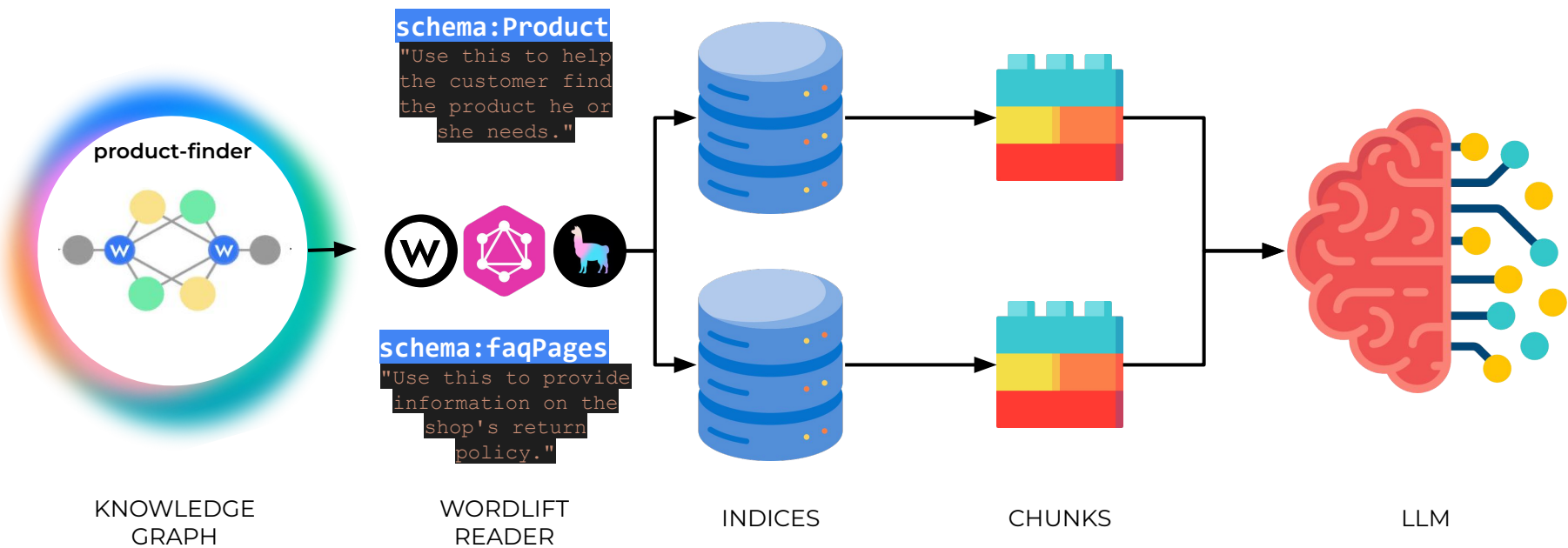
A Product Knowledge
Graph Agent

The RAG Stack powered by Structured Data 2/3

Ingestion



Querying



schema:Product (recommend products)

User I want something that would fit me well everyday in green

08:07:52 PM

Chatbot The Contrast Long-sleeve Blouse In Green would be a great option for everyday wear in green. It is made of lightweight fabric and has a relaxed fit, making it comfortable and flattering.

08:07:52 PM

User I am a girl, looking for a casual look for this summer, what would you suggest?

08:09:17 PM

Chatbot For a casual look this summer, I would suggest a Cotton Eyelet Midi Dress In Mustard, Casual Pants In Black, lightweight t-shirts, shorts, sandals, and sneakers. These items are all comfortable and stylish, perfect for a casual summer look.

08:09:17 PM

schema:faqPages (provide information about the return policy)

User What is the return policy? Do you have one?

08:12:34 PM

Chatbot The return policy is that customers can return an item within 30 days of purchase for a full refund, provided that the item is unused, in the same condition as received, and in its original packaging. Yes, we have a return policy.

Improve retrieval by leveraging relationships



index **only the question**

```
config_options_f = {  
  "text_fields": ["questions.question"],  
  "metadata_fields": ["questions.answer.text", "url"]}
```

Retrieval can fail when there is **not a strong match** between the user **query** and the **nodes being indexed**.

Using schema:FAQPage we can **index the question** and keep the answer as metadata.

Do Androids Dream of Multiple Graphs?

One Agent, two Graphs and the ability to **ask multiple questions** before answering.

User

04:50:31 PM

What does Beatrice think of Knowledge Graphs and how is it different from Teodora's idea of Knowledge Graphs?

Chatbot

04:50:31 PM

Beatrice believes that knowledge graphs are critical to many enterprises today, providing structured data and factual knowledge that can drive products and make them more intelligent and magical. She also believes that knowledge graphs can serve as a living system to help marketing communications professionals do their knowledge-intensive job better and assist people in looking for solutions on the Web, providing interconnected data and structured content. Teodora's idea of Knowledge Graphs is that they can be used to enhance search engine results with semantic-search information gathered from a wide variety of sources. She believes that Knowledge Graphs can provide structured and detailed information about a topic in addition to a list of links to other sites, allowing users to resolve their query without having to navigate to other sites and assemble the information themselves. Beatrice's idea of Knowledge Graphs is more focused on how they can be used to drive products and help marketing communications professionals, while Teodora's idea is more focused on how they can be used to enhance search engine results and provide structured and detailed information.

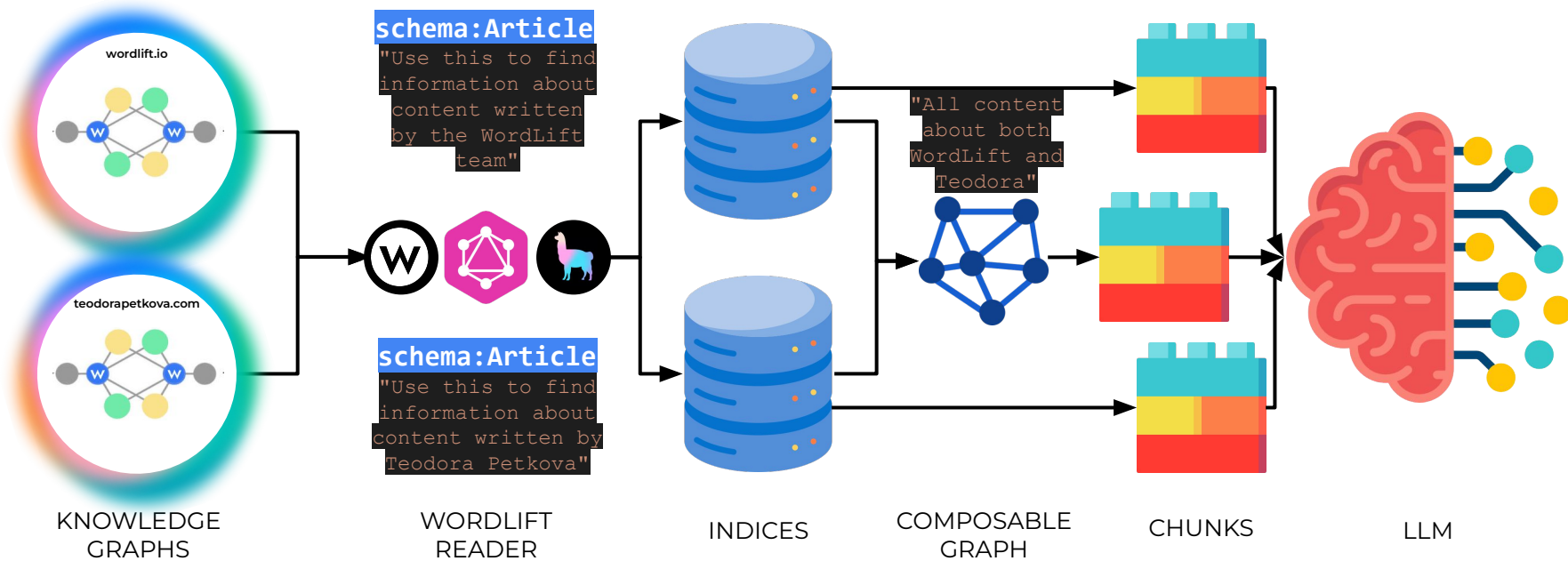


The RAG Stack powered by Structured Data 3/3

Ingestion



Querying



Generated 3 sub questions.

[all_content] Q: What does Beatrice think of Knowledge Graphs

[all_content] A:

Beatrice believes that knowledge graphs are critical to many enterprises today, providing structured data and factual knowledge that can drive products and make them more intelligent and magical. She also believes that knowledge graphs can serve as a living system to help marketing communications professionals do their knowledge-intensive job better and assist people in looking for solutions on the Web, providing interconnected data and structured content. She has seen the potential of knowledge graphs through her direct experience in helping travel brands, and believes that they can help travel brands attract more visitors and provide precise answers to certain questions.

[wordlift_content] Q: What is WordLift's idea of Knowledge Graphs

[wordlift_content] A:

WordLift's idea of Knowledge Graphs is that they are a logical way to organize information on the web, built on top of a vocabulary called Schema.org which defines the possible relationships available among things on the web. Knowledge Graphs are comprised of information from sources such as Wikipedia, Structured Data, G+ Page, Wikidata, and other sources. They are used to create a context, to improve content findability by leveraging on semantic search engines like Google and Bing, and to provide precise answers to certain questions.

[teodora_content] Q: What is Teodora's idea of Knowledge Graphs

[teodora_content] A:

Teodora's idea of Knowledge Graphs is that they can be used to enhance search engine results with semantic-search information gathered from a wide variety of sources. She believes that Knowledge Graphs can provide structured and detailed information about a topic in addition to a list of links to other sites, allowing users to resolve their query without having to navigate to other sites and assemble the information themselves. Teodora also believes that Knowledge Graphs can be used to create smart content at scale and to manage knowledge in marketing.

Trace: query

```
|_llm → 9.806551 seconds
|_sub_questions → 24.096234 seconds
|_synthesize → 7.543244 seconds
|_llm → 7.532639 seconds
```

User What does Beatrice think of structured data?

06:45:08 PM

Chatbot Beatrice thinks that structured data is important for search engine optimization and can help search engines return better, more relevant results and answers to the end user. She also believes that Schema gives site owners a chance to include things that Google might have missed, and that search engine optimization should be understood as search engine optimization with data.

User What about Teodora, what is her view of Structured Data?

06:45:57 PM

Chatbot Teodora's view of Structured Data is that it is essential for search engines to return better, more relevant results and answers to the end user or the data consumer. Structured data is also key to understanding and proper communication between people, software, and hardware. She believes that businesses that have their data available, standards-compliant, and linked will be ahead of the SEO game.



BONUS SLIDE



<https://s.mj.run/Yp5Y0HUWxus> by the Italian painter Michelangelo Merisi da Caravaggio --v 5.2"

Learnings

1. The future of content is **building multi-agent systems** capable of extracting in-context chunks using knowledge graphs to interact with the audience.
2. Every agent needs **a clear mission**.
3. You need a **data fabric** (and a **KG**). Your data, your content and your unique messaging are **as essential as the LLM**.
4. At the hearth of **a successfull AI-generated user experience** (as for apps and websites) lies **a robust content model** and **solid Information Architecture** (IA).
5. **LLMs**, even with the right context, can still **make mistakes** (you need validation!).

Grazie!



Kalicube &  **WordLift**

W



References

1. [Neuro-symbolic AI: Where Knowledge Graphs Meet LLMs](#)
2. [Knowledge Graphs In-Context](#)
3. [LLM-Powered Autonomous Agent](#)
4. [\[colab\]WordLift Reader for LlamaIndex](#)
5. [From classic to modern era: what is a dialogue by Teodora Petkova](#)
6. [AI is like an Iceberg by Tony Seale \(a survival guide\)](#)
7. [LLM Ontology-prompting for Knowledge Graph Extraction by Peter Lawrence](#)