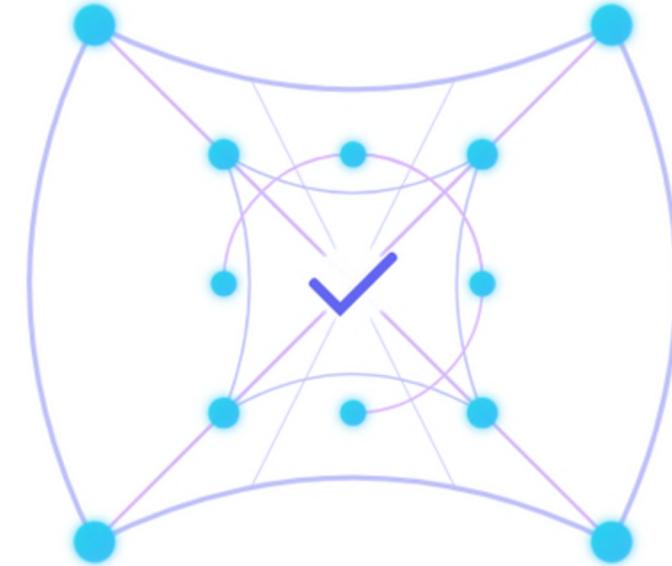


FactRAG



Fact-Checking System using GraphRAG

Presented by

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Problem Statement



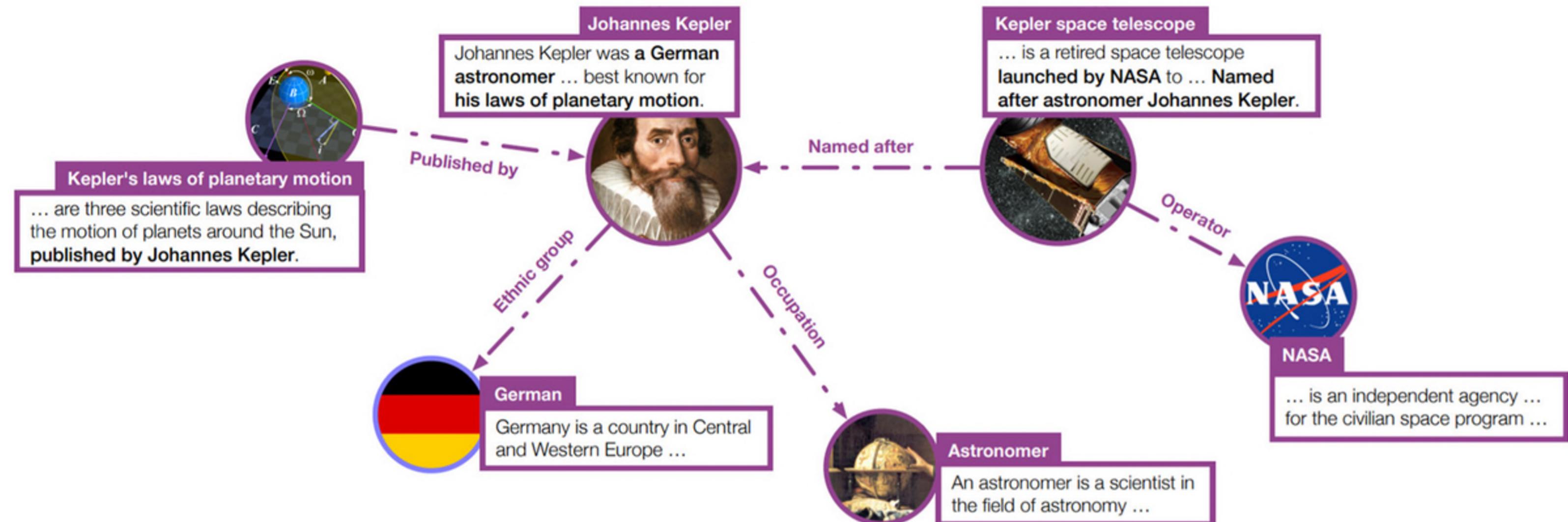
- Challenge: Manual fact-checking is time-consuming and error-prone.

Automated, reliable fact verification system

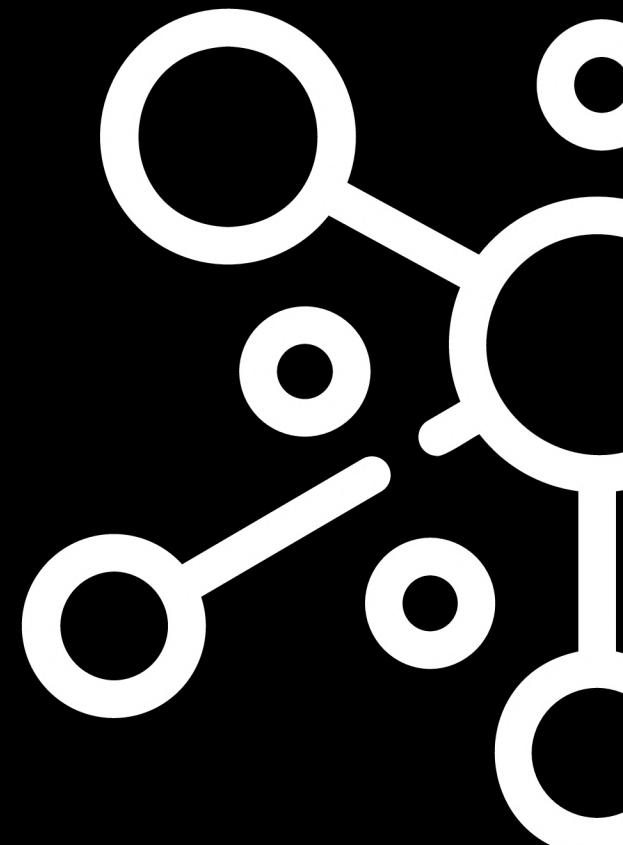
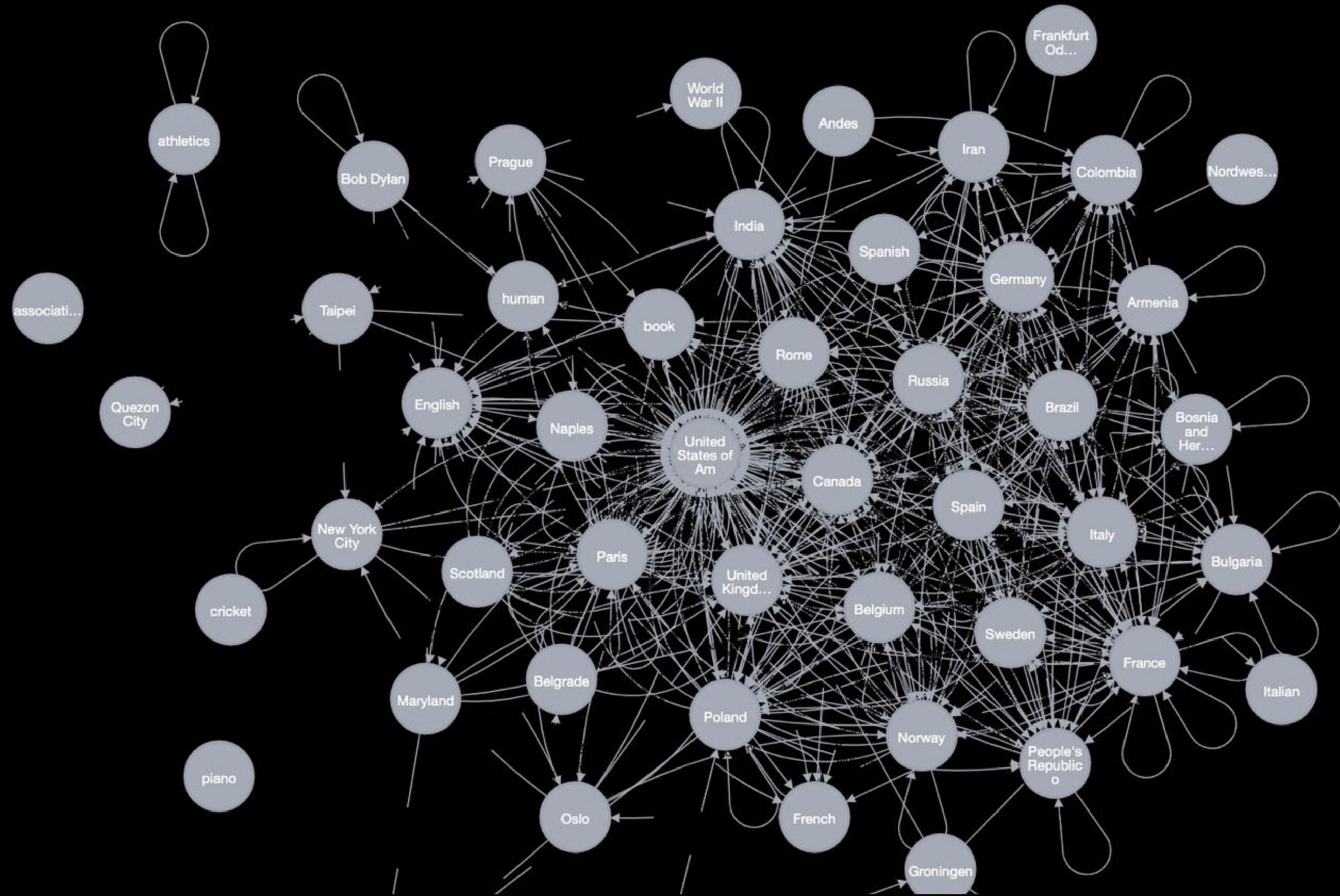
- Current Limitations:
 - Text-based systems lack structured knowledge
 - Traditional approaches miss complex relationships
 - Scalability issues with large datasets

Dataset Overview - Wikidata5M

Setting		#Entity	#Relation	#Triplet
Transductive	Train	4,594,485	822	20,614,279
	Valid	4,594,485	822	5,163
	Test	4,594,485	822	5,133
Inductive	Train	4,579,609	822	20,496,514
	Valid	7,374	199	6,699
	Test	7,475	201	6,894



Full Knowledge Graph



* Graph-Native Design

Its property graph model & Cypher language make it perfect for querying the knowledge graph

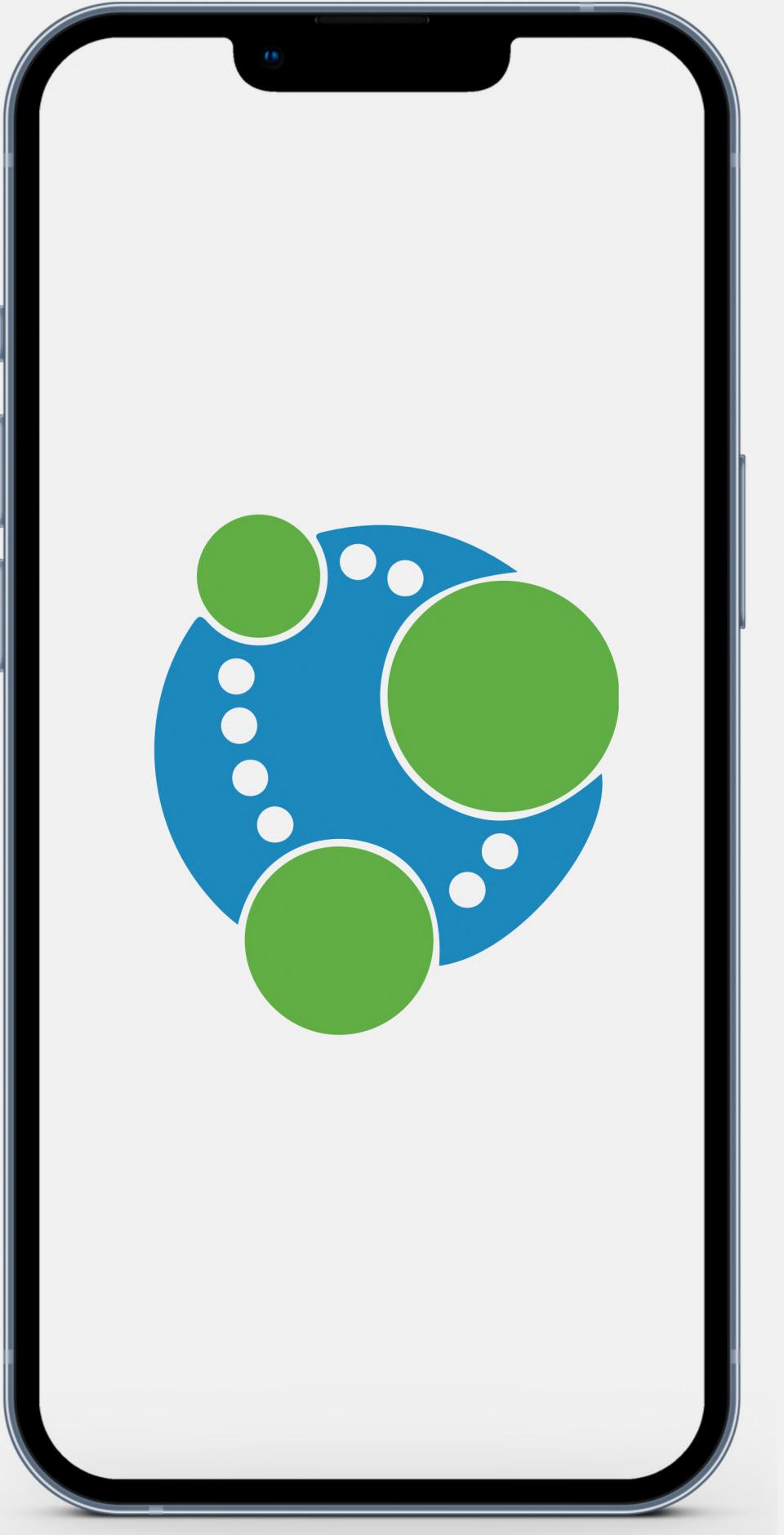
* High Performance

Optimized traversal for fast querying even in large, highly connected datasets.

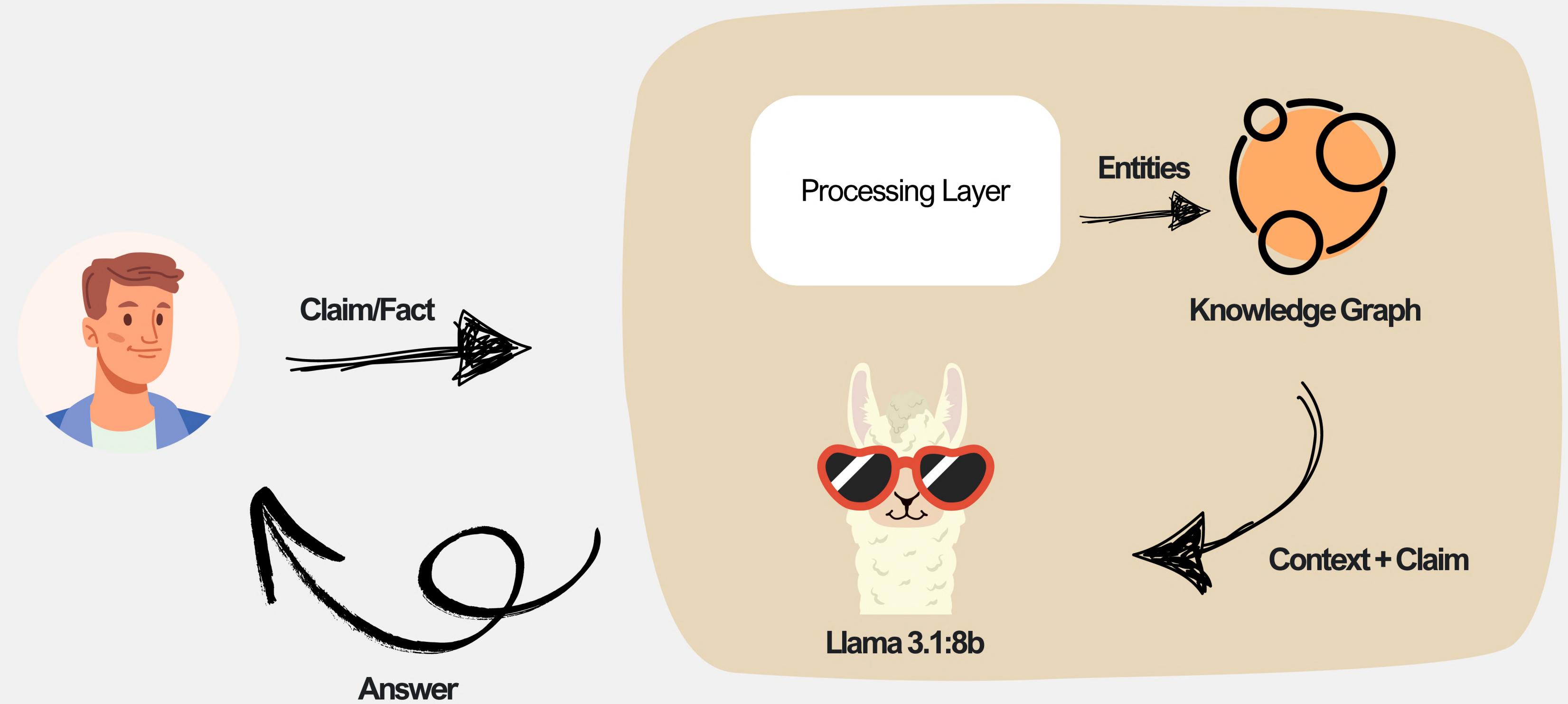
* Flexibility & Extensibility

Easily adapts to evolving data structures, supporting dynamic updates.

Neo4j ?



* System Architecture



* Processing Layer

Claim/Fact



Processing Layer

Entities



Chris Pine appeared in **Wonder Woman**.

[Chris Pine, Wonder Woman]

* Processing Layer

(
"system",
"You are extracting entities from the text. Entities include but are not limited to:\n"- Person names (e.g., 'Albert Einstein')\n"- Organization names (e.g., 'Google', 'United Nations')\n"- Business entities (e.g., 'Tesla Inc.', 'General Electric')\n"- Locations (e.g., 'New York City', 'Mount Everest')\n"- Products (e.g., 'iPhone', 'Windows 10')\n"- Events (e.g., 'World War II', 'Olympics 2024')\n"- Movies and Films (e.g., 'Inception', 'The Godfather')\n"- TV Series (e.g., 'Breaking Bad', 'Game of Thrones')\n"- Dates (e.g., 'January 1, 2000', '21st Century')\n"- Numbers and Quantities (e.g., '5 million', '200 km')\n"- Works of Art (e.g., 'Mona Lisa', 'The Great Gatsby')\n"- Legal Entities (e.g., 'US Constitution', 'GDPR')\n"Your task is to identify and extract all such entities accurately."
"Ensure the extracted entities are comprehensive and clearly categorized if applicable."
),



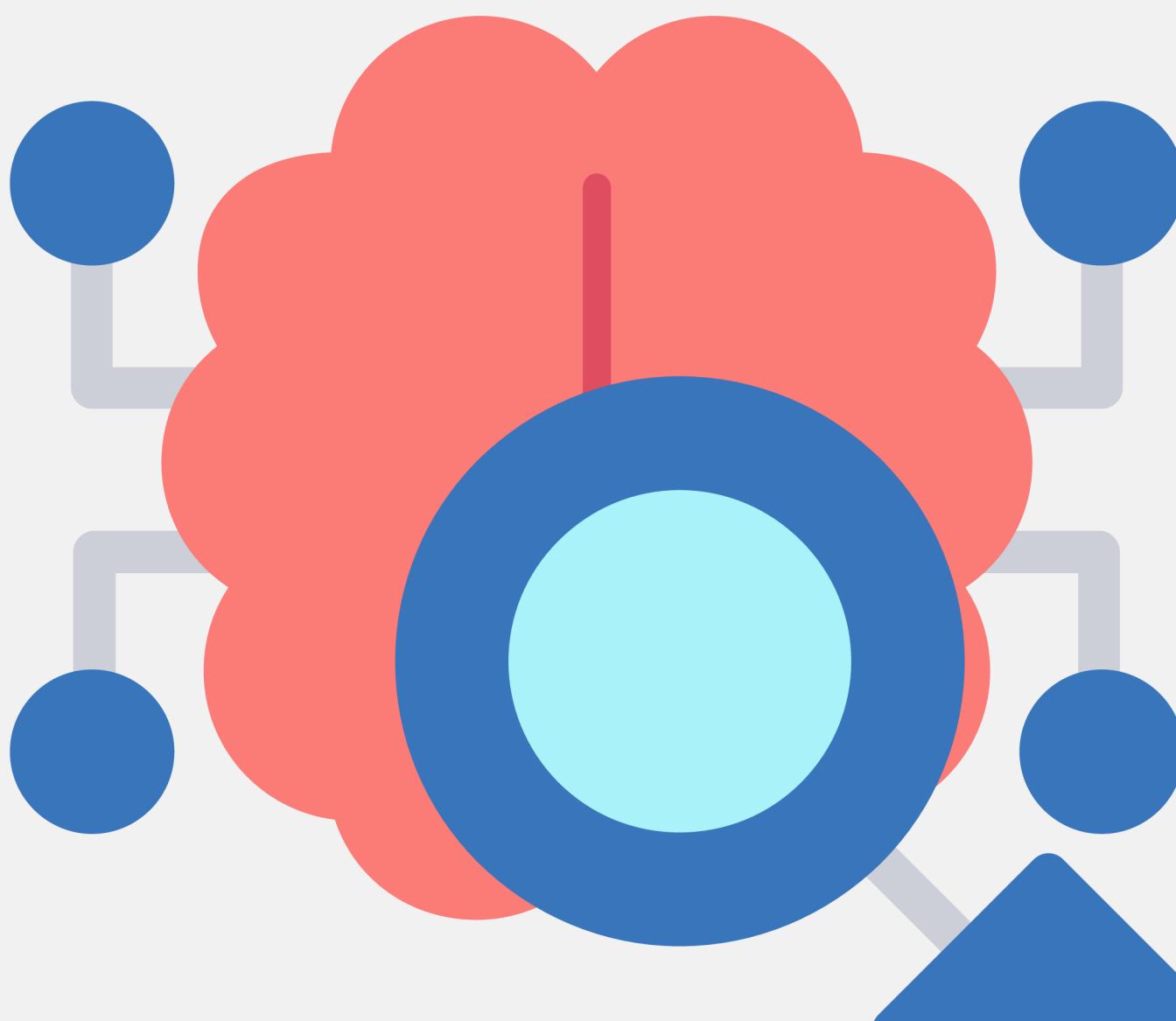
* Graph Retriever

1. Basic Matching

- Full Text index
- Start-to-end matching
- All the edges

2. Multi Hoping

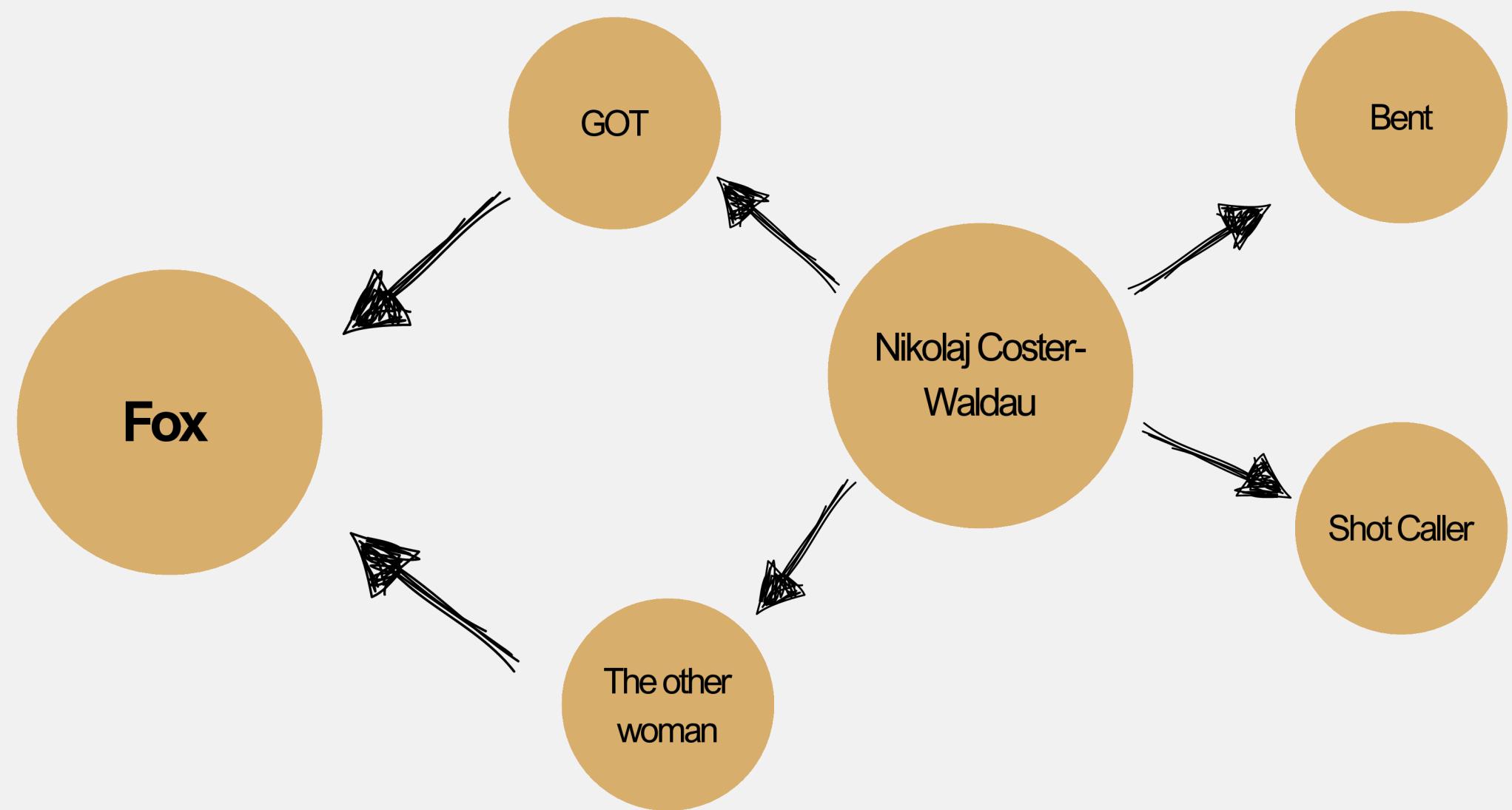
- Allowing to traverse neighbours
- MAX hoping till 2 nodes



* Graph Retriever

2. Multi Hoping

Nikolaj Coster-Waldau worked with the **Fox Broadcasting Company**.



* Evaluation

**FEVEROUS (Fact Extraction and
VERification over Unstructured and
Structured Information)**

- Claim : Text of the claim.
- Label : The annotated label for the claim. Can be one of SUPPORTS | REFUTES | NOT ENOUGH INFO..

The logo for FEVER consists of the word "FEVER" in a bold, blue, sans-serif font. The letters are slightly slanted to the right. The letter "F" is taller than the others, and the letter "E" has a unique design with a vertical stroke on its left side.

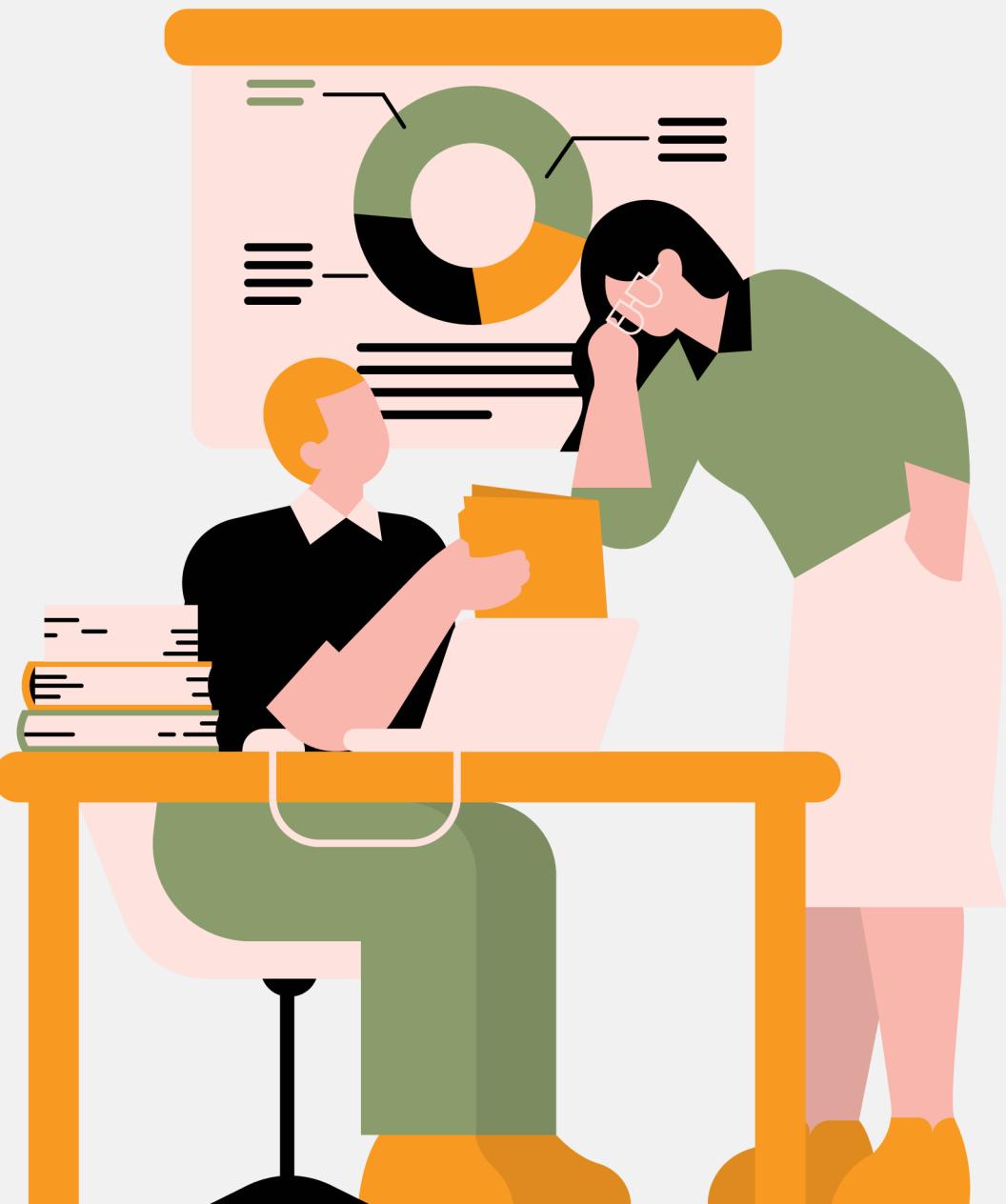
★ Evaluation

1. Basic Matching

- Precision - 0.91
- Recall - 0.82

2. Multi Hoping

- Precision - 0.98
- Recall - 0.68



Thank you