LLMs und Digitale Bibliotheken Ein perfekter Match?

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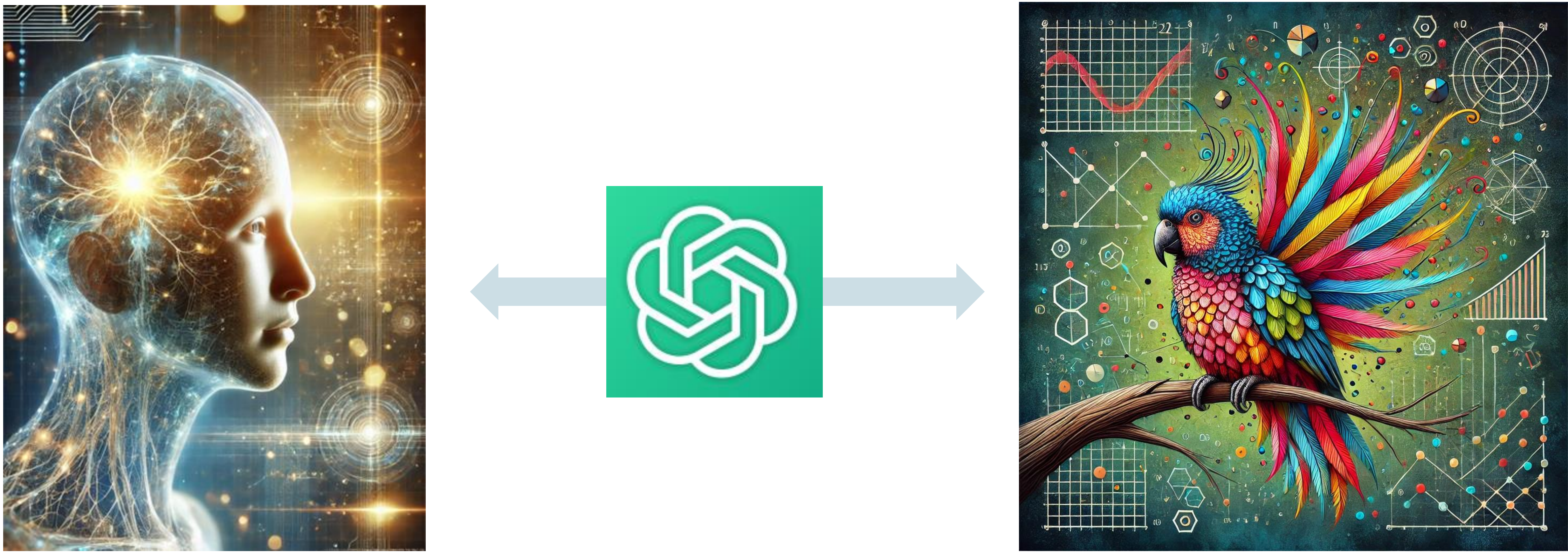
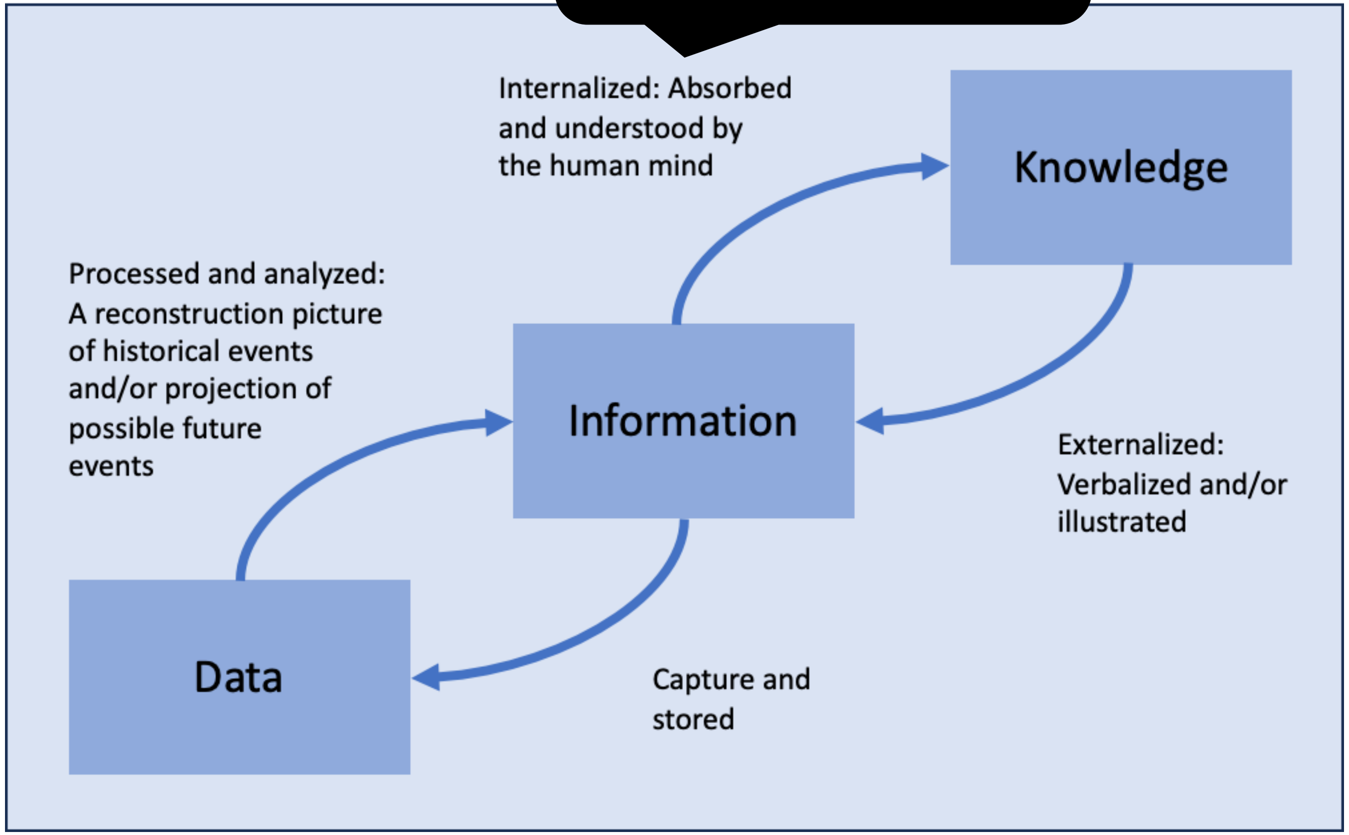


„Der Student muss es wissen,
der Assistent muss wissen, wo es steht,
der Prof muss wissen, wo der Assistent ist.“

Wissen im Schrank
Ist noch kein Wissen im Kopf



Internalized: Absorbed and understood by the human mind

Knowledge

Processed and analyzed: A reconstruction picture of historical events and/or projection of possible future events

Information

Externalized: Verbalized and/or illustrated

Data

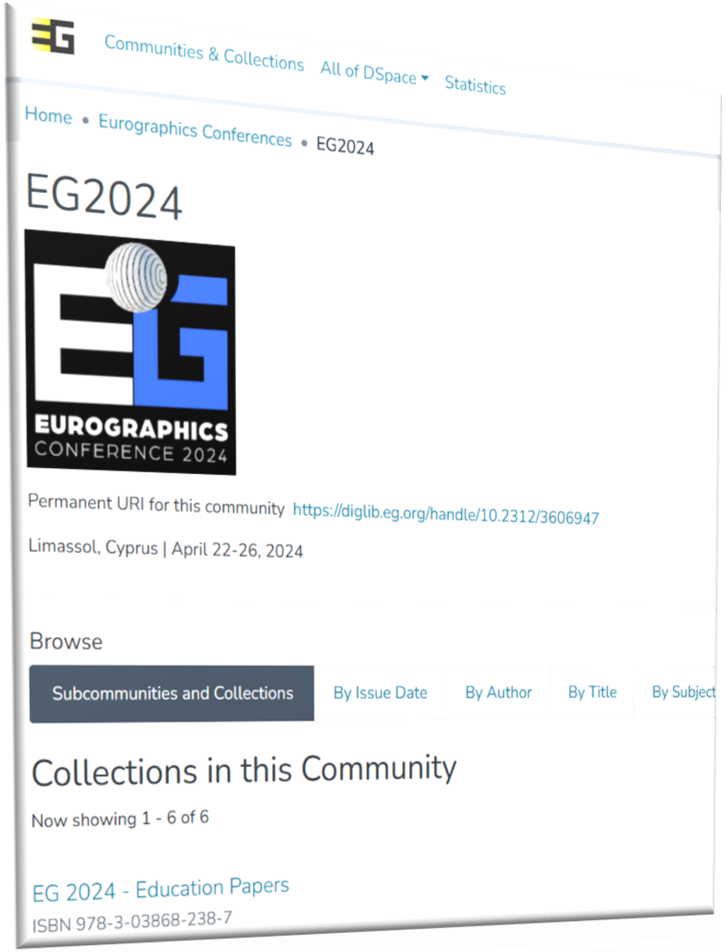
Capture and stored

[Liew (2007)]

Eurographics

Digital Library

- Eurographics ist eine europaweite professionelle Vereinigung, die sich auf die Förderung der Computergrafik und verwandter Bereiche wie Multimedia, wissenschaftliche Visualisierung und Mensch-Computer-Interaktion konzentriert.
- Förderung des globalen Wissensaustausch durch ihre weltweite Mitgliedschaft und pflegt Verbindungen zu Entwicklungen in den USA, Japan und darüber hinaus.
- Eurographics organisiert Aktivitäten und bietet Dienstleistungen für Forscher, Entwickler, Lehrende und Fachleute der Industrie an, die Zugang zu Veranstaltungen und Ressourcen erhalten.
- Seit 1997 Betreiber der Eurographics Digital Library für das Journal „Computer Graphics Forum“, sowie diverser Konferenzen und Workshops. (~ 7000 Artikel)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Limassol, Cyprus | April 22-26, 2024

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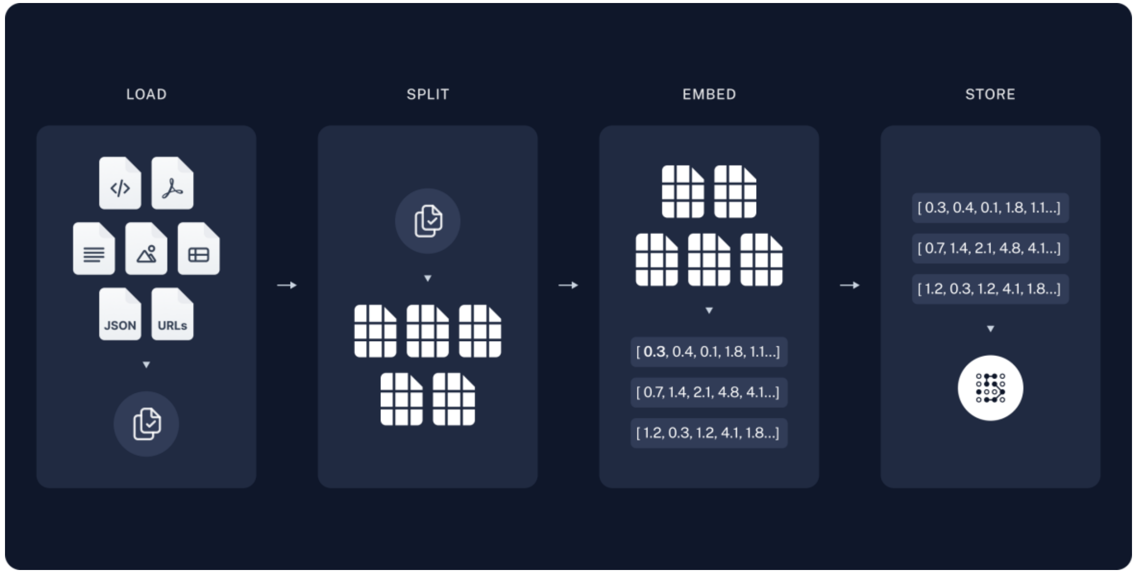
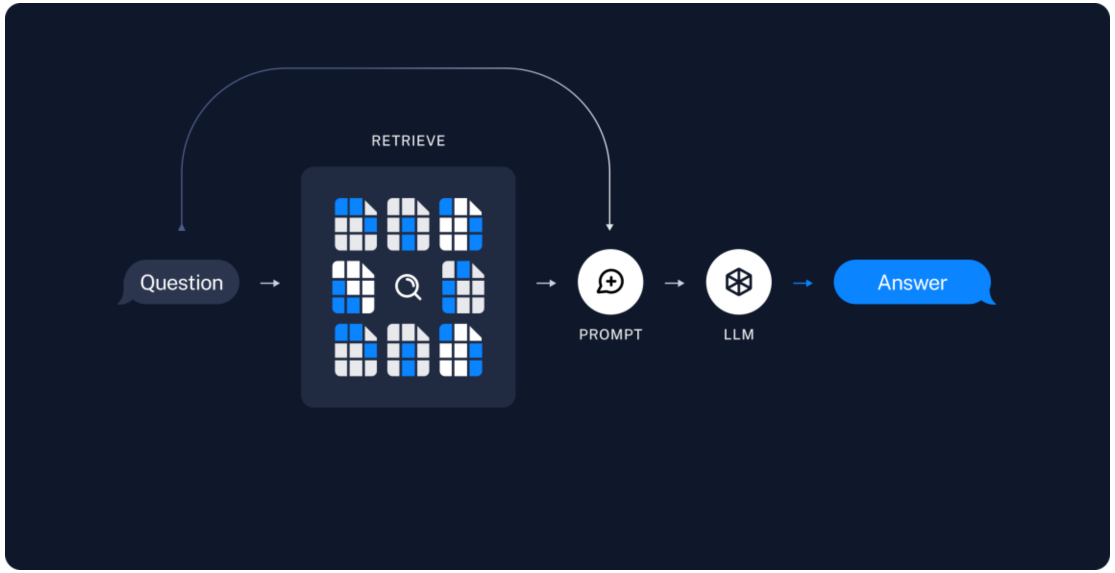
Retrieval-Augmented Generation


LOAD
JSON
URLs
SPLIT
EMBED
[0.3, 0.4, 0.1, 1.8, 1.1...]
[0.7, 1.4, 2.1, 4.8, 4.1...]
[1.2, 0.3, 1.2, 4.1, 1.8...]
STORE
[0.3, 0.4, 0.1, 1.8, 1.1...]
[0.7, 1.4, 2.1, 4.8, 4.1...]
[1.2, 0.3, 1.2, 4.1, 1.8...]

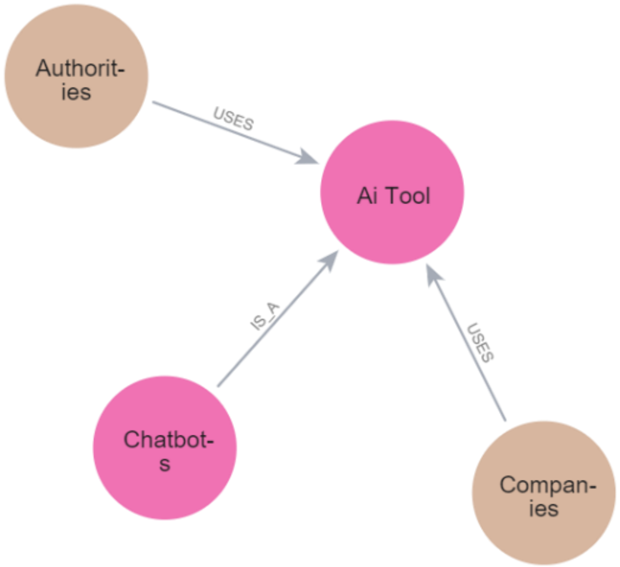

RETRIEVE
Question
PROMPT
LLM
Answer

[LangChain]

Wissensgraphen

Ein Wissensgraph ist eine strukturierte Darstellung von Wissen in Form von Knoten (Entitäten) und Kanten (Beziehungen), die Informationen semantisch miteinander verknüpfen.

- Wissen auf verständliche Weise zu organisieren
- Kontextbezogene Verbindungen sichtbar zu machen
- Komplexe Informationen schnell zugänglich und leichter navigierbar zu machen


Authorit-
ies
USES
Ai Tool
IS_A
USES
Chatbot-
s
Compan-
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Wissensgraph

- Strukturelles Wissen
- Genauigkeit & Interpretierbarkeit
- Domänenspezifisches Wissen

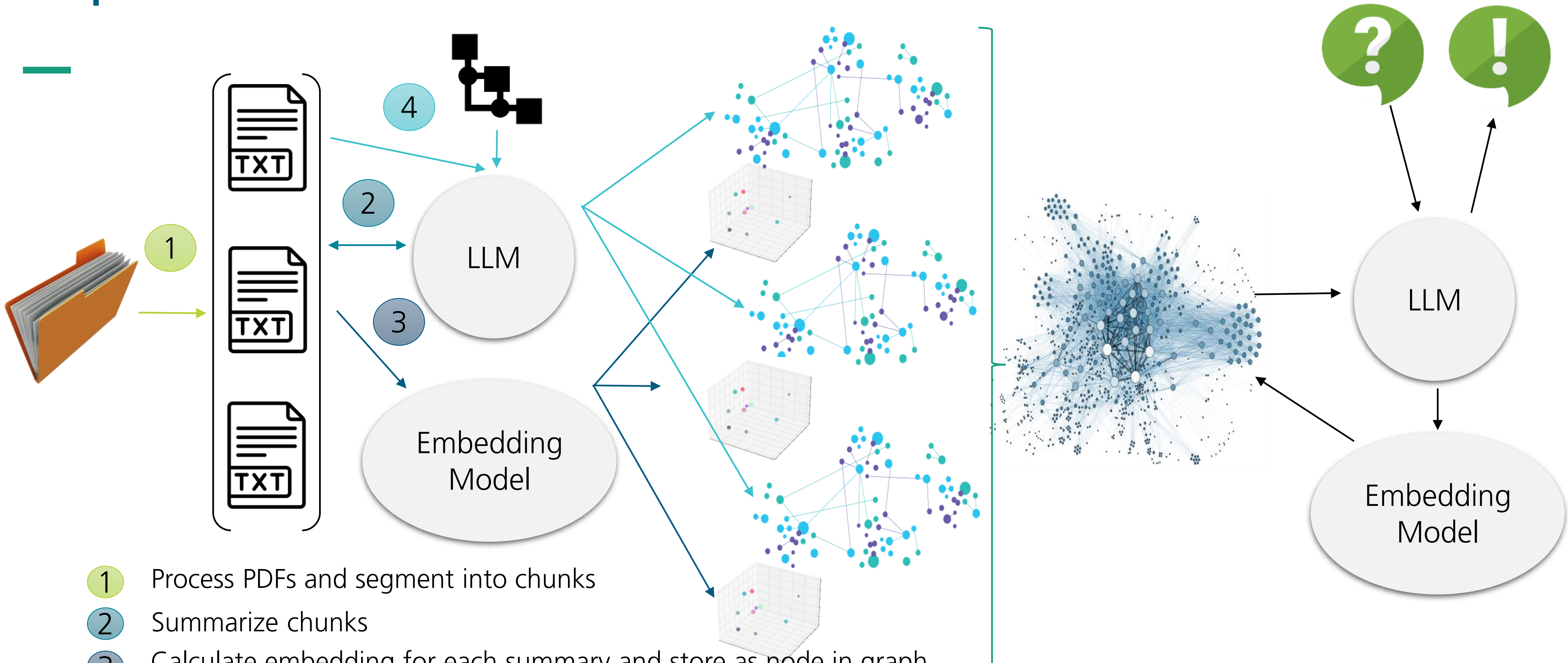
- Ungesehene Fakten
- Fehlendes Sprachverständnis
- Unvollständigkeit

LLM

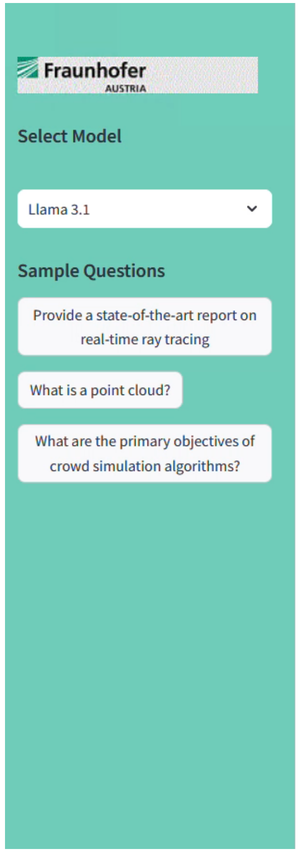
- Allgemeines Wissen
- Sprachverarbeitung
- Generalisierbarkeit

- Implizites Wissen
- Halluzinationen
- Black-Box
- Unentschlossenheit

GraphRAG in Neo4J


4
2
3
1
TXT
TXT
TXT
LLM
Embedding Model
?
!
LLM
Embedding Model

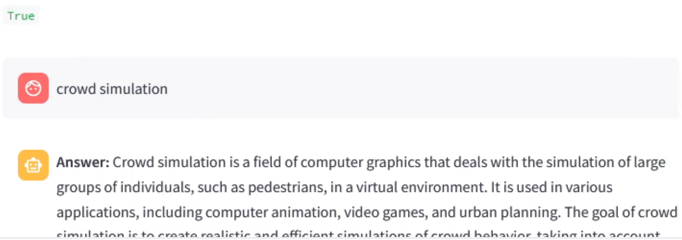
1. Process PDFs and segment into chunks
2. Summarize chunks
3. Calculate embedding for each summary and store as node in graph
4. Extract entities and relationships for each summary and store in graph


Select Model

Llama 3.1

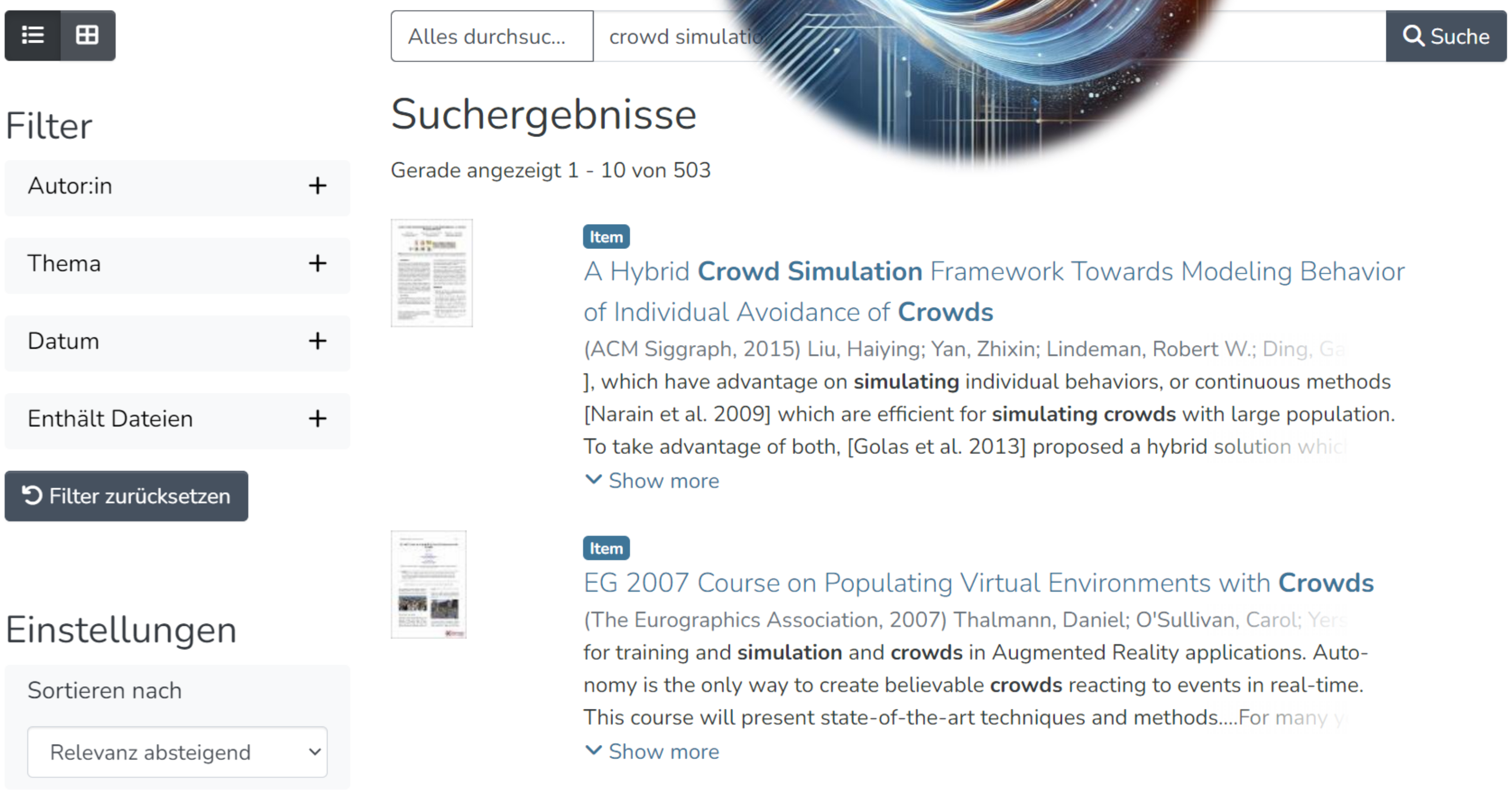
Sample Questions

Provide a state-of-the-art report on real-time ray tracing
What is a point cloud?
What are the primary objectives of crowd simulation algorithms?


```
True
```

crowd simulation

Answer: Crowd simulation is a field of computer graphics that deals with the simulation of large groups of individuals, such as pedestrians, in a virtual environment. It is used in various applications, including computer animation, video games, and urban planning. The goal of crowd simulation is to create realistic and efficient simulations of crowd behavior, taking into account


Alles durchsuc...
crowd simulatio
Suche

Filter

Autor:in +
Thema +
Datum +
Enthält Dateien +
Filter zurücksetzen

Einstellungen

Sortieren nach: Relevanz absteigend

Suchergebnisse

Gerade angezeigt 1 - 10 von 503

Item

A Hybrid **Crowd Simulation** Framework Towards Modeling Behavior of Individual Avoidance of **Crowds**

(ACM Siggraph, 2015) Liu, Haiying; Yan, Zhixin; Lindeman, Robert W.; Ding, Ga

], which have advantage on **simulating** individual behaviors, or continuous methods [Narain et al. 2009] which are efficient for **simulating crowds** with large population. To take advantage of both, [Golas et al. 2013] proposed a hybrid solution whic

Show more

Item

EG 2007 Course on Populating Virtual Environments with **Crowds**

(The Eurographics Association, 2007) Thalmann, Daniel; O'Sullivan, Carol; Yers

for training and **simulation** and **crowds** in Augmented Reality applications. Autonomy is the only way to create believable **crowds** reacting to events in real-time. This course will present state-of-the-art techniques and methods....For many y

Show more

Technologie

neo4j

python™

LangChain

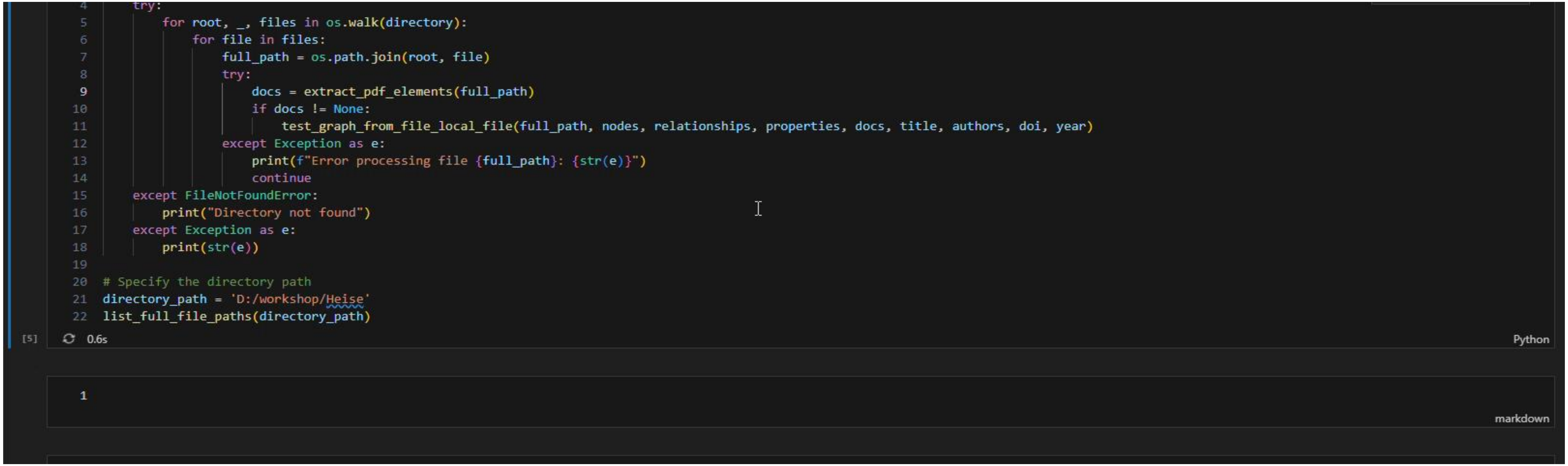
MISTRAL AI_

OpenAI

Meta

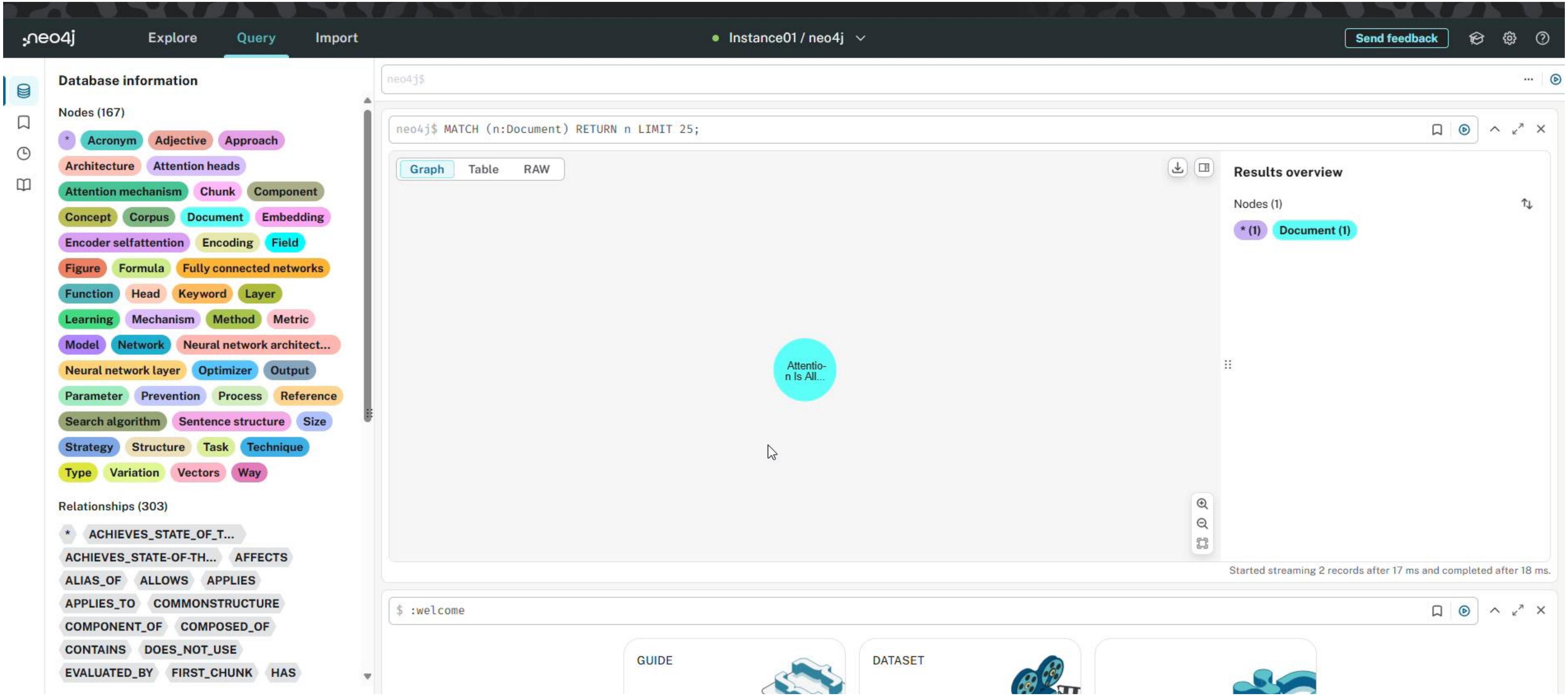
Hugging Face

Graph Konstruktion



```python
    try:
        for root, _, files in os.walk(directory):
            for file in files:
                full_path = os.path.join(root, file)
                try:
                    docs = extract_pdf_elements(full_path)
                    if docs != None:
                        test_graph_from_file_local_file(full_path, nodes, relationships, properties, docs, title, authors, doi, year)
                except Exception as e:
                    print(f"Error processing file {full_path}: {str(e)}")
                    continue
    except FileNotFoundError:
        print("Directory not found")
    except Exception as e:
        print(str(e))

# Specify the directory path
directory_path = 'D:/workshop/Heise'
list_full_file_paths(directory_path)
```

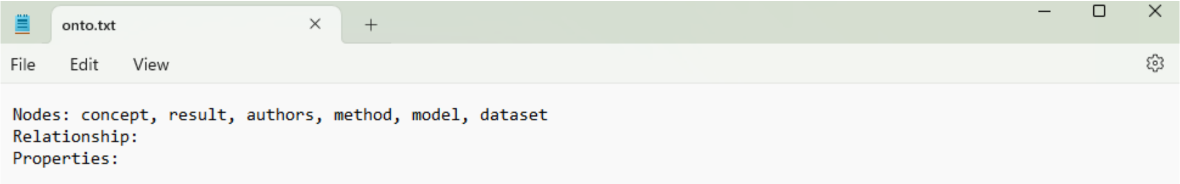

neo4j
Explore
Query
Import
Instance01 / neo4j
Send feedback
Database information
Nodes (167)
*
Acronym
Adjective
Approach
Architecture
Attention heads
Attention mechanism
Chunk
Component
Concept
Corpus
Document
Embedding
Encoder selfattention
Encoding
Field
Figure
Formula
Fully connected networks
Function
Head
Keyword
Layer
Learning
Mechanism
Method
Metric
Model
Network
Neural network architect...
Neural network layer
Optimizer
Output
Parameter
Prevention
Process
Reference
Search algorithm
Sentence structure
Size
Strategy
Structure
Task
Technique
Type
Variation
Vectors
Way
Relationships (303)
*
ACHIEVES_STATE_OF_T...
ACHIEVES_STATE-OF-TH...
AFFECTS
ALIAS_OF
ALLOWS
APPLIES
APPLIES_TO
COMMONSTRUCTURE
COMPONENT_OF
COMPOSED_OF
CONTAINS
DOES_NOT_USE
EVALUATED_BY
FIRST_CHUNK
HAS
neo4j$
Graph
Table
RAW
Attentio-
n Is All...
Results overview
Nodes (1)
* (1)
Document (1)
GUIDE
DATASET

```
neo4j$ MATCH (n:Document) RETURN n LIMIT 25;
```

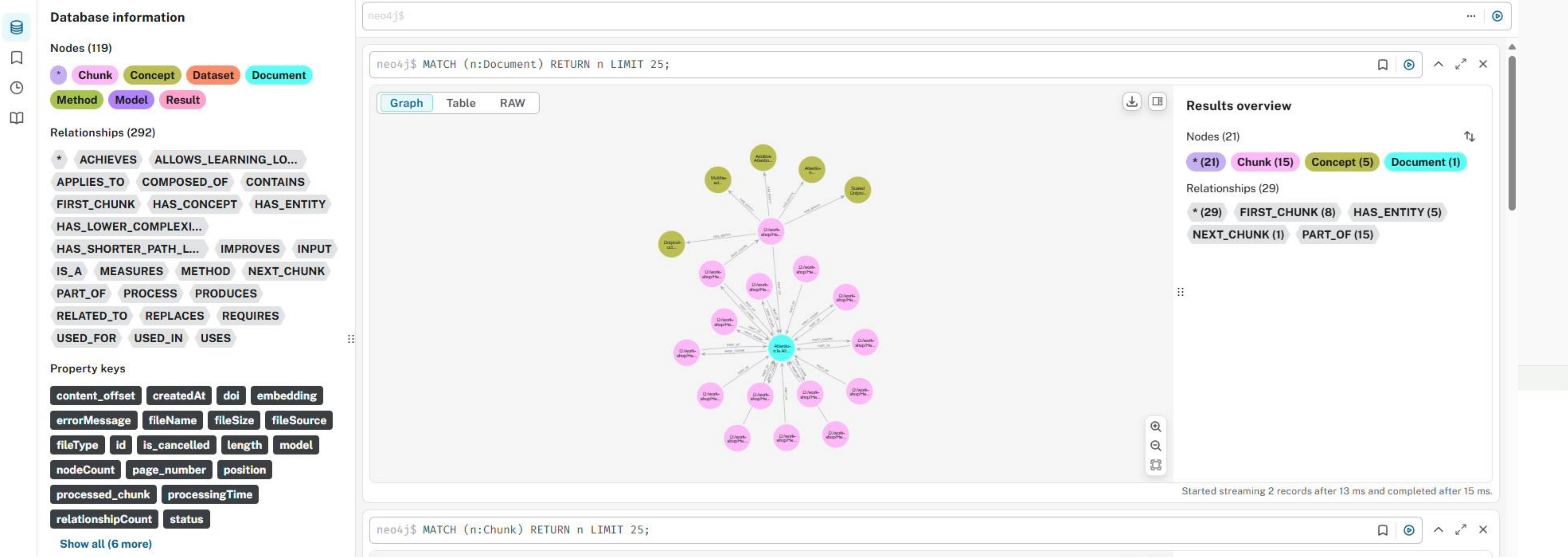
Started streaming 2 records after 17 ms and completed after 18 ms.

```
$ :welcome
```

Ontologie


onto.txt
File
Edit
View

```
Nodes: concept, result, authors, method, model, dataset
Relationship:
Properties:
```


Database information

Nodes (119)

*
Chunk
Concept
Dataset
Document
Method
Model
Result

Relationships (292)

*
ACHIEVES
ALLOWS_LEARNING_LO...
APPLIES_TO
COMPOSED_OF
CONTAINS
FIRST_CHUNK
HAS_CONCEPT
HAS_ENTITY
HAS_LOWER_COMPLEXI...
HAS_SHORTER_PATH_L...
IMPROVES
INPUT
IS_A
MEASURES
METHOD
NEXT_CHUNK
PART_OF
PROCESS
PRODUCES
RELATED_TO
REPLACES
REQUIRES
USED_FOR
USED_IN
USES

Property keys

content_offset
createdAt
doi
embedding
errorMessage
fileName
fileSize
fileSource
fileType
id
is_cancelled
length
model
nodeCount
page_number
position
processed_chunk
processingTime
relationshipCount
status
Show all (6 more)

```
neo4j$ MATCH (n:Document) RETURN n LIMIT 25;
```

Graph
Table
RAW

Results overview

Nodes (21)

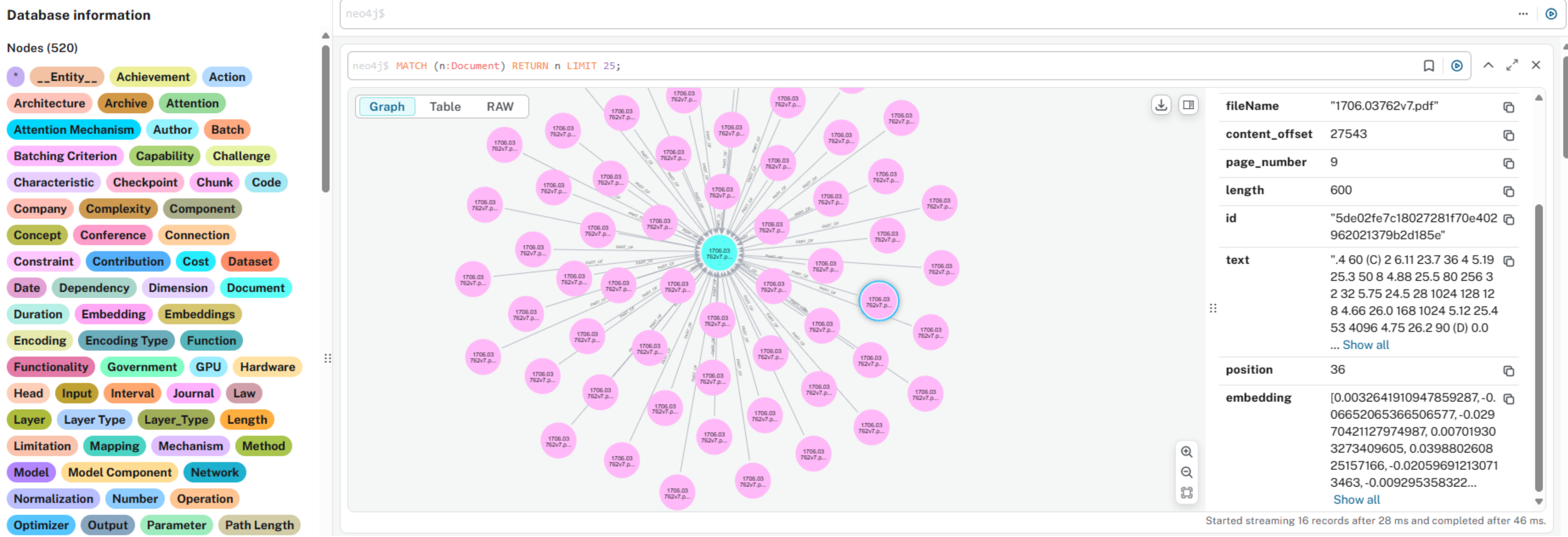
* (21)
Chunk (15)
Concept (5)
Document (1)

Relationships (29)

* (29)
FIRST_CHUNK (8)
HAS_ENTITY (5)
NEXT_CHUNK (1)
PART_OF (15)

Started streaming 2 records after 13 ms and completed after 15 ms.

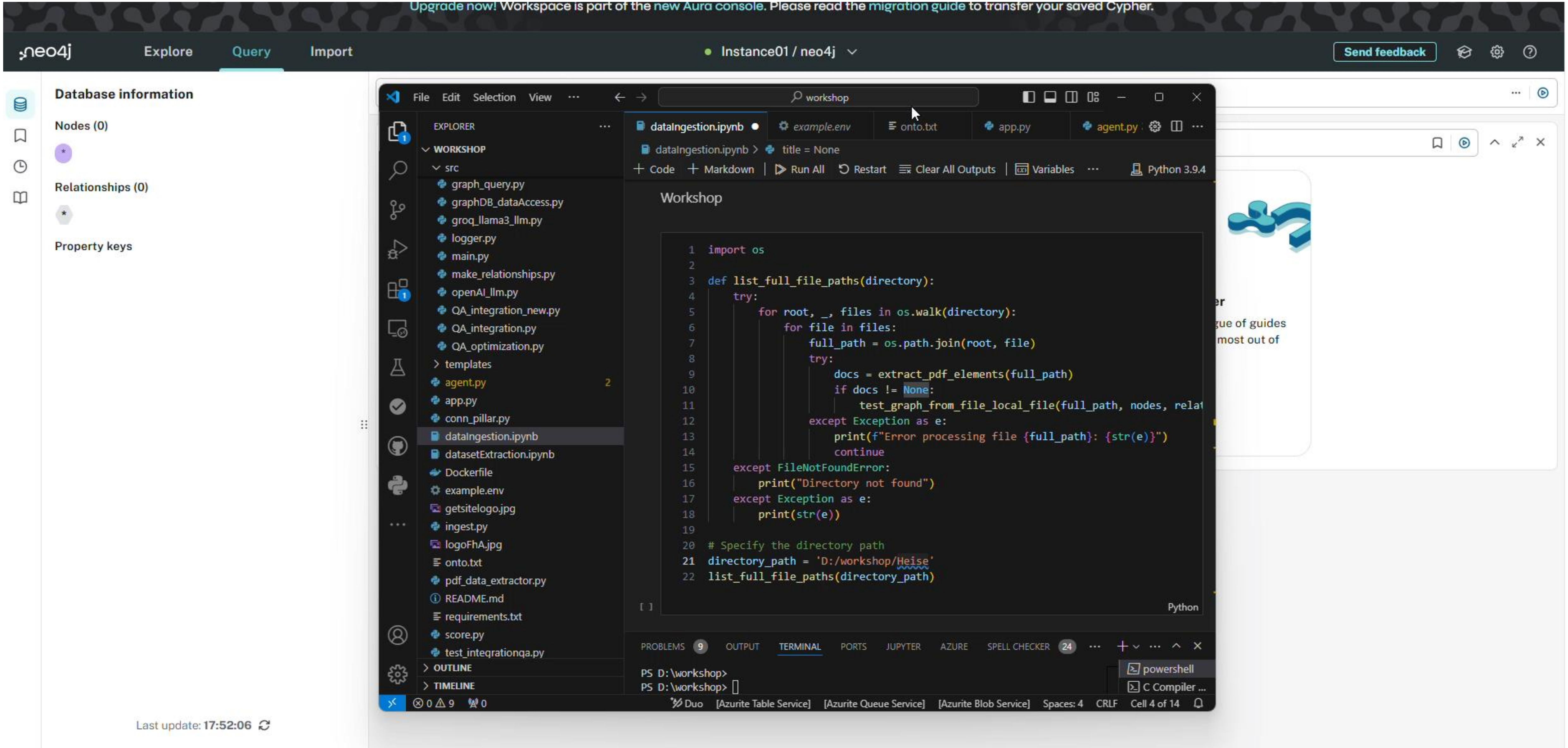
```
neo4j$ MATCH (n:Chunk) RETURN n LIMIT 25;
```


Database information
Nodes (520)
*
__Entity__
Achievement
Action
Architecture
Archive
Attention
Attention Mechanism
Author
Batch
Batching Criterion
Capability
Challenge
Characteristic
Checkpoint
Chunk
Code
Company
Complexity
Component
Concept
Conference
Connection
Constraint
Contribution
Cost
Dataset
Date
Dependency
Dimension
Document
Duration
Embedding
Embeddings
Encoding
Encoding Type
Function
Functionality
Government
GPU
Hardware
Head
Input
Interval
Journal
Law
Layer
Layer Type
Layer_Type
Length
Limitation
Mapping
Mechanism
Method
Model
Model Component
Network
Normalization
Number
Operation
Optimizer
Output
Parameter
Path Length
neo4j$
Graph
Table
RAW
1706.03 762v7.p...
PART_OF

```
neo4j$ MATCH (n:Document) RETURN n LIMIT 25;
```

fileName	"1706.03762v7.pdf"
content_offset	27543
page_number	9
length	600
id	"5de02fe7c18027281f70e402962021379b2d185e"
text	".4 60 (C) 2 6.11 23.7 36 4 5.19 25.3 50 8 4.88 25.5 80 256 3 2 32 5.75 24.5 28 1024 128 12 8 4.66 26.0 168 1024 5.12 25.4 53 4096 4.75 26.2 90 (D) 0.0 ... Show all
position	36
embedding	[0.0032641910947859287, -0.06652065366506577, -0.02970421127974987, 0.007019303273409605, 0.039880260825157166, -0.020596912130713463, -0.009295358322... Show all

Started streaming 16 records after 28 ms and completed after 46 ms.


Upgrade now! Workspace is part of the new Aura console. Please read the migration guide to transfer your saved Cypher.
neo4j
Explore
Query
Import
Instance01 / neo4j
Send feedback
Database information
Nodes (0)
Relationships (0)
Property keys
Last update: 17:52:06
File
Edit
Selection
View
workshop
dataIngestion.ipynb
example.env
onto.txt
app.py
agent.py
EXPLORER
WORKSHOP
src
graph_query.py
graphDB_dataAccess.py
groq_llama3_llm.py
logger.py
main.py
make_relationships.py
openAI_llm.py
QA_integration_new.py
QA_integration.py
QA_optimization.py
templates
agent.py
app.py
conn_pillar.py
dataIngestion.ipynb
datasetExtraction.ipynb
Dockerfile
example.env
getsitelogo.jpg
ingest.py
logoFhA.jpg
onto.txt
pdf_data_extractor.py
README.md
requirements.txt
score.py
test_integrationqa.py
OUTLINE
TIMELINE
dataIngestion.ipynb > title = None
Code
Markdown
Run All
Restart
Clear All Outputs
Variables
Python 3.9.4
Workshop
Python
PROBLEMS 9
OUTPUT
TERMINAL
PORTS
JUPYTER
AZURE
SPELL CHECKER 24
powershell
C Compiler ...
0 9 0
Duo
[Azurite Table Service]
[Azurite Queue Service]
[Azurite Blob Service]
Spaces: 4
CRLF
Cell 4 of 14
ue of guides
most out of

```python
import os

def list_full_file_paths(directory):
    try:
        for root, _, files in os.walk(directory):
            for file in files:
                full_path = os.path.join(root, file)
                try:
                    docs = extract_pdf_elements(full_path)
                    if docs != None:
                        test_graph_from_file_local_file(full_path, nodes, relat
                except Exception as e:
                    print(f"Error processing file {full_path}: {str(e)}")
                    continue
    except FileNotFoundError:
        print("Directory not found")
    except Exception as e:
        print(str(e))

# Specify the directory path
directory_path = 'D:/workshop/Heise'
list_full_file_paths(directory_path)
```

```
PS D:\workshop>
PS D:\workshop>
```

Kontakt

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