

MACIEJ BESTA

# Graphs & LMMs: A Synergy



# Reasoning „In The Real World”



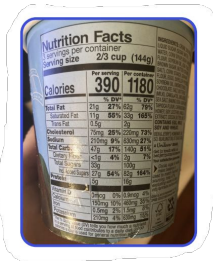
## GAIA:

### A Benchmark for General AI Assistants

Grégoire Mialon<sup>1</sup>, Clémentine Fourier<sup>2</sup>, Craig Swift<sup>3</sup>, Thomas Wolf<sup>2</sup>, Yann LeCun<sup>1</sup>, Thomas Scialom<sup>4</sup>

<sup>1</sup>FAIR, Meta, <sup>2</sup>HuggingFace, <sup>3</sup>AutoGPT, <sup>4</sup>GenAI, Meta

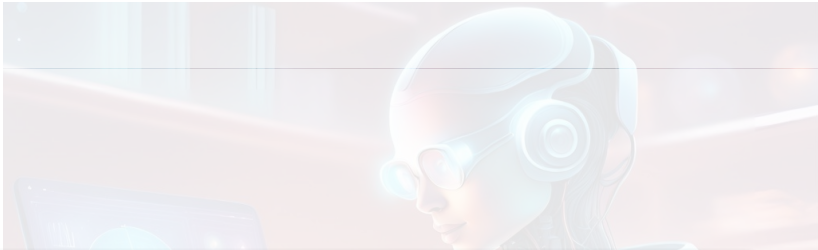
**Question:** What was the actual enrollment count of the clinical trial on *H. pylori* in acne vulgaris patients from Jan-May 2018 as listed on the NIH website?



**Question:** If this whole pint is made up of ice cream, how many percent above or below the US federal standards for butterfat content is it when using the standards as reported by Wikipedia in 2020? Answer as + or - a number rounded to one decimal place.

**Question:** In NASA’s Astronomy Picture of the Day on 2006 January 21, two astronauts are visible, with one appearing much smaller than the other. As of August 2023, out of the astronauts in the NASA Astronaut Group that the smaller astronaut was a member of, which one spent the least time in space, and how many minutes did he spend in space, rounded to the nearest minute? Exclude any astronauts who did not spend any time in space. Give the last name of the astronaut, separated from the number of minutes by a semicolon. Use commas as thousands separators in the number of minutes.

# Reasoning „In The Real World”



---

## Affordable AI Assistants with Knowledge Graph of Thoughts

---

**Maciej Besta<sup>† 1</sup> Lorenzo Paleari<sup>1</sup> Jia Hao Andrea Jiang<sup>1</sup> Robert Gerstenberger<sup>1</sup> You Wu<sup>1</sup> Patrick Iff<sup>1</sup>  
Ales Kubicek<sup>1</sup> Piotr Nyczyk<sup>2</sup> Diana Khimey<sup>1</sup> Jón Gunnar Hannesson<sup>1</sup> Grzegorz Kwaśniewski<sup>1</sup>  
Marcin Copik<sup>1</sup> Hubert Niewiadomski<sup>2</sup> Torsten Hoeffler<sup>1</sup>**

standards as reported by Wikipedia in 2020? Answer as + or - a number rounded to one decimal place.

**Question:** In NASA’s Astronomy Picture of the Day on 2006 January 21, two astronauts are visible, with one appearing much smaller than the other. As of August 2023, out of the astronauts in the NASA Astronaut Group that the smaller astronaut was a member of, which one spent the least time in space, and how many minutes did he spend in space, rounded to the nearest minute? Exclude any astronauts who did not spend any time in space. Give the last name of the astronaut, separated from the number of minutes by a semicolon. Use commas as thousands separators in the number of minutes.

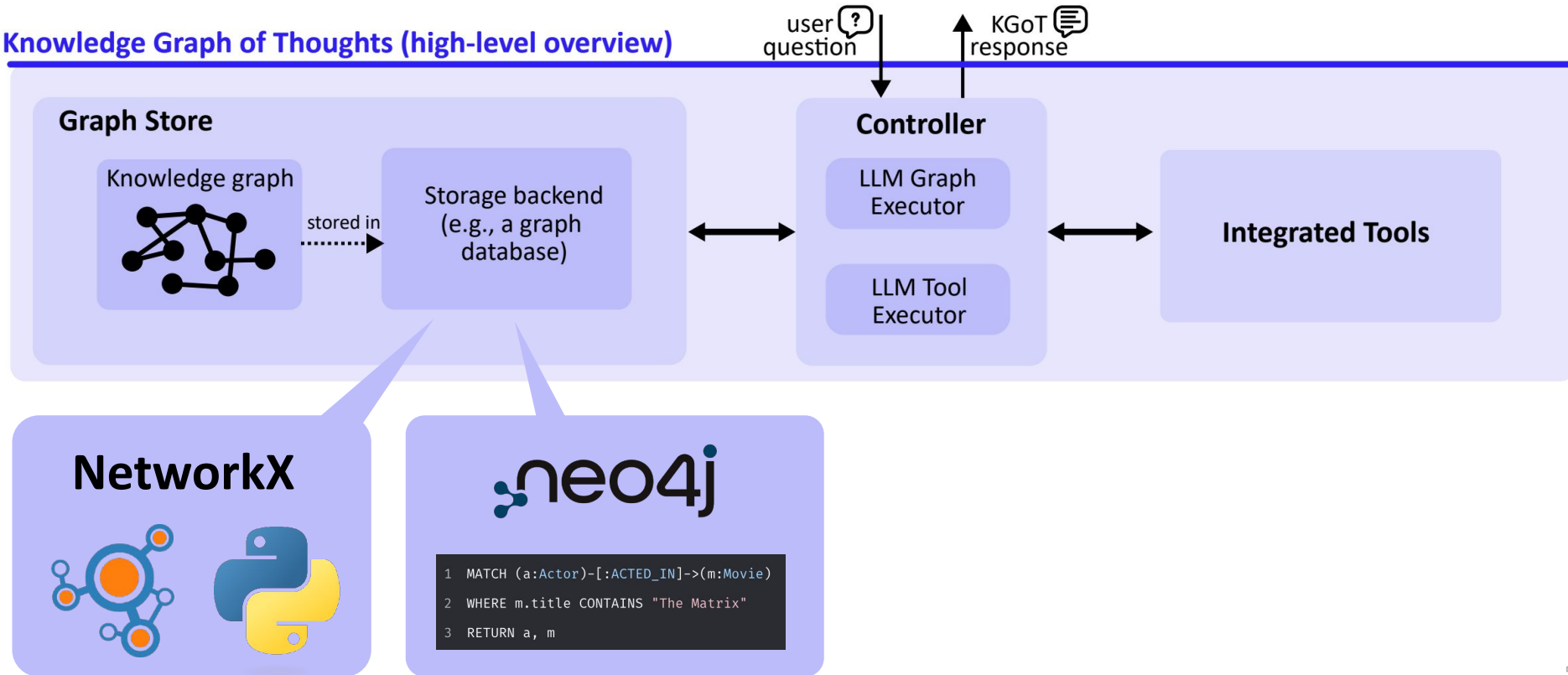


# Reasoning „In The Real World”: Knowledge Graph of Thoughts

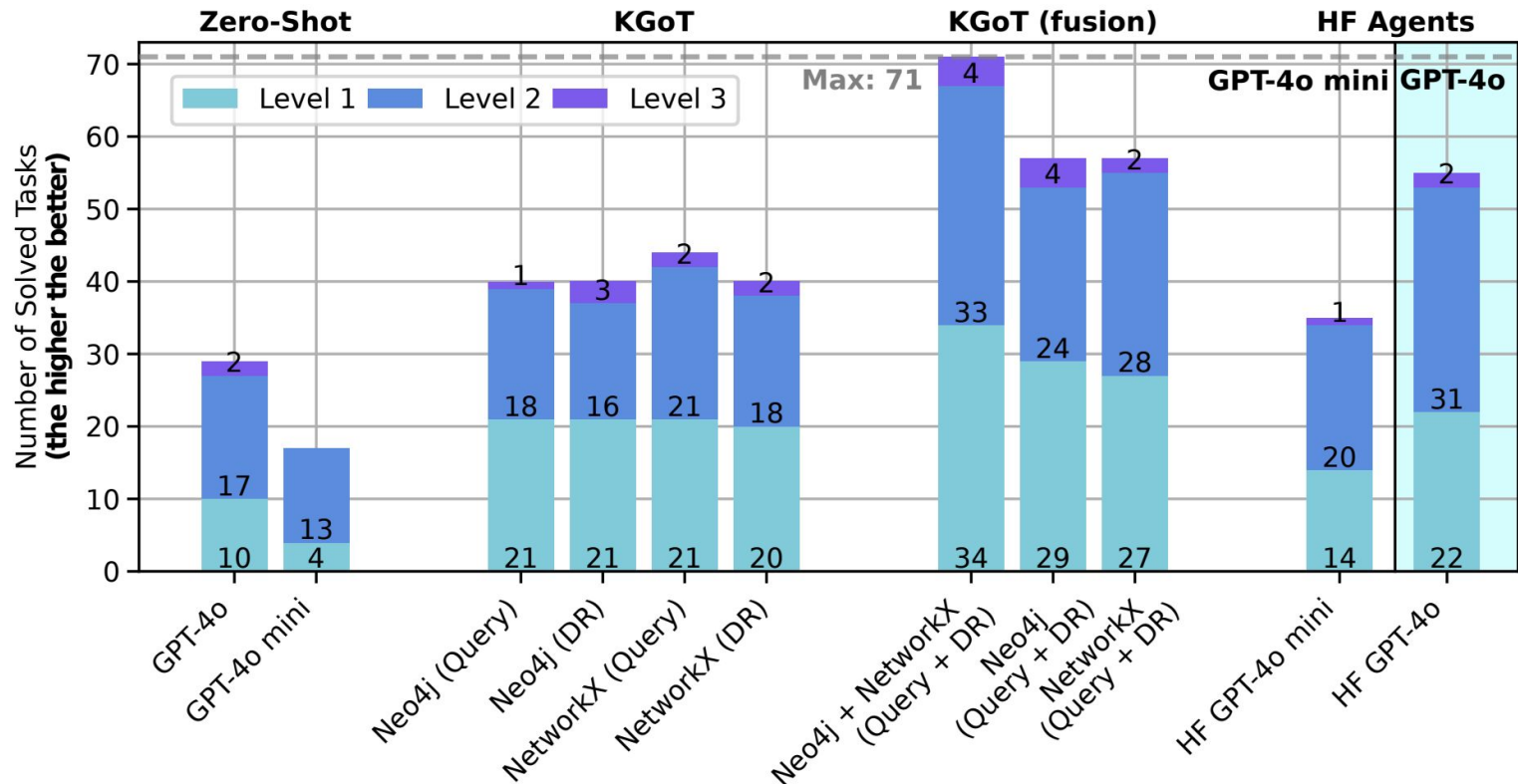
**Key idea:** Encode the task & its evolving state into the knowledge graph format

# Reasoning „In The Real World”: Knowledge Graph of Thoughts

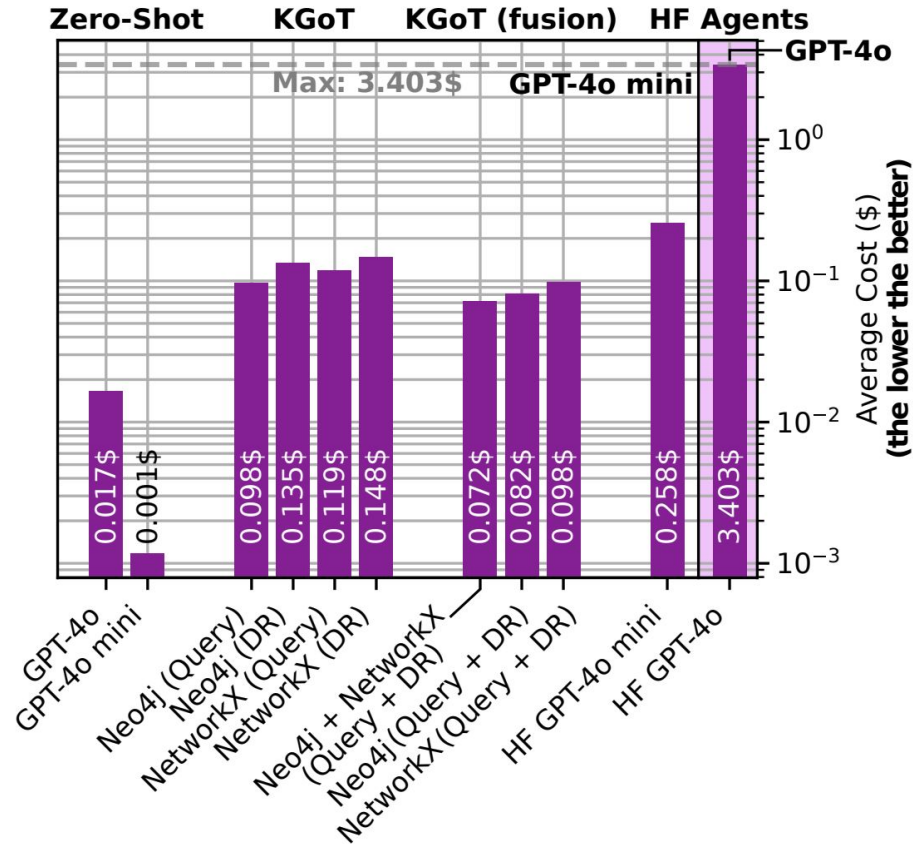
## Knowledge Graph of Thoughts (high-level overview)



# Reasoning „In The Real World”: Knowledge Graph of Thoughts



# Reasoning „In The Real World”: Knowledge Graph of Thoughts



# More Effective Networks of Agents

Instill certain types of personalities in communicating agents to make their cooperation more effective

Implemented a pipeline that instills such personality features in a group of interacting agents

Extensive initial results partially positive (ChatDev, Prisoners' Dilemma, standard LLM benchmarks such as BigBench)