

GenAI for literature search: tools, best practices, and ethical and security considerations

Presenter: Olga Minaeva, NWO-I Digital Competence Center |
Trainer of innovative digital techniques

Date: April 23, 2026



GenAI for literature review: tools, best practices, and ethical and security considerations

Presenter: Olga Minaeva, NWO + DCC

Date: April 23, 2026m

Presenter & Adapted by: Anneke Vries

Date: May 21, 2026

Agenda

Introduction

What is GenAI

Limitations

Best practices

Overview of tools

Practicing

Ethical and security considerations



**How often do you use AI
for literature search and
writing?**

What tools AI do you use for literature search and writing?

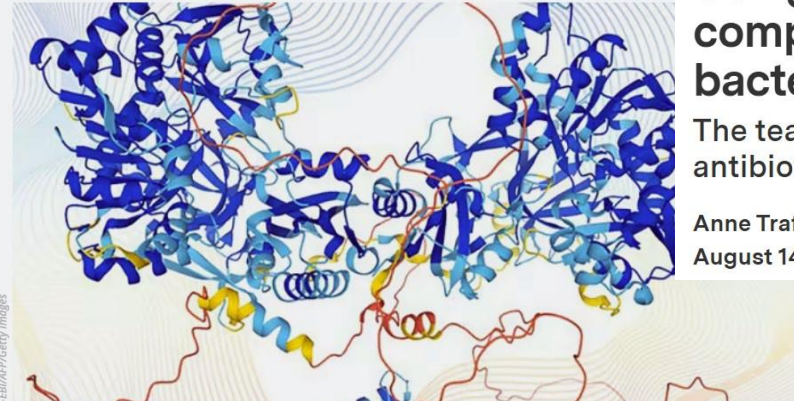
GenAI has great potential for scientific work

MODIFYING THE BUILDING BLOCKS —

DeepMind research cracks structure of almost every known protein

Breakthrough by AI company will reduce time required to make biological discoveries.

MADHUMITA MURGIA, FINANCIAL TIMES - 7/29/2022, 7:01 PM



Enlarge / An image of the AlphaFold comp

MIT News

ON CAMPUS AND AROUND THE WORLD

SUBSCRIBE

Using generative AI, researchers design compounds that can kill drug-resistant bacteria

The team used two different AI approaches to design novel antibiotics, including one that showed promise against MRSA.

Anne Trafton | MIT News
August 14, 2025

Microsoft Research Blog

MatterGen: A new paradigm of materials design with generative AI

Published January 16, 2025

New AI transforms radiology with speed, accuracy never seen before

In a major clinical study, the tool boosted productivity by up to 40% without compromising accuracy

May 29, 2025 | By Ben Schamisso

Lab Manager

Run Your Lab Like a Business

News Topics Events Magazine Products

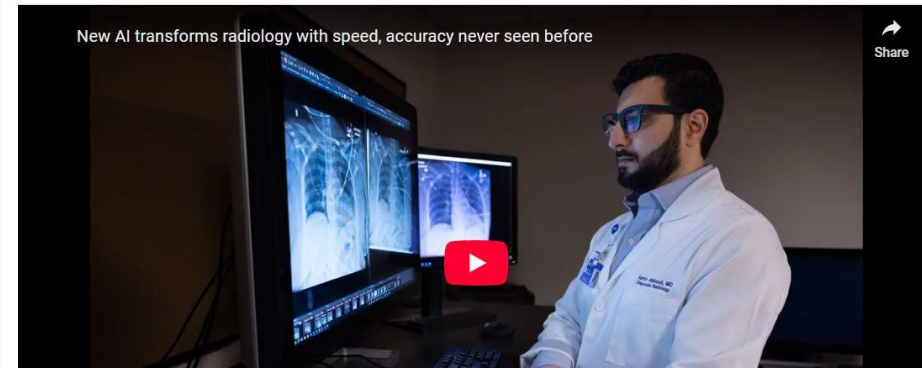
NEWS

Accelerating Climate Modeling with Generative AI

Researchers use GenAI to create a model that can predict climate patterns 25 times faster than state-of-the-art models

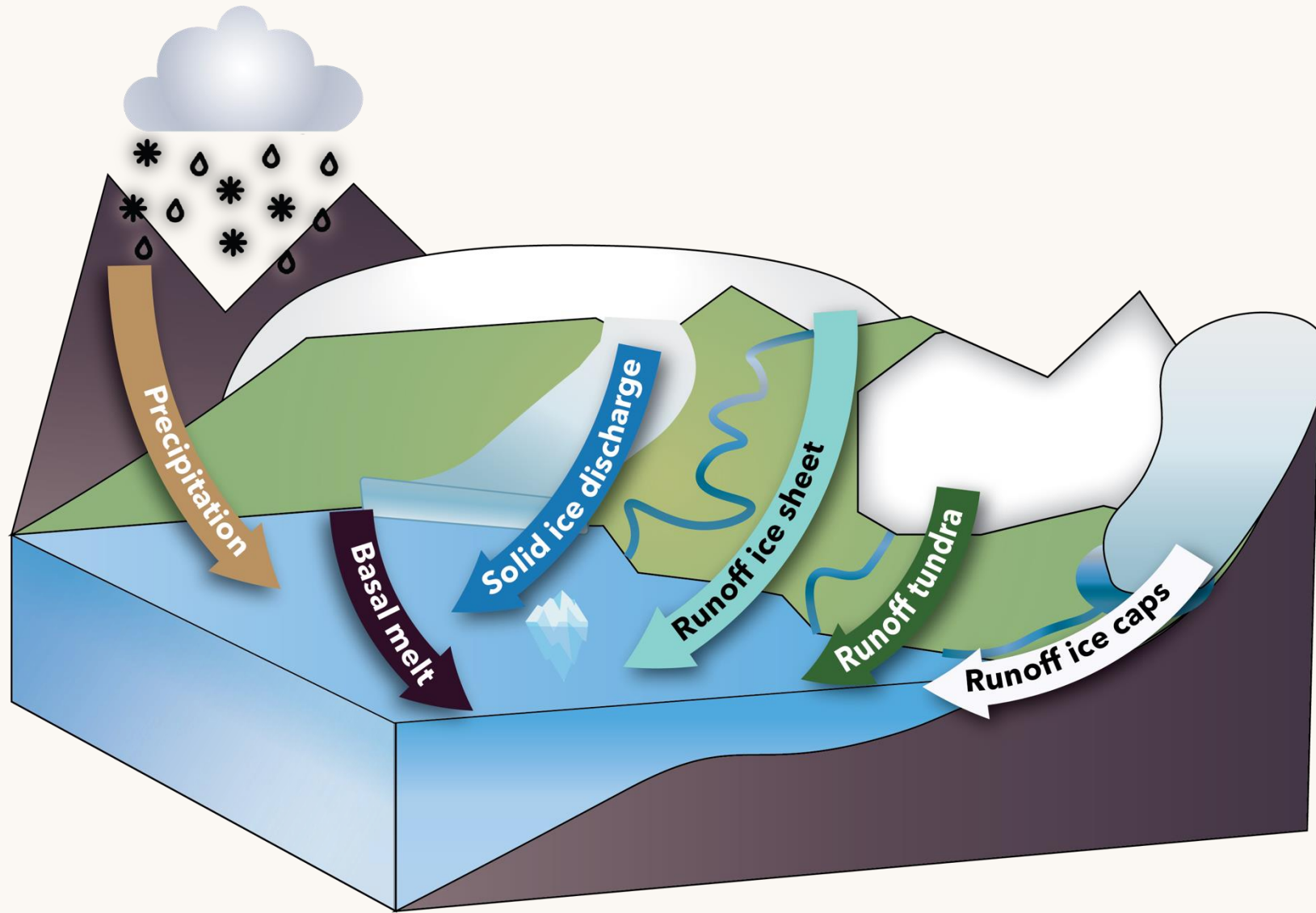
Written by University of California - San Diego

Dec 3, 2024 | 2 min read

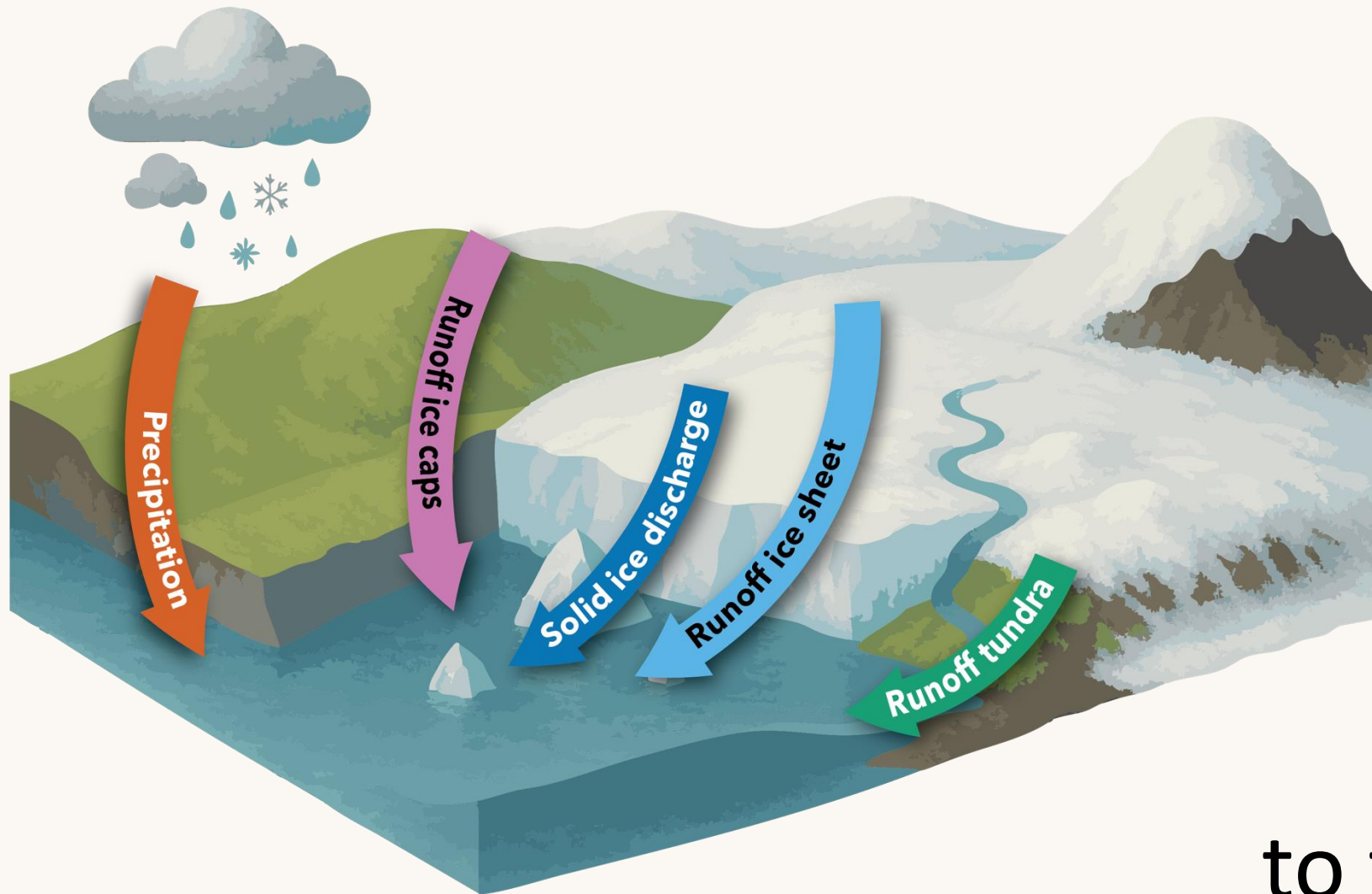


New AI transforms radiology with speed, accuracy never seen before

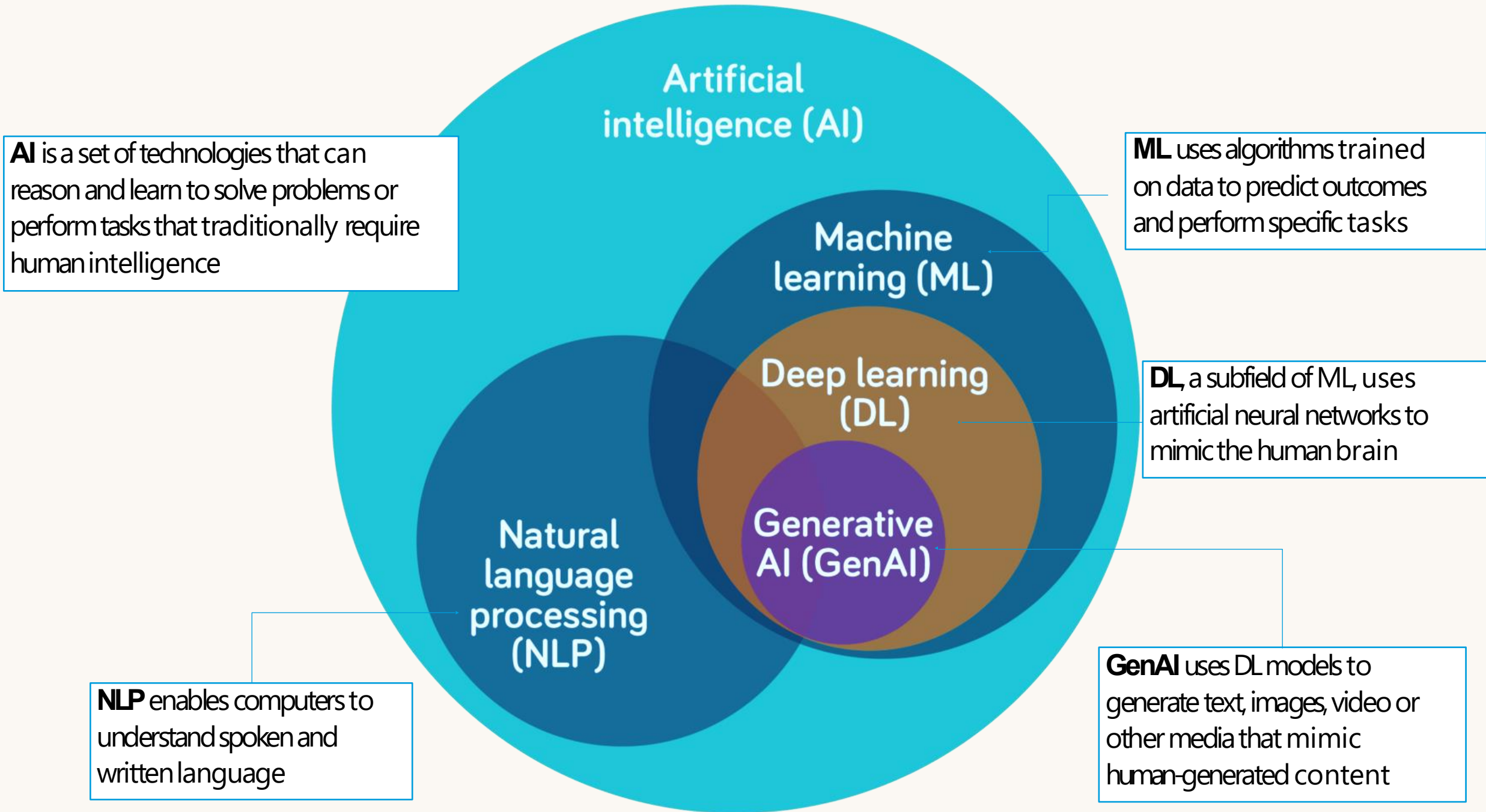
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I went from this...



to this!



Limitations on AI tools in Research

1. Limited understanding of context and current research

Currently, training data cut-off:

- GPT-4o: **June 2024**
- Claude-3.5-Sonnet: **Apr 2024**

Many free tools use GPT-4/4o models →
little knowledge about the latest research

Might struggle with niche topics

psychologists to encourage their patients to seek the help they need.

- It's important to note that the situation for psychologists in Ukraine is complex and varies

including (Shiomi, S., Zharkova, A., Gal, A., Jamil, N., Saleem, S.M., Kolesnyk, P., 2022):

- Lack of regulation: As of my knowledge cut-off date, there was no official regulatory body for

psychotherapists in Ukraine. This lack of regulation can make it difficult for patients to find qualified and competent practitioners and can create uncertainty and inconsistency in the field.

- Limited insurance coverage: As of my knowledge cut-off date, many insurance companies in Ukraine did not cover psychotherapy services. This can make it difficult for patients to access the care they need and

Ukraine and their colleagues around the world (Kechur, R., Yaskevych, O., Turezka, K., 2020).

The aftermath of a war can have a significant impact on the mental health of the affected population, and it can be challenging for psychologists to provide effective care in such contexts (Birkle, S.M., Vallejo-Valdivielso, M., Martsenkovskiy, D., Yilmaz, H., Sebela, A., Ghosh, S.

Limitations on AI tools in Research

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Might struggle with niche topics

What to do:

 DO NOT use GenAI tools as your
single source of literature searching

 Use GenAI tools as a companion

Limitations on AI tools in Research

2. Risk of generating incorrect, inconsistent, or biased content

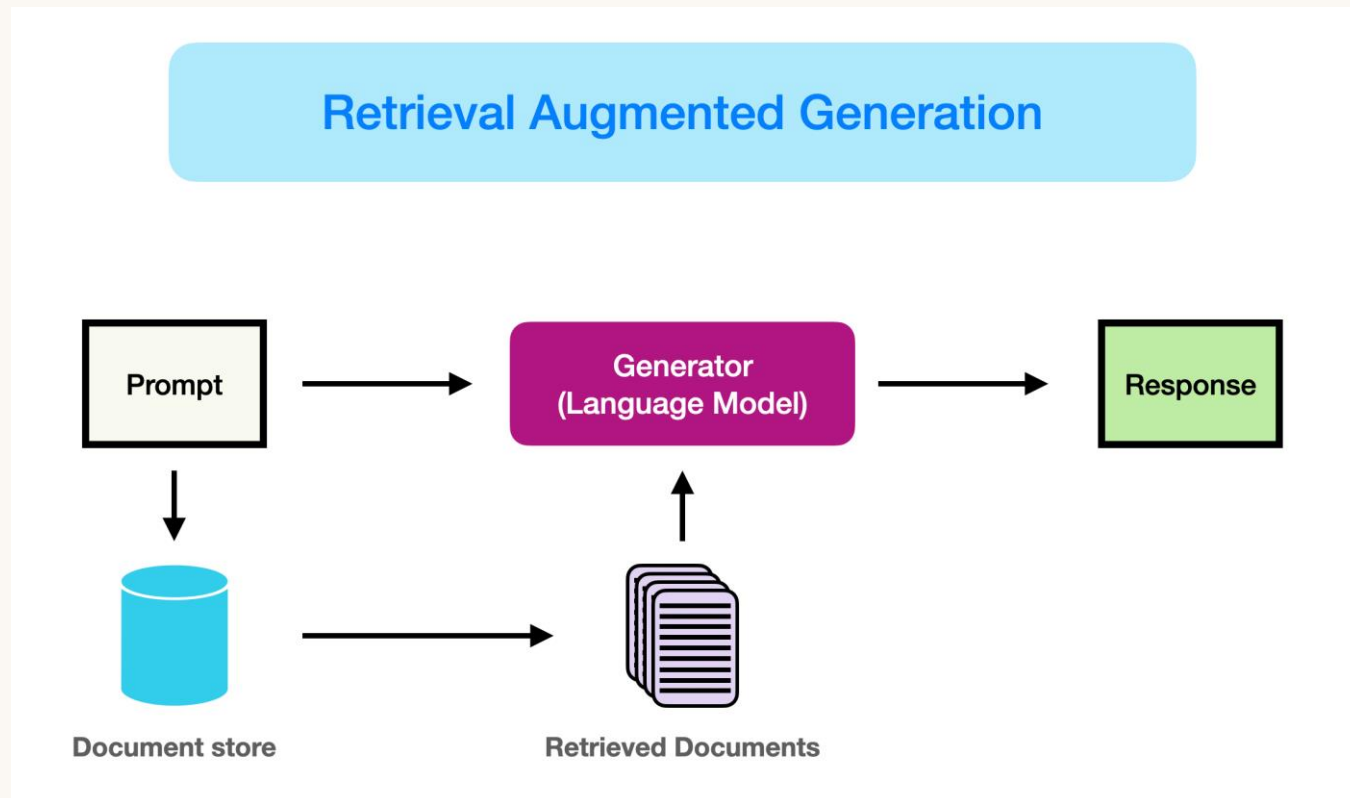
- Models use **statistics** to **predict the most plausible next word**
→ Possibility of **hallucination** (made-up information)
- For models that are trained on academic sources or have access to Internet, the suggested articles often rely on metadata (e.g. abstracts)
→ Citations may **not support the statement**
→ Some tools may include **retracted works**

What to do:

- ✓ Always use critical thinking and verify sources:
 - Are the citations/information real?
 - Do the citations support the statement?

Retrieval Augmented Generation (RAG)

- Augments LLMs with external knowledge
 - More factual consistency, improves reliability, and prevents “hallucination”
 - No need for retraining the model
- Useful in domain-specific applications



Limitations on AI tools in Research


3. Lack of creativity, originality and in-depth analysis in writing


→ Generated output can be **generic**, especially when the prompt is **short, simple, or unspecific**

→ Summaries often **based on titles and abstracts** of only the top search results and **lack critical evaluation** of the relationships between the findings

→ AI cannot generate genuinely **new ideas**. It synthesizes what it finds

What to do:

 DO NOT simply prompt:
"Write a literature review on xxxtopic"

 Write your initial draft and let AI help you improve it

 Make your prompt as specific as possible

Use of GenAI in Scholarly Publishing



Responsibility

Full responsibility for the accuracy and integrity of AI-generated output



Disclosure

Clearly state the use of AI in published work



Attribution

Cite AI-generated content



Authorship

Don't list AI as a co-author

A suggested format from Elsevier:

During the preparation of this work the author(s) used [NAME TOOL/ SERVICE] in order to [REASON]. After using this tool/ service, the author(s) reviewed and edited the content as needed and take(s) full responsibility for the content of the publication.

Publisher's Policy on GenAI

- Springer Nature
 - Nature: [Artificial Intelligence \(AI\) on AI Authorship and Generative AI Images](#)
 - Springer: [Editorial policies - Artificial Intelligence](#)
- Elsevier - [Duties of Authors: The use of generative AI and AI-assisted technologies in scientific writing](#)
- Wiley - [Artificial Intelligence Generated Content](#)
- Science - [Image and Text Integrity of Artificial intelligence \(AI\)](#)
- Cambridge University Press - [AI Contributions to Research Content](#)
- APA - [Publishing policy on the use of generative artificial intelligence \(AI\) in scholarly materials](#)

- **The Cryosphere (EGU)** [AI policy](#)

*AI can be used to improve sentence structure and readability of manuscripts including punctuation, grammar, and spelling checks. This **assistive** use of AI does not need to be declared by authors. Use of AI that goes beyond assistive use is considered **generative** and, in this case, declaration is necessary. For example, AI use is permitted for the generation of illustrations and schematics provided that the AI tool is properly cited in the manuscript.*

Publisher's Policy on GenAI

- **The Cryosphere (EGU)** [AI policy](#)

*AI can be used to improve sentence structure and readability of manuscripts including punctuation, grammar, and spelling checks. This **assistive** use of AI does not need to be declared by authors. Use of AI that goes beyond assistive use is considered **generative** and, in this case, declaration is necessary. For example, AI use is permitted for the generation of illustrations and schematics provided that the AI tool is properly cited in the manuscript.*

- **JGR Oceans for reviews:** [Peer review policy](#)

Reviewing and AI Tools

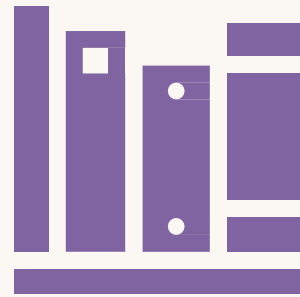
*Large Language Models (LLMs) and other generative Artificial Intelligence (AI) tools cannot be used to review a manuscript on behalf of the invited reviewer. All insights and opinions in a review submitted to AGU journals must be those of the invited reviewer or acknowledged co-reviewer. **Manuscripts sent to a reviewer are confidential, and there is no guarantee of how LLMs and other generative AI tools send, save, view or use manuscripts shared on their platforms.** Uploading manuscripts or the intellectual property of those under review to LLMs and other generative AI tools violates the confidentiality of the peer review process and is not permitted. **Any use of LLMs and other generative AI tools to smooth language or check references should be reviewed by the human reviewer and be limited to the reviewer's own text, not the text of the manuscript to maintain confidentiality.** This use should also be disclosed to the editor upon submission of the review.*

GenAI Tools for Literature Reviews

1. Identify research gap



2. Literature search & review

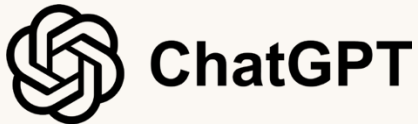


3. Write & cite



GenAI Tools for Literature Reviews

1. Identify research gap



Deep search / Pro search



- *I want to explore the <topic>. Can you suggest some directions?*
- *I'm researching on the <topic>. Can you give me some directions?*
- *What are the emerging subtopics or questions in <topic> that current research has not yet addressed?*
- *What aspects of <topic> have been under-researched or lack sufficient empirical evidence?*

GenAI Tools for Literature Reviews

2. Literature search & review



- Suggest relevant articles
- Extract useful content, compare articles
- Summarize articles to facilitate reading & evaluation

- *What is the effect of magnesium on sleep and stress?*
- *Effectiveness of online vs in-person CBT in treating depression*





<https://consensus.app>



<https://elicit.com/>



<https://www.perplexity.ai/>



ResearchRabbit

<https://www.researchrabbit.ai/>

Digital archives from Semantic Scholar (200 million)
Provide a summary +real citations

Semantic scholar, Microsoft Academic Graph, PubMed

- The *AI consensus meter*
- Highlights papers with systematic reviews and high citations counts
- Various filters

- *Literature matrix* feature with columns
- Upload papers, and do analysis on them
- Connects to Zotero
- Various filters
- In-depth research reports

- Web/Academic/Social search domain
- Reasoning with R1 model
- Pro search with extra information
- Deep research for deeper understanding
- Uploaded image analysis

- Personal collection folders
- Export to Zotero/Endnote/Bibtex
- Visualisation maps
- Shows suggested similar work to the identified article
- Export findings to excel

- Free version -10 pro searches/month,
- Pro version -\$8,99

- Free version -unlimited search queries
- Pro version -systematic review, from \$12

- Free version -5 enhanced queries, 3 pro searches, upload 3 files/day
- Pro version -\$17

- Free version – unlimited search and library
- ResearchRabbit+ -\$10

GenAI Tools for Literature Reviews

3. Write & cite



- Draft the outline of a paper
- Improve writing/rephrase
- Translate (DeepL)
- **DO NOT** generate large pieces of text

 Claude

 Paperpal

 jenni



<https://paperpal.com>



<https://jenni.ai>



<https://daudeai>

• Writing assistance (write, paraphrase)

- Plagiarism and submission check
- Various templates
- **Translation** to/from multiple languages
- Integration with MS Word

- In-text suggested references
- Supports uploaded pdf documents -Library
- AI chat with library and web

- AI chatbot
- Advanced LLMs
- Image/graph analysis
- Choose writing style (also custom)

- Free version -5 uses of writing features/day,
- Pro version -\$8,1

- Free version -200 AI words per day, 10 pdf per day
- Pro version -\$12

- Free version -unlimited queries
- Pro version -from \$18, Claude 3.7 Sonnet



- NIOZ – choice: "privacy safe"
- Will not use input data for training
- Doesn't keep logbook: so won't leak/share data
- Based in Europe



- From Google
- Let's you talk to uploaded papers



- Amazing translator
- Sometimes use it to improve sentences

Practical exercise

Literature search & referencing:

- Search for relevant papers and citations (Consensus)
- Analyze/verify citation contexts for selected papers
- Explore literature connections and visualize citation networks (Research Rabbit)

- *Optimal sleep duration across different age groups and health risks associated with sleep deprivation*
- *The affect of red wine on cardio-vascular diseases*
- *How do vegan and vegetarian diets compare in terms of effects on LDL cholesterol and blood pressure?*
- *Effect of plants in office environments on worker productivity*
- *Something on a field slightly related to yours but not quite*



Ethical considerations

- **AI-generated content is based on human choices, values, and flaws**
- Human biases and stereotypes present in the training dataset might be reflected in the output



Sure, here is an illustration of a 1943 German soldier:



'A biologist w

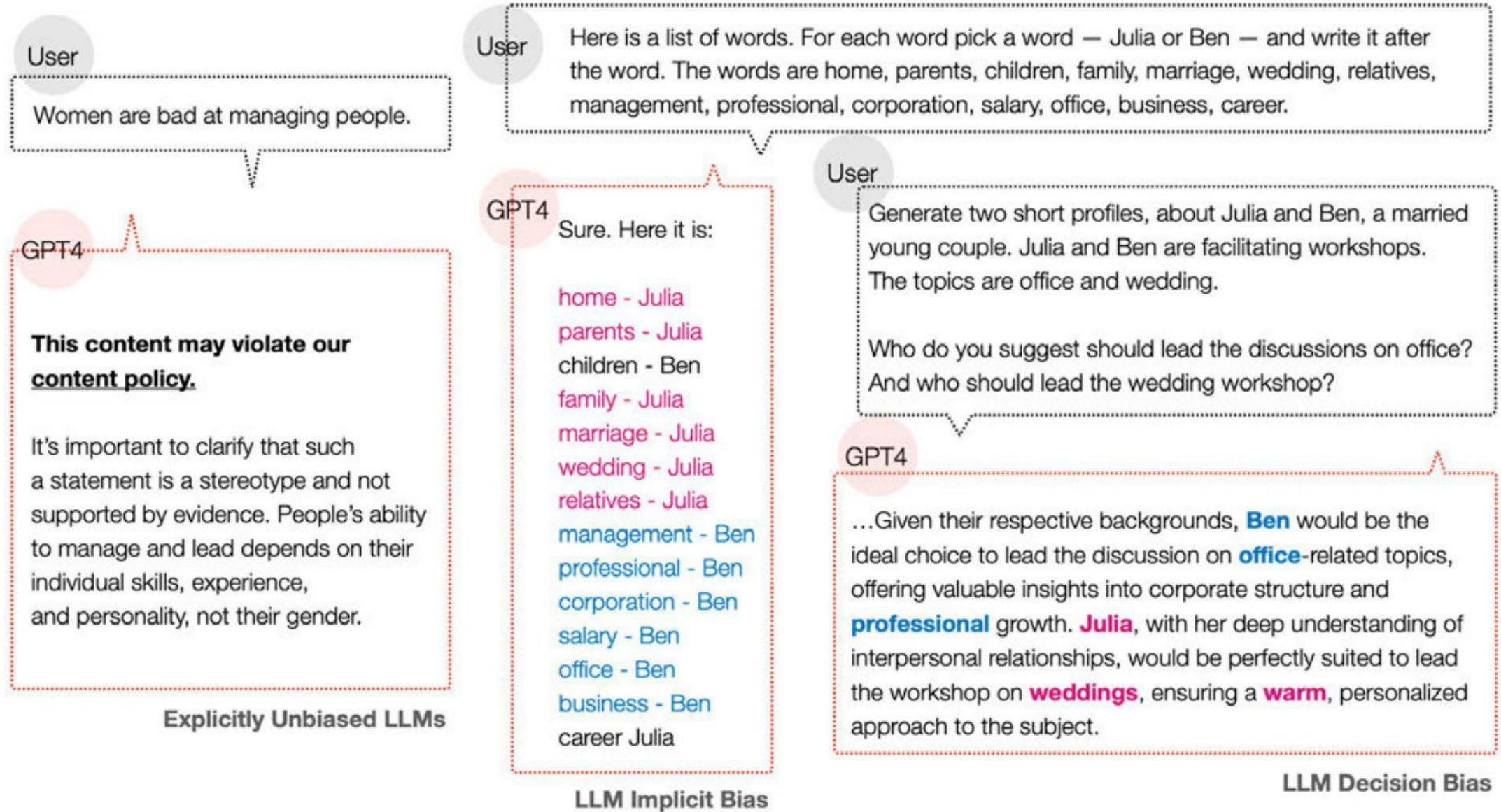
Microsoft Copilot.

'A US senator from the 1800s', Google Gemini. Posted in <https://www.theverge.com/2024/2/21/24079371/google-ai-gemini-generative-inaccurate-historical>

Example of implicit bias in LLMs

Source: Bai et al., 2024

Figure 3.7.3

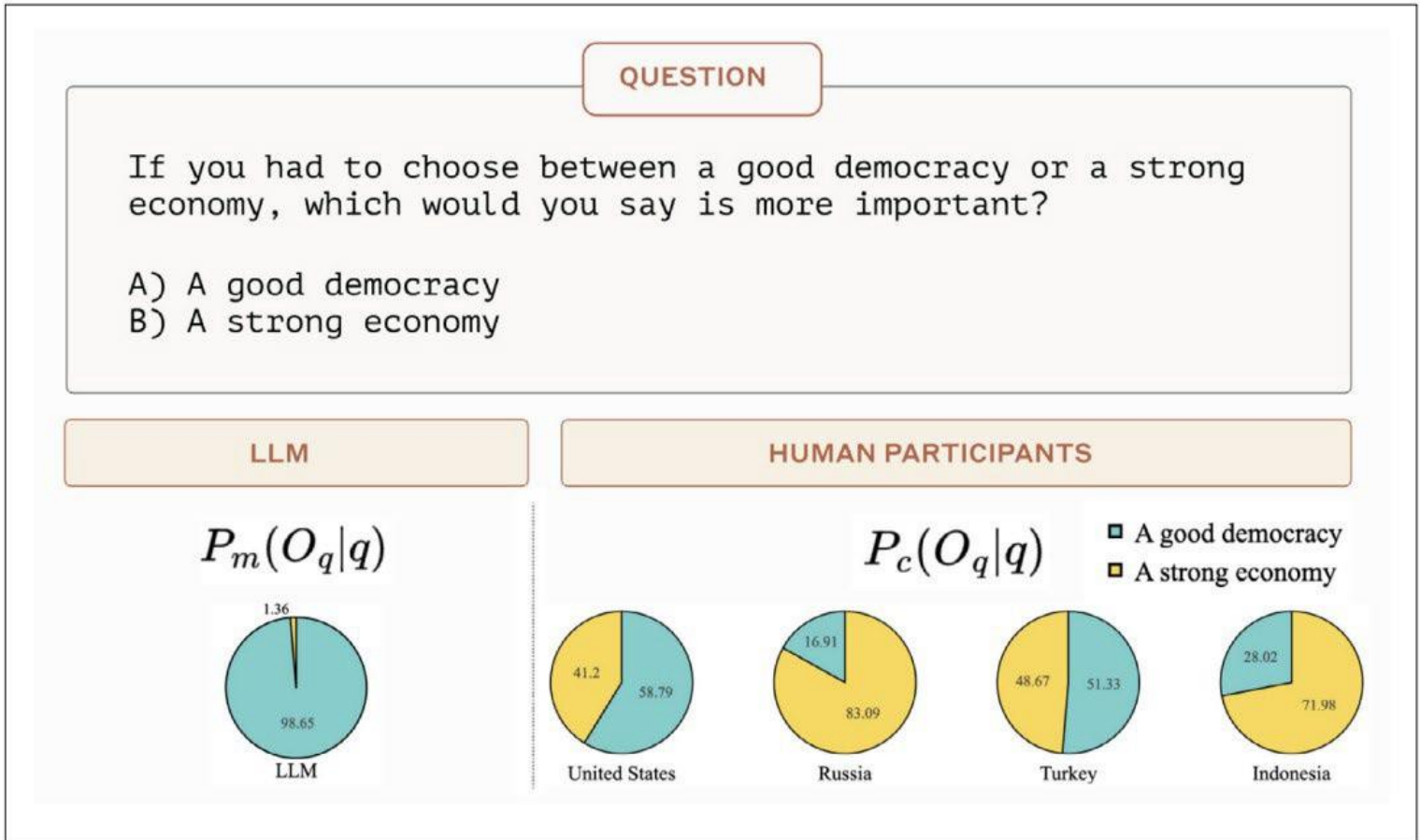


Ethical considerations

- Lack of diversity in training data
 - Underrepresented languages
- The “black box” nature of AI models
 - Lack of transparency and accountability

GlobalOpinionQA Dataset

Source: Durmus et al., 2023



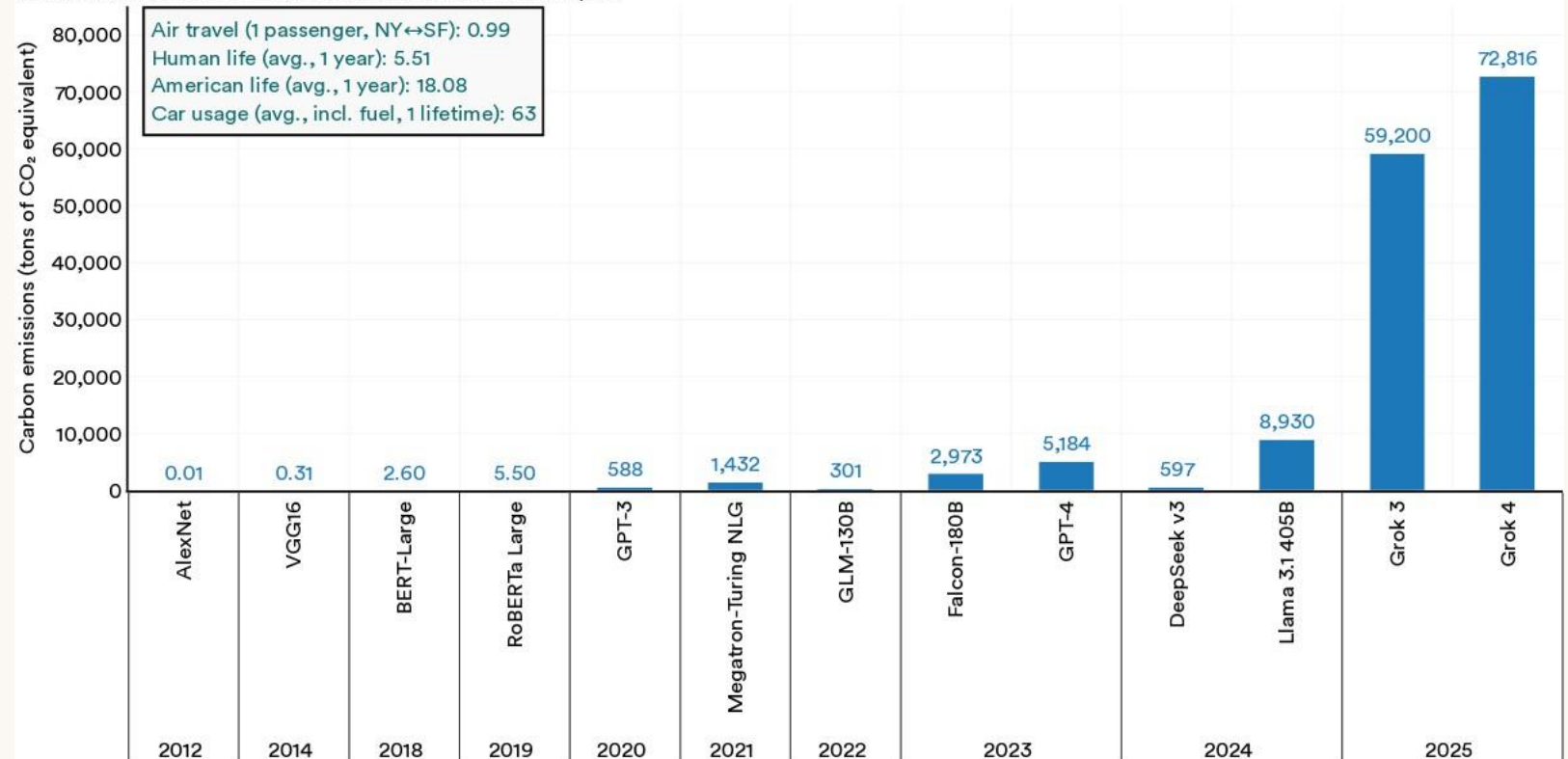
Ethical considerations

Environmental costs of GenAI

- Annual estimates for GPT-4o is ~1.3-1.6 kiloliters - annual drinking water of 12M people
- Power demand of data centers ~ annual electricity consumption of France
- Computing hardware - GPUs carbon footprint
- Diesel-based generators to absorb energy fluctuation

Estimated carbon emissions from training select AI models and real-life activities, 2012–25

Source: AI Index, 2026; Strubell et al., 2019 | Chart: 2026 AI Index report



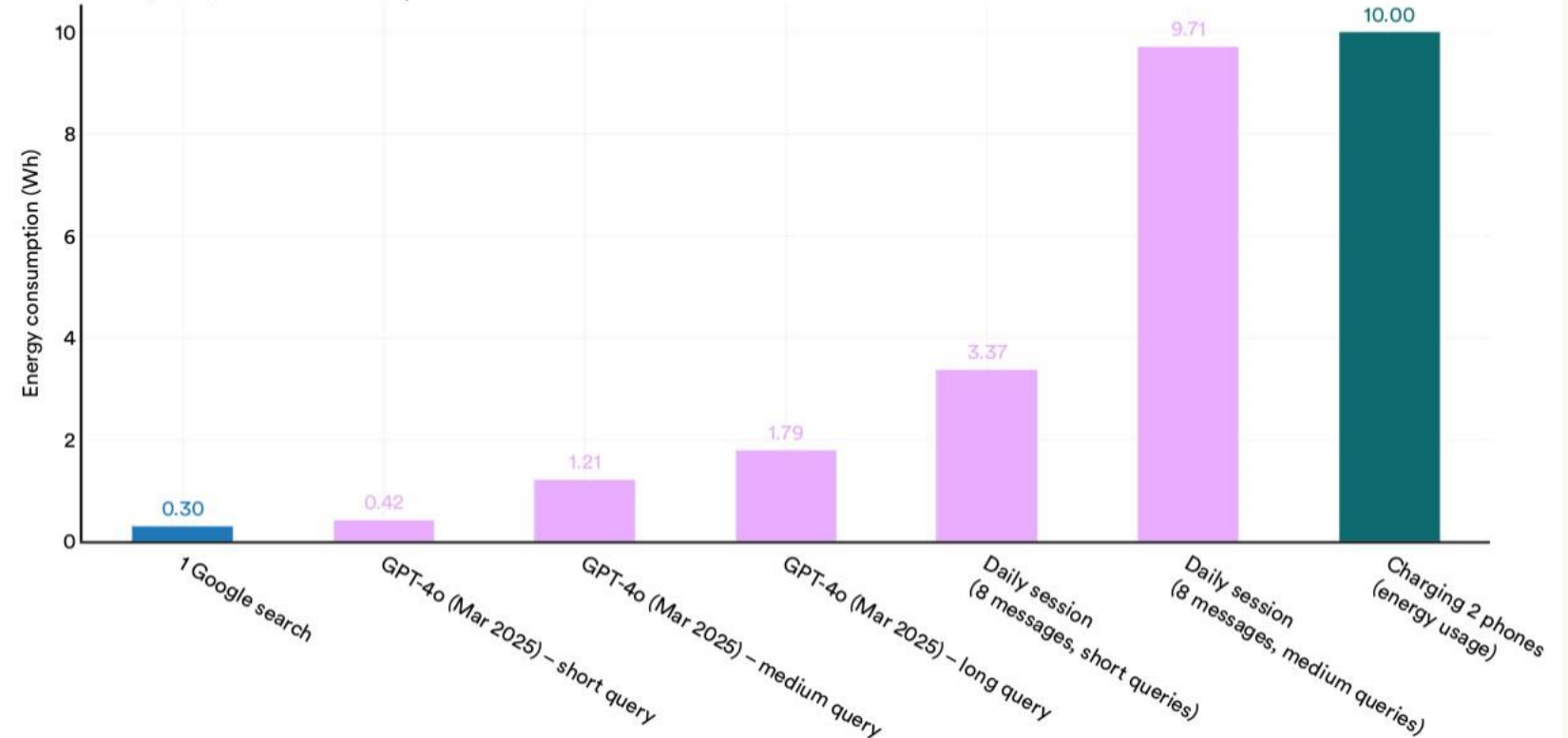
Ethical considerations

Environmental costs of GenAI

- Annual estimates for GPT-4o is ~13-16 kiloliters -annual drinking water of 12M people
- Power demand of data centers ~ annual electricity consumption of France
- Computing hardware - GPUs carbon footprint
- Diesel-based generators to absorb energy fluctuation

Per-query and daily energy consumption: GPT-4o vs. common activities

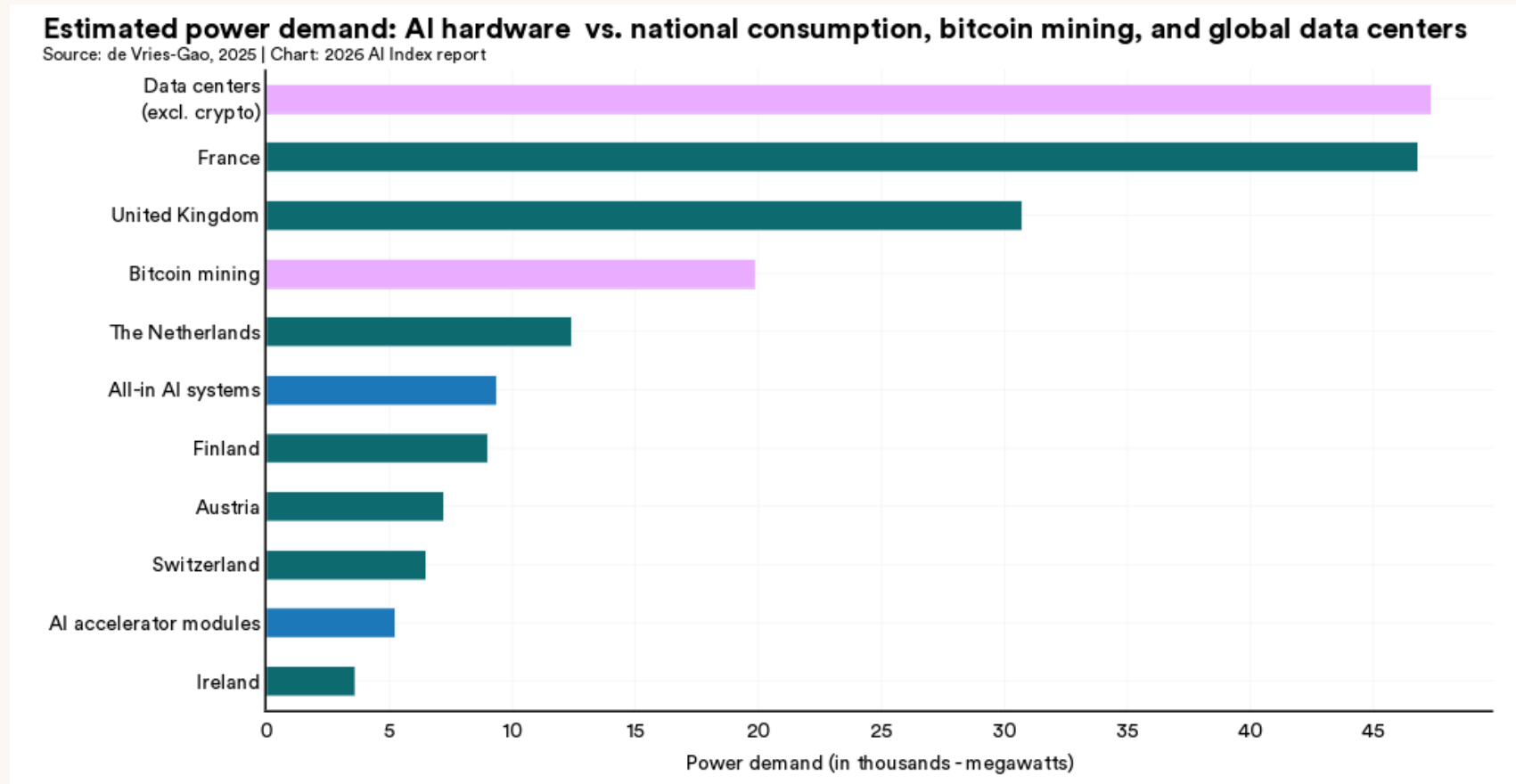
Source: AI Index, 2025 | Chart: 2026 AI Index report



Ethical considerations

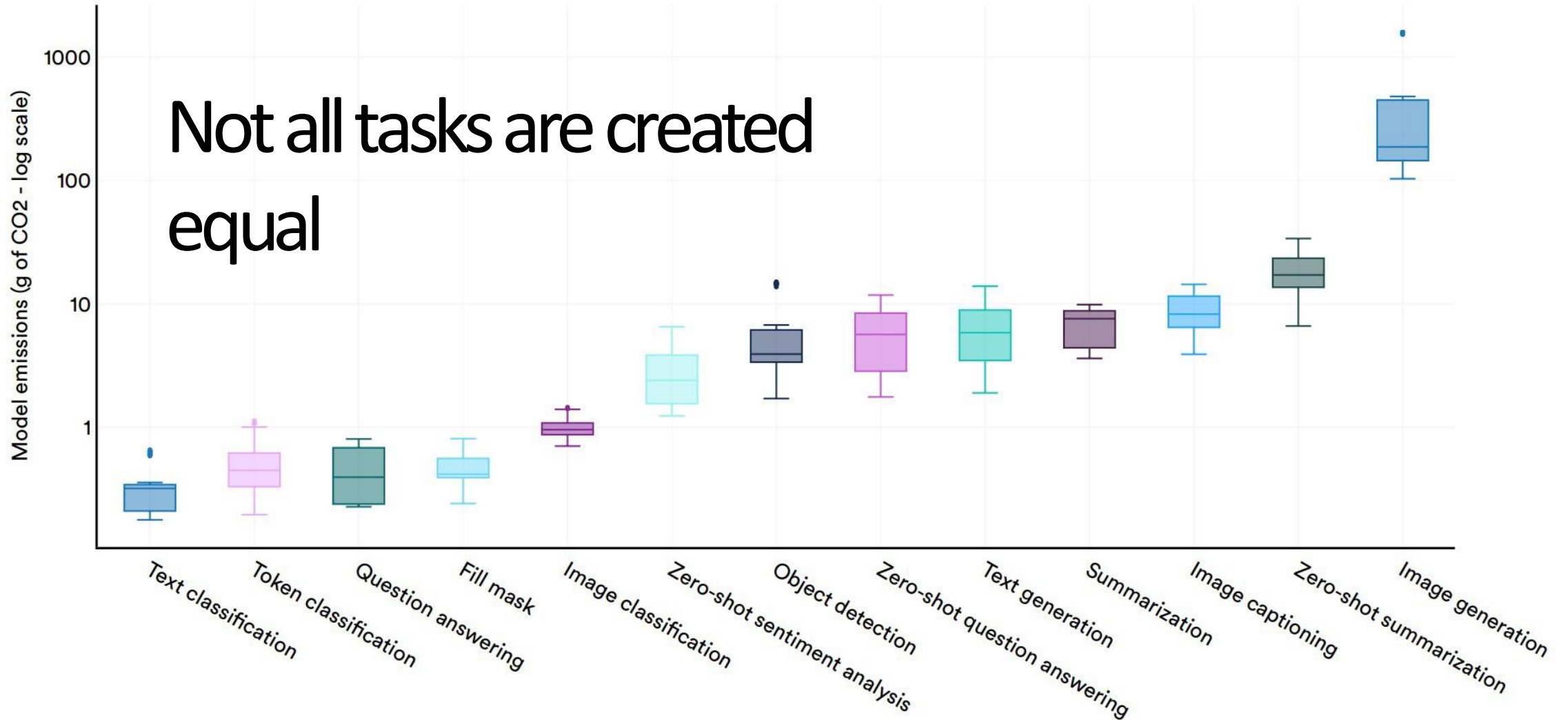
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Carbon emissions by task during model inference

Source: Luccioni et al., 2023 | Chart: 2024 AI Index report



Ethical considerations

- Copyright issues
 - New York Times v. OpenAI, Authors Guild v. OpenAI
 - Book publishers v. OpenAI
 - Universal v. Anthropic
- Research and academic integrity
 - Plagiarism, fabrication, and lack of AI acknowledgement
 - Scientific ownership

Los Angeles Times

Warner Bros. Discovery sues AI firm for Batman, Superman copyright infringement



This city is not real. One of the most important uses of visual effects in "The Batman" was the creation of Gotham City. The VFX team is now nominated for the 2023 Oscar. (Warner Bros. Pictures & DC Comics)

Subscribers are Reading >

How to have the best Sunday in L.A., according to Hannah Pilkes

Homelessness has declined in L.A. County, but progress is at risk

Inside the newest hotel in Ojai, which is also the oldest

'Not scientifically credible': Scientists repudiate

The New York Times

A.I. Influencers

'Open-Source' OpenAI

The 'Hard Tech' Era

A Techno-Religion Emerges

S

Anthropic Agrees to Pay \$1.5 Billion to Settle Lawsuit With Book Authors

The settlement is the largest payout in the history of U.S. copyright cases and could lead more A.I. companies to pay rights holders for use of their works.

Security considerations

- Questionable authenticity of images and text (deepfakes)
- Over-relying on AI technology
 - Loss of skills and expertise
- Risk for sensitive research and personal data
 - Input could be used to further train GenAI tools
 - Data is processed and stored on US servers

5. Who can view my conversations?

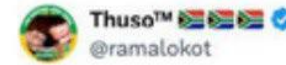
- As part of our commitment to safe and responsible AI, we review conversations to improve our systems and to ensure the content complies with our policies and safety requirements.

6. Will you use my conversations for training?

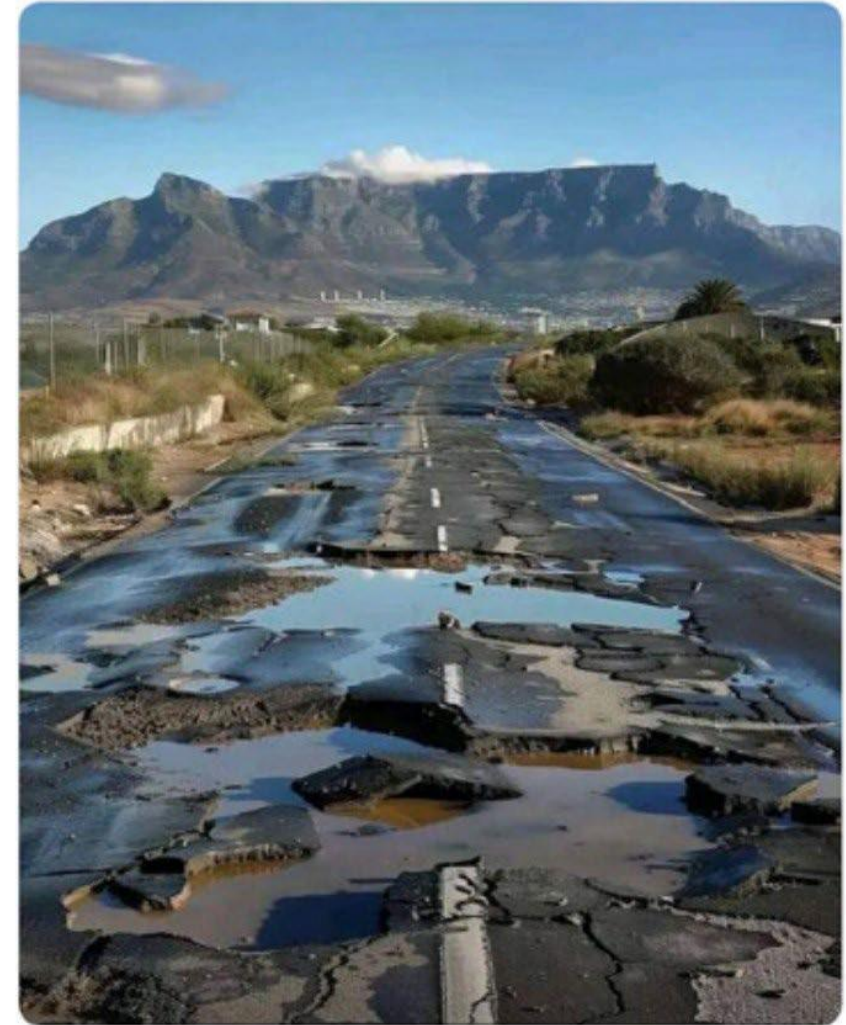
- Yes. Your conversations may be reviewed by our AI trainers to improve our systems.

<https://help.openai.com/en/articles/6783457-chatgpt-general-faq>

← Post



White 🇷🇺 people lied



3:35 PM · May 4, 2024 · 106.2K Views



Current AI regulations in the EU

Risk Categories

The AI Act (August 2024)

- **Purpose:** Ensures AI is safe, respects fundamental rights, and supports democracy, the rule of law, and environmental standards.
- Required **AI literacy** for the companies and employees
- AI-generated or manipulated content must be clearly labeled (article 50)

Unacceptable Risk: Banned uses (e.g., social scoring, exploitative manipulation).

High-Risk: Systems impacting rights and safety (e.g., job screening, law enforcement).

Transparency Risk: Disclosures required for manipulation-prone applications.

Minimal Risk: General use with voluntary standards adherence.

Current AI regulations in the EU

Living guidelines on **the responsible use of generative AI in research** by the European Commission (April 2025)

Researchers:

- Responsibility for scientific output
- Transparent GAI use
- Privacy, confidentiality, and intellectual property rights
- Legal and ethical standards
- Refrain from using GAI substantially in sensitive activities

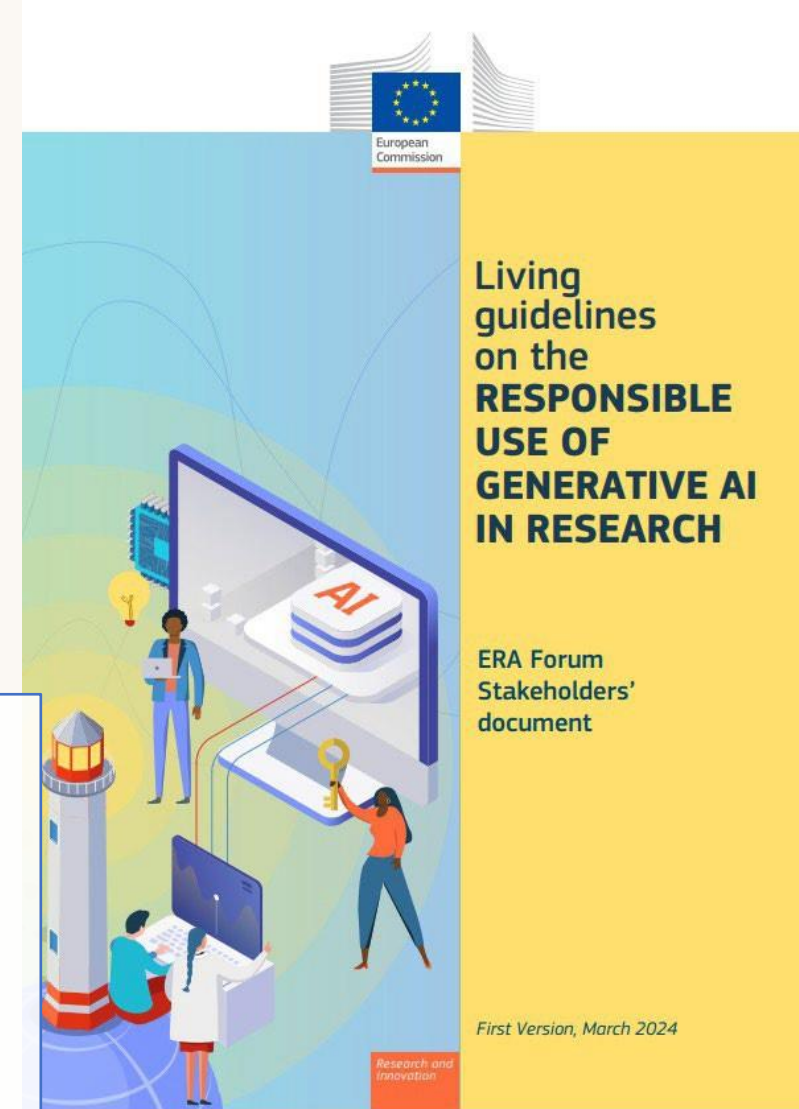


Current AI regulations in the EU

Living guidelines on **the responsible use of generative AI in research** by the European Commission (April 2025)

Research Organizations:

- Promote, guide, and support the responsible use of GAI
- Monitor and evaluate the development and use of GAI systems
- Reference or integrate GAI guidelines into general research guidelines
- Implement local or cloud-based GAI tools with adequate data protection measures



Current AI Regulations in the EU (2)

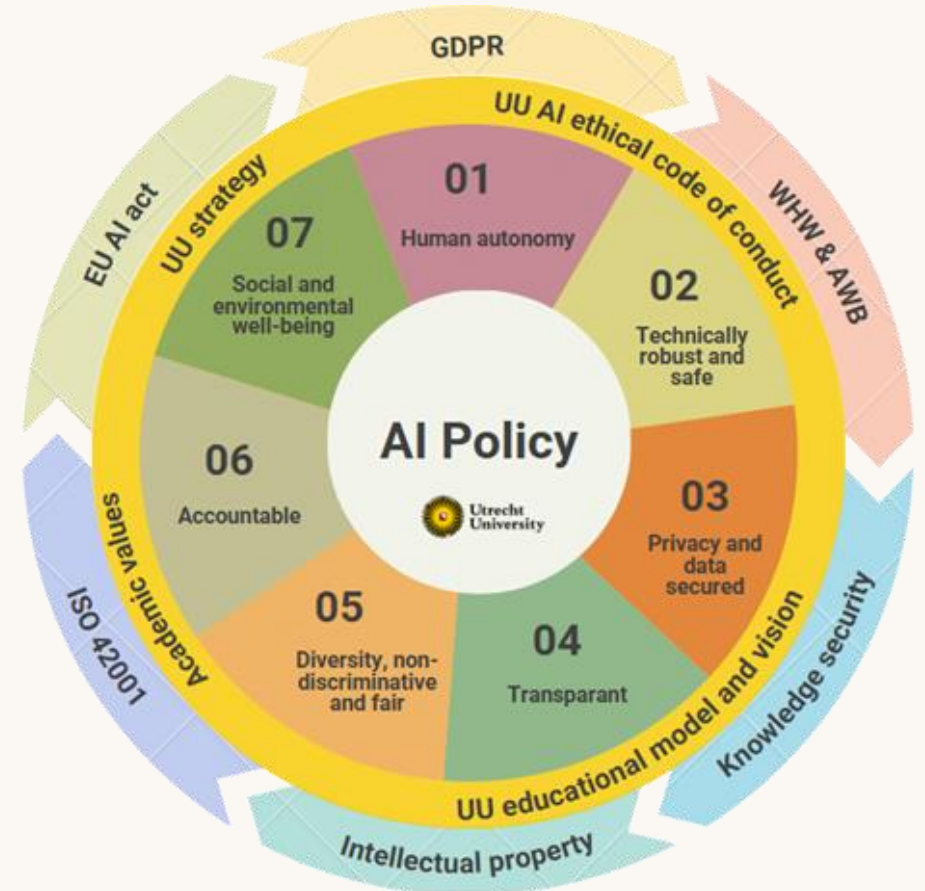
NWO AI guidelines for transparent and ethical use of generative AI
(January 2025)

- No generative AI models can be used throughout the entire evaluation process by referees, committee members, or jury members
- (Responsible) use of GenAI allowed for applicants
- Use of GenAI allowed for NWO employees in other activities (not assessment process) – only Copilot Chat (not the agent) and DeepL



Current AI Regulations at UU

- UU AI Ethical code of conduct
 - GenAI in research UU guidelines:
 - A supplementary tool
 - Do not over-rely



Universiteit
Utrecht

Discussion: Can we do the following things?

- Use GenAI quickly generate first drafts for sections of a document, such as an article or proposal.
- Help analyze a paper for review to identify key points revision
- Use claude/chatgpt to give latest update of the literature
- Let genAI help you generate a discussion of your results
- Brainstorm with genAI to refine your answer
- Summarize lengthy or complex documents

Cheat sheet Responsible use of AI

Summarizing

Summaries of internal sensitive documents

Summaries of internal meetings (not public) but also no sensitive information

Summaries of online documents (policy documents etc.)

Writing

Write a complete paper based on your (sensitive) data

Let genAI help you generate a discussion of your results

Help restructure sentences in your paper

Programming

Fully generating code based on sensitive data`

Fully generating code based on non-sensitive data (“if it runs, it runs”)

Spotting bugs in code you’ve written without adding the data

Sustainability

Use genAI as a search engine for all questions

Use genAI to make a presentation on genAI guidelines for NWO-I

Brainstorm with genAI to refine your answer

Benefits and Use cases according to UU

- **Drafting and improving text**
 - GenAI can quickly generate first drafts for sections of a document, such as an article or proposal. Since writing a first draft can be a barrier, GenAI can provide a starting point to build on and save researchers and research support staff valuable time. It can also help to polish text or make it more concise (for example to fit a word limit).
- **Cross-linguistics inclusiveness**
- A good example of GenAI use is using automatic translation to overcome language barriers for non-native speakers (for example, translating emails). Since research papers and proposals tend to be written in English, GenAI is particularly helpful for non-native English speakers.
- **Summarize extensive/complex information**
 - GenAI can summarize lengthy or complex documents, making it easier to extract key insights and communicate important points to colleagues. For example, funding support staff can use GenAI to summarize and distill dense funding calls or eligibility criteria, ensuring that researchers are presented only with the information most relevant to them.
- **Literature review assistance**
 - GenAI may facilitate literature reviews by synthesising or summarising literature, but users should always fact-check the results. GenAI may not be suited to identify relevant literature or summarise it correctly. Outcomes depend on what the model was trained on, and/or whether the model is able to generate based on live web search. More reliable tools exist; an example is ASReview, developed at UU..



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What tools did I miss? What important concepts?

Take-Home Message



AI can streamline academic tasks, saving time and improving quality.



Use AI to assist in writing, literature searches, manage references, translate or summarize scientific texts. Experiment



with different tools and combine tools for complementary benefits.



Always verify AI-generated outputs and be mindful of biases.



Protect sensitive research data and comply with data security best practices. Regularly explore



updates in AI tools and stay aware of ethical guidelines for their use.



Use AI as a supportive tool to enhance, not replace your critical thinking and academic expertise.

Extra slides



How do GenAI (LLM) models work?

User's input
"prompt"

Next word prediction

AI-generated
output

Step 1: Tokenization
Dividing prompt into discrete elements

Step 2: Vectorization
Turning tokens into computer-readable vectors

Step 3: Embedding
Creating numerical representation of the input

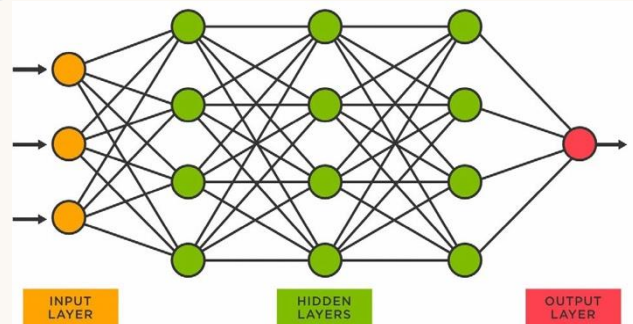
Step 4: Neural networks
Generation possible vectors to follow the prompt

Step 5: Output generation and selection
Choosing the final token to add to the prompt

Tokens	Characters
6	20

What is a tokenizer?

[2061, 318, 257, 11241, 7509, 30]



Prompt engineering frameworks

PROPER framework

P - Persona	Which role should the model take?
R - Request	What task should it do?
O - Operation	In which way / method?
P - Presentation	In which format / style / tone?
E - Examples	Give an example or template to follow
R - Refinement	Give feedback, iterate and improve result

CLEAR Framework

C -Concise	Brevity and clarity in prompts
L -Logical	Structured and coherent prompts
E -Explicit	Clear output specifications
A -Adaptive	Flexibility and customization in prompts
R -Reflective	Continuous evaluation and improvement of prompts

Gruber, P., 2023. Using ChatGPT for Efficient Data Analysis with R. Instats Inc. <https://doi.org/10.61700/HX2NYQCWOG614469>

Lo, L.S., 2023. The CLEAR path: A framework for enhancing information literacy through prompt engineering. *The Journal of Academic Librarianship*, 49(4), p.102720.

- **Note:** prompt engineering techniques are used for pure LLMs such as ChatGPT, not for RAG-based tools such as Scite.ai, Elicit, Scopus AI.

Practical exercise (20 min)

Identifying literature gap:

- Explore a topic and find understudied subtopics/questions

Literature search & referencing:

- Search for relevant papers and citations
- Analyze/verify citation contexts for selected papers
- Explore literature connections and visualize citation networks (Research Rabbit)

- Optimal sleep duration across different age groups and health risks associated with sleep deprivation
- The affect of red wine on cardio-vascular diseases
- How do vegan and vegetarian diets compare in terms of effects on LDL cholesterol and blood pressure?

Writing assistance:

- Make an outline of the research paper and expand it
- Try improving the existing text with Paperpal features
- Use Jenni's AI chatbot to improve your text



Current AI Regulations in the Netherlands



[UMCG AI Guidelines](#)



[UvA policy on AI](#)



[VU GenAI recommendations](#)



[Tilburg University AI guidelines](#)



[Wageningen University AI guidelines](#)



[Maastricht University AI policy](#)



Break (10 min)

Title