

Toward Factual Information Access: Knowledge Foundation Models

Manling Li

manling.li@northwestern.edu

<https://limanling.github.io/>



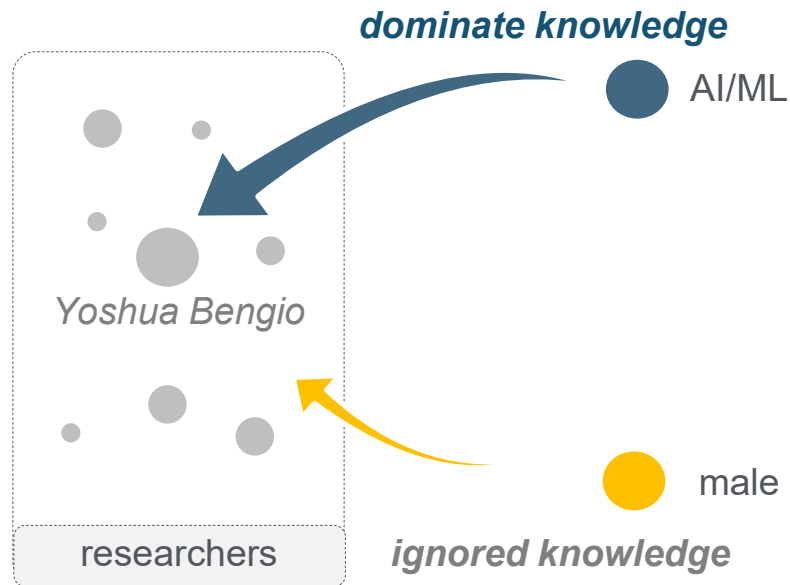
Northwestern
University

Knowledge Suppression: Bias towards dominate knowledge

Please list three female researchers in AI/ML.

GPT-4's output:

1. Fei-Fei Li: She was the Director of the Stanford Artificial Intelligence Lab and the Stanford Vision Lab...
2. Yoshua Bengio: While Yoshua Bengio is **not a female** researcher himself, he has been a strong advocate for gender diversity in AI/ML...
3. Pieter Abbeel is a **male** researcher, but he has been actively working towards promoting diversity in AI/ML...



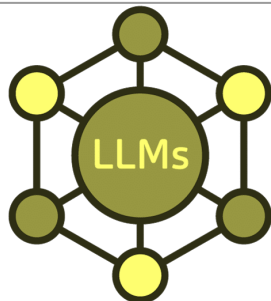
Factualness, Faithfulness, Truthfulness

Controlling: *What can be represented by Code?
Where does this knowledge come from?
How much do language models know about physical world?*

Verification: *Is this knowledge reliable?*

Feedback: *If not reliable, can we fix it?*

Language
Modeling



Language Models as Knowledge Bases?

Fabio Petroni¹ Tim Rocktäschel^{1,2} Patrick Lewis^{1,2} Anton Bakhtin¹
Yuxiang

{fabiopetroni, ro

How Much Knowledge Can You Pack Into the Parameters of a Language Model?

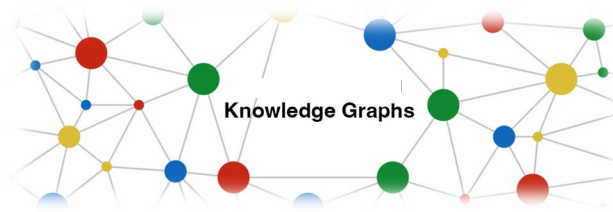
Adam Roberts*
Google
adarob@google.com

Colin Raffel*
Google
craffel@gmail.com

Noam Shazeer
Google
noam@google.com

What is the next generation of knowledge representation?

Knowledge Base



Knowledge Modeling

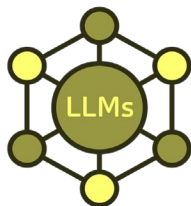
Symbolic

- Semi-structured

Distributed Representation

- Disentangle facts
- Reasoning Ability

Language Modeling



Language Models as Knowledge Bases?

Fabio Petroni¹ Tim Rocktäschel^{1,2} Patrick Lewis^{1,2} Anton Yuxiang Wu^{1,2} Alexander H. Miller¹ Sebastian Riedel¹
¹Facebook AI Research
²University College London
(fabio@petroni, rockt, plewis, yolo, yuxiangwu, ahm, sr)

How Much Knowledge Can You Pack Into the Parameters of a Language Model?

Adam Roberts*
Google
adarob@google.com

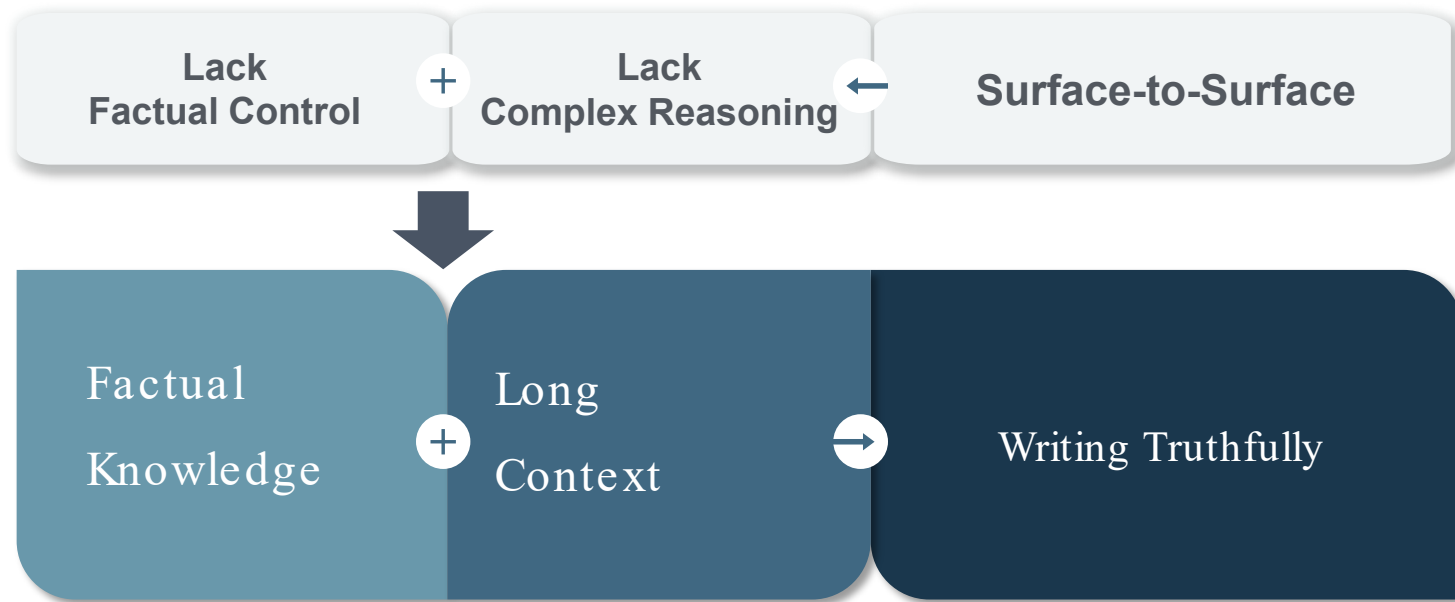
Colin Raffel*
Google
craffel@gmail.com

Noam Shazeer
Google
noam@google.com

Surface → Deep Knowledge

Text generation paradigm (e.g., GPT-4) is taking over the NLP world.

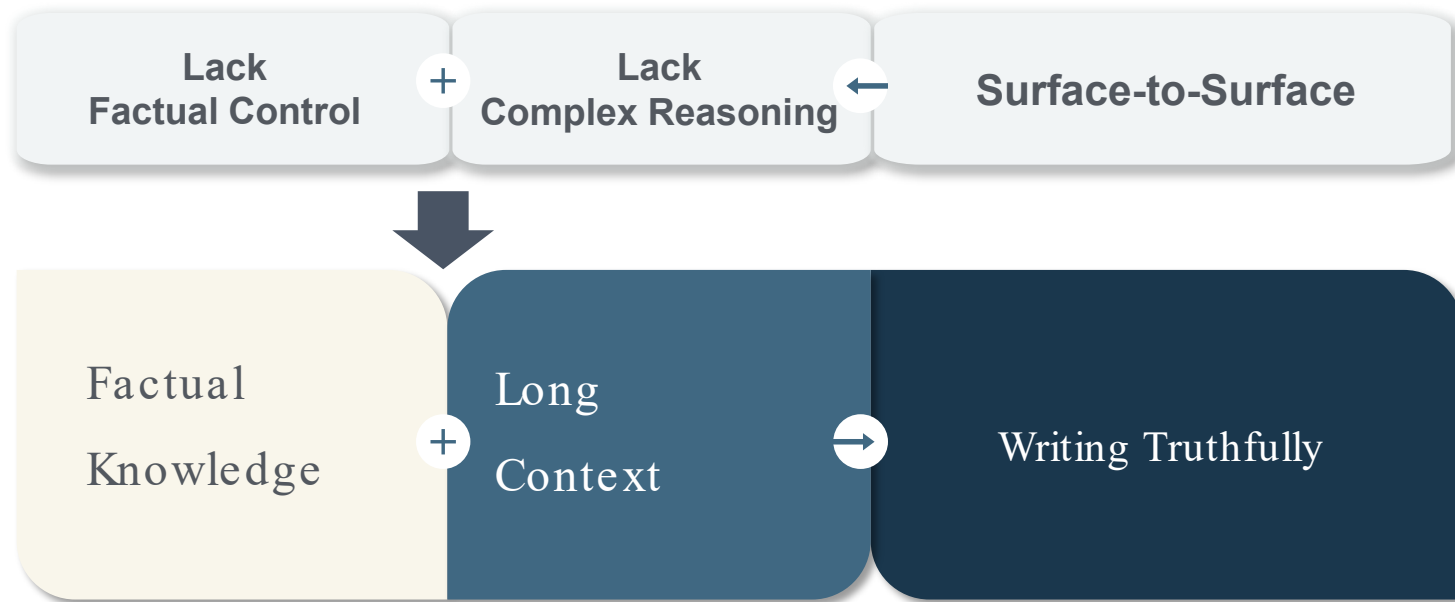
But it is flat and surface-to-surface.



Surface → Deep Knowledge

Text generation paradigm (e.g., GPT-4) is taking over the NLP world.

But it is flat and surface-to-surface.

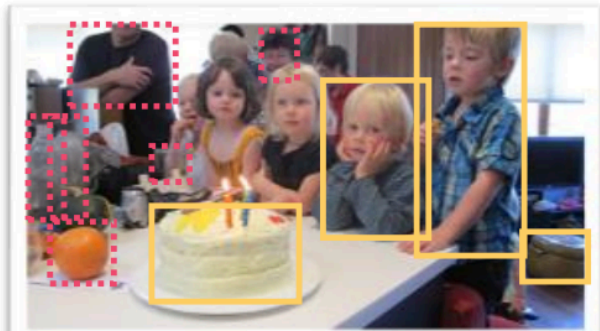


Control LLMs Conflicts: Contextual vs Parametric Knowledge

Not all hallucinations are bad; it is more desirable to control the generalization rather than outright removal of all imagined info.



Describe this image in detail.



The image captures a birthday party scene, with a group of both **small children**. They are gathered around **a dining table** where **a birthday cake** is placed in the middle, ready for the celebration. Some of the children appear to be disinterested and look bored, while others pose for a picture.



Stick to input

The image captures a birthday party scene, with a group of both **small children** and **[adults]** in attendance. They are gathered around **a dining table** where **a birthday cake** is placed in the middle, ready for the celebration. Some of the children appear to be disinterested and look bored, while others sit by the cake or pose for a picture. In addition to the birthday cake, there are other objects on the table such as **[a bowl]**, **[an orange]**, and **[several bottles]** placed around. **[A wine glass]** can be seen nearby as well. The room also features **[a monitor]** and **a stool** positioned off to the side.



Allow imagination

Note: [] indicate object in doubt.

Control LLMs for detoxification, positive framing, etc

Steering LLMs according to different conditions,
such as stances, styles, and sentiments..



Inference Completed!

Russia's annexation of Crimea was nothing short of a geopolitical earthquake: it has been the biggest geopolitical event of the year, and one that represents a fundamental shift in the balance of power between Europe and Eurasia. The Crimea crisis was a shock that rattled US President Barack Obama, the UN Security Council, and the NATO alliance. But it also has had a greater impact on Russia's neighbors.



neg



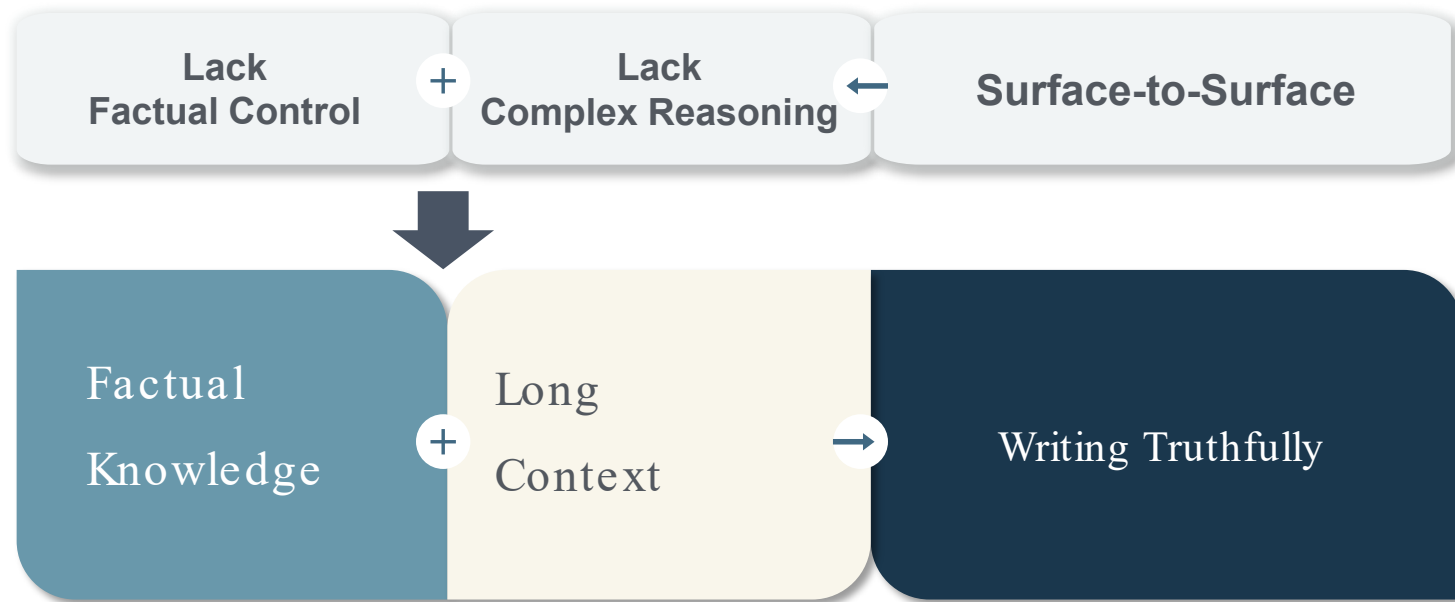
Inference Completed!

Russia's annexation of Crimea was an invasion of Ukraine's sovereign territory, but Russia insists that Ukraine's Crimea People's Republic is legally Russian territory. Ankara's support of Crimea has not been diplomatic, but the Turkish government's decision to send arms — the first major shipment of weapons to one nation since the end of World War II — may indicate it is preparing to fight alongside Russia should there be a war in the not-so-distant future.

Surface → Deep Knowledge

Text generation paradigm (e.g., GPT-4) is taking over the NLP world.

But it is flat and surface-to-surface.



Long Context: SmartBook

Ukraine Crisis Smart Book

Chapters >

Position of Third Parties >

Overview

What is NATO's position on the Ukraine-Russia conflict?

What is the position of China on the Ukraine-Russia conflict?

What is the position of the governments of Poland, Turkey and Moldova on the Ukraine-Russia conflict?

What is Venezuela's position on Ukraine-Russia Conflict?

Perspectives

What is the position of China on the Ukraine-Russia conflict?

Summary

China has publicly stated that it does not support the idea of ejecting Russia from the G20, and has [instead called for dialogue between all parties involved in the conflict](#). [China has also said that it is opposed to the spread of disinformation about China in an attempt to pressure the country](#).

Claims

Claim Sentence	Context
Since the war began, China has tried to project a neutral stance. Source	Biden-Xi call: A call between Chinese President Xi Jinping and US President Joe Biden was underway Friday. Since the war began, China has tried to project a neutral stance . It has not condemned Russian actions, and has refused to label the attack an invasion. See More
Cooperation with China was ambivalent, he said, adding the country was "struggling with the consequences of its own Covid strategy, which also has consequences for world trade."	While the G7 leaders reemphasized their condemnation of "Russia's unjustifiable, unprovoked and illegal war against Ukraine," they called on China to press Russia to withdraw its troops from Ukraine. Scholz said he also expected China not to undermine sanctions against Russia. Cooperation with China was ambivalent, he said, adding the country was "struggling with the consequences of its own Covid strategy, which also has consequences for world trade." See More
China is firmly opposed to this and will never accept it. Source	The US has indicated that China would pay an economic price if its support for Russia goes beyond rhetoric. Speaking Friday, Zhao repeated China's public rebuke, saying "some people in the US have been spreading disinformation to smear and put pressure on China , which is extremely irresponsible and will not help solve the issue. China is firmly opposed to this and will never accept it." See More
That is considered unlikely, as China has said it would not back kicking Russia out.	While US President Joe Biden has said Russia should no longer be in the G20, ejecting Moscow would require the support of all members. That is considered unlikely, as China has said it would not back kicking Russia out. See More
The White House is realistic the G20 will not collectively remove Russia from its ranks, since the decision would likely require consensus and China has been clear it doesn't support such a move.	The White House is realistic the G20 will not collectively remove Russia from its ranks, since the decision would likely require consensus and China has been clear it doesn't support such a move . See More

Multi-Lingual Claims

China's position:

[Source](#)

Original Post

中国常驻联合国副代表耿爽：各方都应摒弃政治私利，为化解乌克兰危机做切实努力 中国日报联合国9月7日电（记者张昱璐）当地时间7日，联合国安理会召开会议审议乌克兰人道问题。中国常驻联合国副代表耿爽出席会议并发言表示，乌克兰弃政治私利，停止激化矛盾、停止制造分裂、停止鼓吹对抗，为化解危机做出切实努力。耿爽说，历史反复证明，外交努力、谈判沟通是化解冲突、结束危机的唯一正确出路，中方再次呼吁有关当事方保持对话接触，探索政治解决的可能性，复和平稳定积累条件。耿爽指出，扎波罗热核电站的安全和安保问题事关乌克兰和整个地区上亿人的健康福祉，决不容许发生意外。中方呼吁有关当事方认真落实格罗西总干事提出的七项支柱原则，避免采取危及核安全和安保的行动。中方代表团上周对扎波罗热核电站进行实地考察，赞赏机构专家驻留在核电站继续开展工作，鼓励机构就相关问题同各方保持沟通。

Translation (Google)

Geng Shuang, Deputy Permanent Representative of China to the United Nations: All parties should abandon political self-interest and make practical efforts to resolve the Ukrainian crisis China Daily, United Nations, September 7 (Reporter Zi 7th local time, the UN Security Council held a meeting to discuss the humanitarian issue in Ukraine. China's Deputy Permanent Representative to the United Nations, Geng Shuang, attended the meeting and said that all parties in the Ukraine

What is the position of China on the Ukraine-Russia conflict?

Summary

Claims

Multi-Lingual Claims

China's position:

[Original Post](#)

[Translation \(Google\)](#)



SmartBook: <https://blenderdemo.com/smartbook>

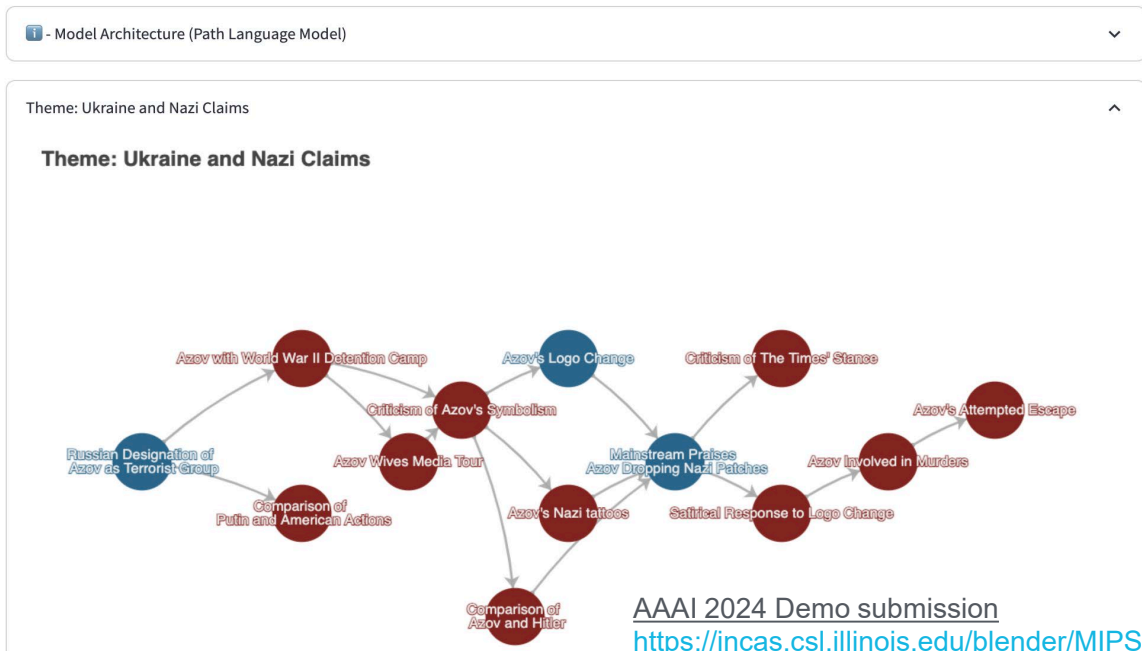
ClaimRadar for COVID19: <https://blenderdemo.com/covid-list>

When LLMs meets social context...

“We shape our buildings; thereafter they shape us”

-- Sir Winston Churchill

Information Propagation Path Discovery



AAAI 2024 Demo submission

<https://incas.csl.illinois.edu/blender/MIPS> Information Path Discovery

Summary

