



Using AI tools for searching literature - opportunities and challenges

RWTH Publishing Forum (#6) 23.1.2025

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Lena Nietzsche, RWTH University Library

Some Housekeeping

- this session is *not* recorded
- slides will be available on the website of the RWTH University Library (→ Research → Scholarly Publishing → Publishing Forum) and in RWTH Publications
- **Save-the-date: next Publishing Forum**
March 27, 2025, 1:00 p.m. (Zoom)
- Ideas for further topics?
⇒ Let us know! rtp@ub.rwth-aachen.de

And now: „Using AI tools for searching literature - opportunities and challenges“

Agenda

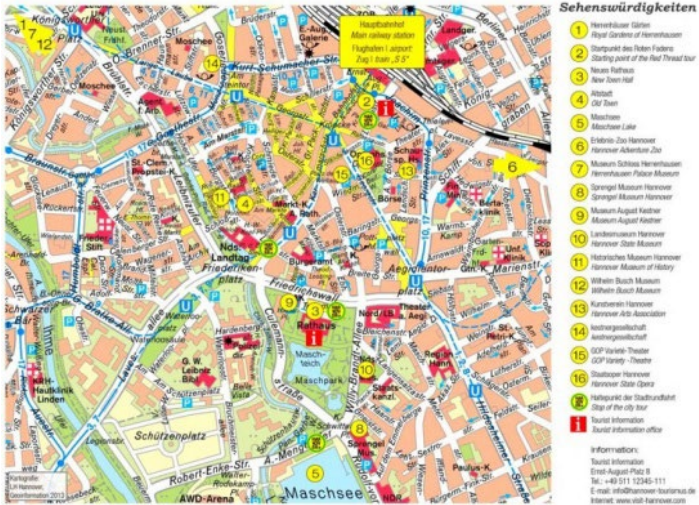
- Dr. A.-L. Lorenz: ORKG Ask - Find the research you`re actually looking for
- L. Nietzsche: AI-supported literature research: tools and techniques

ORKG Ask

Find the research you're actually looking for

Digitalization in everyday life

50 years ago

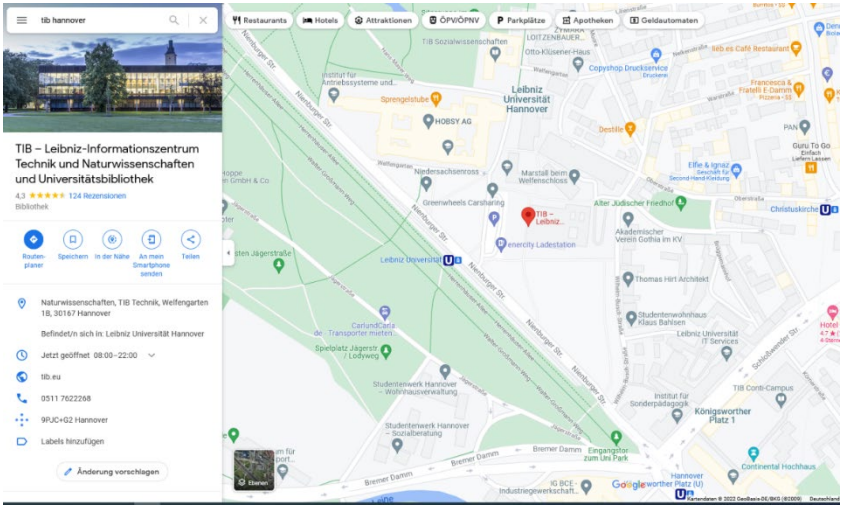


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Navigation to TIB Hannover



Now



© Google

- + New Features:
 - Zoom in
 - Traffic jam warning
 - Opening hours
 - Interesting places around

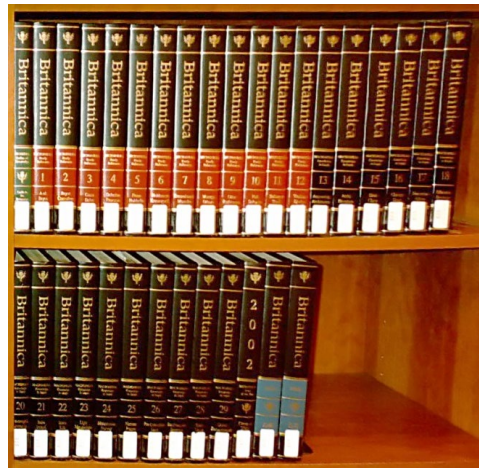
Similar in other domains....

Who still remembers?



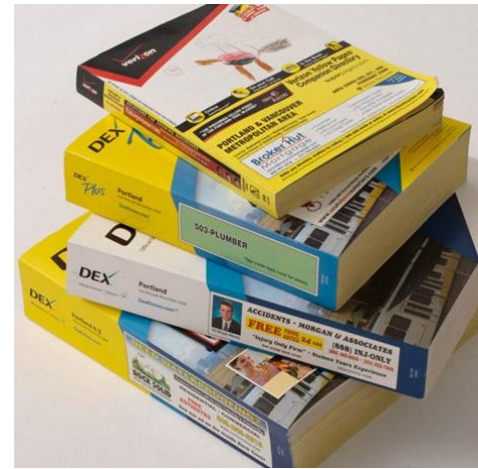
Mail order catalogs

Photo: dpa



Encyclopedias

Photo: Wikipedia User:SEWilko (2006):
Encyclopedia Britannica, 15th edition 2002.
CC BY-SA 3.0

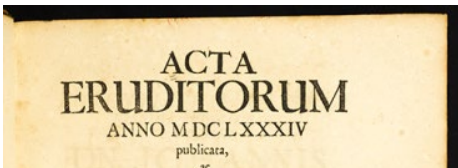


Phone books

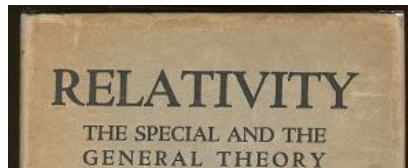
Whole industries got disrupted and our lives were significantly changed

What about Science?

Over 300 years ago



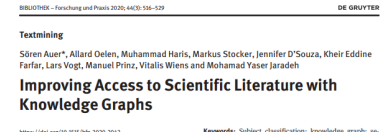
100 years ago



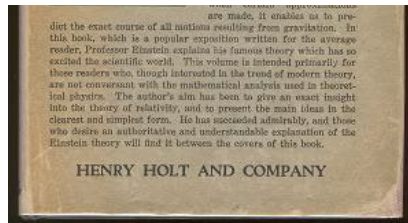
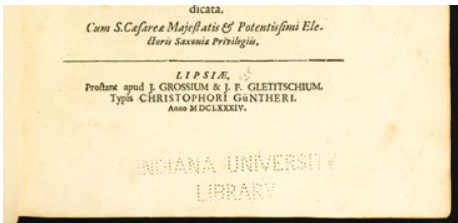
20 years ago



Today



Science does not harvest the full potential of digitalization



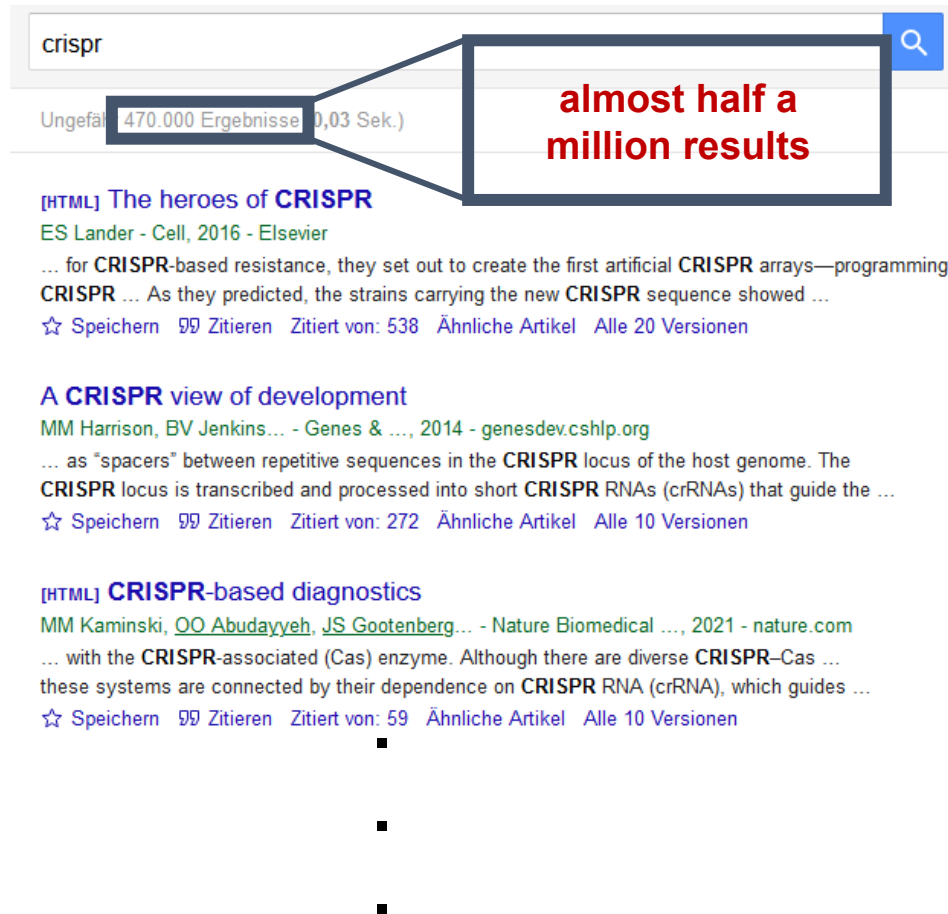
Not much has changed!

A Consequence of Document Centered Information Flows: The Publication Flood

- ~ 2.5 Mio new publications per year
- Researchers lack overview, even in small fields
- Loss of knowledge
- Answering questions is like looking for a needle in the haystack



An Example – CRISPR



The image shows a search engine interface with the search term 'crispr' entered. A callout box points to the search results count, which is 'Ungefähr 470.000 Ergebnisse (0,03 Sek.)'. A red text box highlights the text 'almost half a million results'.

crispr

Ungefähr 470.000 Ergebnisse (0,03 Sek.)

almost half a million results

[\[HTML\] The heroes of CRISPR](#)
ES Lander - Cell, 2016 - Elsevier
... for CRISPR-based resistance, they set out to create the first artificial CRISPR arrays—programming CRISPR ... As they predicted, the strains carrying the new CRISPR sequence showed ...
☆ Speichern Zitieren Zitiert von: 538 Ähnliche Artikel Alle 20 Versionen

[A CRISPR view of development](#)
MM Harrison, BV Jenkins... - Genes & ..., 2014 - genesdev.cshlp.org
... as "spacers" between repetitive sequences in the CRISPR locus of the host genome. The CRISPR locus is transcribed and processed into short CRISPR RNAs (crRNAs) that guide the ...
☆ Speichern Zitieren Zitiert von: 272 Ähnliche Artikel Alle 10 Versionen

[\[HTML\] CRISPR-based diagnostics](#)
MM Kaminski, OO Abudayyeh, JS Gootenberg... - Nature Biomedical ..., 2021 - nature.com
... with the CRISPR-associated (Cas) enzyme. Although there are diverse CRISPR–Cas ... these systems are connected by their dependence on CRISPR RNA (crRNA), which guides ...
☆ Speichern Zitieren Zitiert von: 59 Ähnliche Artikel Alle 10 Versionen

■

■

■

Specific research questions:

- Who applied CRISPR to butterflies?
- How to apply CRISPR with minimal costs?
- How do different genome editing techniques compare?

Enter LLMs...

The Verge (2024):
<https://www.theverge.com/2024/5/16/24158531/gannett-ai-generated-overviews-usa-today-memo>

TECH / ARTIFICIAL INTELLIGENCE / CREATORS

Newspaper conglomerate Gannett is adding AI-generated summaries to the top of its articles

The New York Times (2024):
<https://www.nytimes.com/interactive/2024/06/24/technology/ai-deepfake-facebook-midjourney-quiz.html>

A.I. Is Getting Better Fast. Can You Tell What's Real Now?

TECHNOLOGY | ARTIFICIAL INTELLIGENCE

The Smartest Way to Use AI at Work

Generative AI tools can help you get ahead in the office—if you know how to use them

The Wall Street Journal (2024):
<https://www.wsj.com/tech/ai/the-smartest-way-to-use-ai-at-work-ce921ff4>



Can AI help me with literature review?

Archiv

Erstunken und erlogen: Chat GPT erfindet wissenschaftliche Quellen

© Deutschlandfunk

<https://www.deutschlandfunk.de/erstunken-und-erlogen-chat-gpt-erfindet-wissenschaftliche-quellen-dlf-c2303c11-100.html>

Rüsberg, Kai | 13. Februar 2023, 14:49 Uhr

▶ Hören 04:59

↓ Audio herunterladen

📍 Abonnieren



ChatGPT

GPT-4 produziert mehr Falschinformationen als Vorgängerversion

Das Logo der Sendung „Campus und Karriere“ (l



Mit seinem neuen Modell schreibt ChatGPT ausführlichere und genauere Texte. Jedoch verfasst die KI auch häufiger Falschnachrichten als vor dem Upgrade, zeigt ein Versuch.

21. März 2023, 16:10 Uhr Quelle: ZEIT ONLINE, [heo](#)

© Zeit Online <https://www.zeit.de/digital/2023-03/chatgpt-4-falschinformationen-verbretung-newsguard>

How about ChatGPT?

ARTIFICIAL INTELLIGENCE

Why Meta's latest large language model survived only three days online

Galactica was supposed to help scientists. Instead, it mindlessly spat out biased and incorrect nonsense.

By Will Douglas Heaven

November 18, 2022

A model specifically for science maybe?

>wiki article on bears living in space

Bears living in space

Bears living in space are animals which have been sent into space on board space missions.

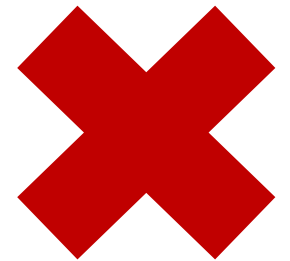
History

Soviet Union

The Soviet Union was the first country to put a bear into space. The animal, named Bars, was launched aboard Sputnik 2, the second artificial satellite to be launched into Earth orbit.

Bars was a Karelian bear (a small, sleek brown bear), which was selected by S. P. Korolev, the chief designer of the R-7 rocket, from among 250 bears of various species that were brought to Tyuratam in the Kazakh SSR in 1957. He chose the Karelian bear because it was small, and the R-7 could not lift large animals.

Bars was a three-year-old female bear who weighed 40 kg (88 lb). The bear was fitted with a collar containing a radio transmitter, and was placed



© MIT Technology Review:

<https://www.technologyreview.com/2022/11/18/1063487/meta-large-language-model-ai-only-survived-three-days-gpt-3-science/>

What went wrong?

- High expectations (AI hype)
→ Scope too large!
- Not specifically made for research or made without requirements of good scientific practice in mind
- Lacking Transparency & Reproducibility



ORKG

Ask

Can AI help me
with literature
review?

Yes! If done correctly...

Search close to 80mio publications &
Find research you are *actually* looking for...

<https://orkg.org/>

Search query
What factors contribute to successful intergenerational knowledge transfer?

Search

The answer and the extracted information was obtained with a large language model and might contain errors and inaccuracies. All information presented by ORKG Ask needs to be carefully checked. Got it

Answer (based on top 5 papers)

The factors contributing to successful intergenerational knowledge transfer include trust between family members, commitment to the family business, intergenerational and intragenerational relationships, psychological ownership, successor's aspects and training, predecessor involvement in the successor training, organizational culture, and relationships with Family Business Associations [1],[3]. Mentoring programs play a significant role in facilitating knowledge transfer and can enhance collaborative relationships, mitigate negative stereotypes, increase knowledge sharing, and enhance technology adaptability throughout the organization [4]. Personality and attitudes, rather than age, influence the willingness to share knowledge and use virtual communication [5].

Filters

Year



Language

Add filter...

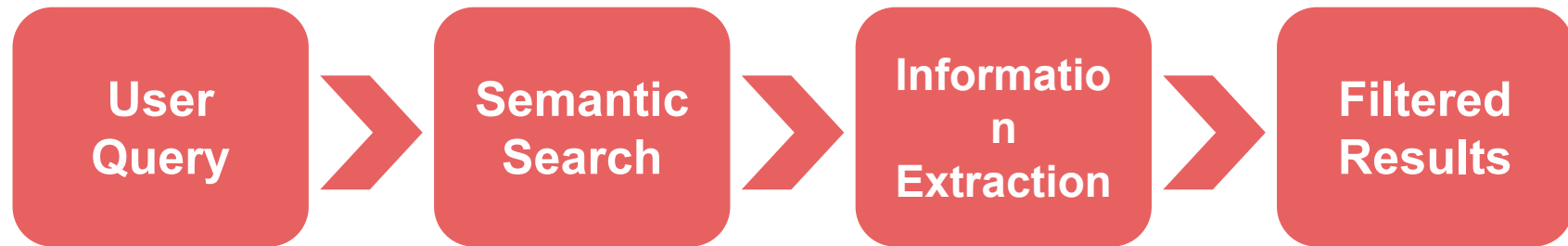
ORKG Ask is brought to you by

Answer	Insights	TL;DR	Conclusions	Results	Methods
<p>Intergenerational Knowledge Transfer in the Workplace: a Sociological Perspective</p> <p>Wang Xin • Dong Xiaoying • December 2009</p>					
<ul style="list-style-type: none"> Existing research findings and a new direction for the field. Analysis framework from properties and factors dimension. Clear definition and understanding of intergenerational knowledge transfer. 	<p>The paper highlights the importance of intergenerational knowledge transfer in the context of a knowledge economy and organizational sustainability. It also reveals that despite extensive research in this area, many aspects of intergenerational knowledge transfer from a sociological perspective remain unexplored.</p>	<p>This paper explores intergenerational knowledge transfer from a sociological perspective and summarizes existing research findings while providing a new direction for the field.</p>	<p>The paper concludes that intergenerational knowledge transfer is crucial for organizational sustainability but that there are gaps in the existing literature and a need for a clearer understanding and definition of the concept.</p>	<p>There are no explicit results mentioned in the paper as it primarily focuses on theoretical framework and discussion.</p>	<p>The paper uses a literature review approach to explore intergenerational knowledge transfer from a sociological perspective.</p>
<p>Intergenerational cooperation at the company and knowledge transfer</p> <p>Kokovnik, K. • Jagodic, G. • December 2016 • 10.29119/1899-6116.2017.39.5 • Politechnika Slaska - Silesian University of Technology</p>					
<ul style="list-style-type: none"> Interpersonal cooperation Transfer and exchange of knowledge Mentoring and work instructions Practical implementation of activities Training and knowledge investment Knowledge sharing platform 	<p>Companies invest in intergenerational cooperation and knowledge transfer as a crucial element for business success.</p>	<p>Companies invest in intergenerational cooperation and knowledge transfer through various means such as interpersonal cooperation, mentoring, training, and a knowledge sharing platform.</p>	<ul style="list-style-type: none"> Intergenerational cooperation plays a significant role in the life and success of every company. The connection between generations ensures the continuity of business practices and the exchange of knowledge which is necessary for the growth and prosperity of the organization. 	<p>Intergenerational cooperation leads to successful knowledge transfer in companies.</p>	<ul style="list-style-type: none"> On-the-job training Workshops Conferences Mentoring programs E-learning
<p>Study of factors influencing knowledge transfer in family firms</p> <p>Barroso Martínez, Ascensión • Sanguino Galván, Ramón • Bañegil Palacios, Tomás • November 2013 • Intangible Capital</p>					
<ul style="list-style-type: none"> Trust between family members Commitment to the family business Intergenerational relationships Intragenerational relationships Psychological ownership of the family business Successor's aspects and training Predecessor involvement in the successor training Organizational culture 	<p>The study concludes that knowledge is best transferred when family members value certain factors.</p>	<p>This study identified factors that contribute to successful intergenerational knowledge transfer in family firms.</p>	<p>The study concludes that trust, commitment, relationships, psychological ownership, training, predecessor involvement, organizational culture, and relationships with Family Business Associations are key factors in successful intergenerational knowledge transfer in family firms.</p>	<p>Based on an extensive literature review, certain factors were identified as contributing to successful intergenerational knowledge transfer in family firms.</p>	<p>An extensive literature review was conducted to identify the factors contributing to successful intergenerational knowledge transfer in family firms.</p>

Tipps & Tricks

- Ask works for **research questions** and answers based on published articles
 - „What is the basic reproduction number of Covid-19?“
 - „How does social media effect college selection processes?“
- Ask is **not meant for everyday knowledge, metadata, author search, etc.**
 - „What will the weather be like tomorrow in Hannover?“
 - „Show me publications by Sören Auer.“
 - „Summarize the lastest publications on climate change.“
→ Filters can often be useful in some of these cases
- Ask is **not a chatbot** (yet)

How does this work?



CORE Dataset:
World's largest collection of OA
research papers

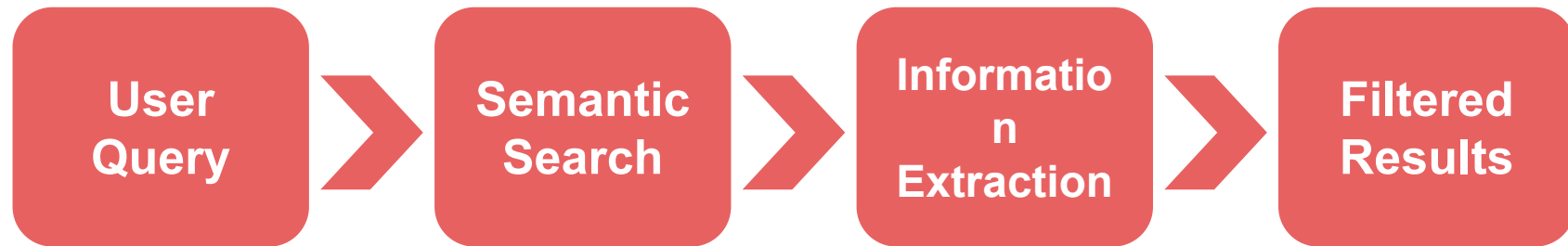
Content:
76.4M publications with abstracts
19.1M publications with full-text

The nerdy details:

Embedding Model:
Nomic

Vector Store:
Qdrant

LLM:
Mistral Instruct 7B v0.2



CORE Dataset:
*World's largest collection of OA
research papers*

Content:
*76.4M publications with abstracts
19.1M publications with full-text*

Recycle & Reuse!

ORKG Ask is Open Source!

→ *Transparency & Reproducibility*

Components (or even the whole system can be reused)
Prompts and models are documented

Frontend:

>> gitlab.com/TIBHannover/orkg/orkg-ask/frontend

Backend:

>> gitlab.com/TIBHannover/orkg/orkg-ask/backend

Issues:

>> gitlab.com/TIBHannover/orkg/orkg-ask/frontend/-/issues

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[@orkg@mastodon.social](https://mastodon.social/@orkg)





AI-supported literature research: tools and techniques

Example: Scopus AI & Research Rabbit

Lena Nietzsche

Agenda

AI-supported literature research: tools and techniques

- Short introduction to AI tools for literature research
 - Why a specific tool?
 - Definition: Finder vs. Connector
- Two tools in detail
 - Scopus AI
 - Research Rabbit
- Conclusion
- Feedback
- Questions?
- References

AI Tools

- First:

AI tools for literature research will not replace the classic search but expand it

- All tools are dynamic, you need to stay up to date
- There are different kinds of AI tools that can be used for literature research, so called Finders and Connectors
- You need to choose wisely which tool to use
- Depends on the research field, what you already have (e.g. relevant articles), etc.

- Focus on two tools that can be used at RWTH: **Scopus AI & Research Rabbit**
 - Overview over a topic and some relevant literature: Scopus AI
 - Finding more articles about a topic and create networks: Research Rabbit

Why specific AI tools for literature research?

- They have a scientific database
- Help to get an overview over a lot of scientific works
- Process a lot of data in short time
- Help to find a start by summarizing the most relevant information about a topic
- Help to find connections between related papers

Finder vs. Connector Tools

Finder:

- Help to find relevant literature
- Search with keywords or a research question
- Examples: ORKG Ask, Semantic Scholar, Scopus AI, Elicit

Connector:

- Help to add related literature to already known ones
- Examples: Research Rabbit, Connected Papers

Note: ChatGPT / RWTHgpt are not suitable for literature research!

Scopus AI

- Additional research tool for Scopus
- Database: Scopus from 2003 to now, mainly English
- License at RWTH since June 2024, expanded for 2025
- Start search with research question or keyword, Finder-Tool
- Gives a summary, an expanded summary, a concept map, topic experts (authors) and trends / emerging themes (Beta)
- Copilot: shows research question and generated search query

Scopus[®] AI

Trusted content. Powered by responsible AI.

Start exploring

Documents Authors Researcher Discovery Organizations **Scopus AI** New

Explore topics and discover relevant references since 2003 [How it works](#)

Scopus AI Copilot

- Example Copilot: Artificial Intelligence → What is artificial intelligence and its applications? → Query → Summary

Artificial Intelligence

[Hide Copilot steps](#) ^

- ✓ **Creating a plan to answer your query**
- ✓ **Performing natural language search:**
 - What is artificial intelligence and its applications?
- ✓ **Performing keyword search:**
 - ("artificial intelligence" OR "ai" OR "machine" OR "intelligent system") AND ("application" OR "use" OR "implementation" OR "utilization") AND ("technology" OR "innovation" OR "development" OR "advancement") AND ("data" OR "information" OR "analytics" OR "processing") AND ("algorithm" OR "model" OR "framework" OR "approach") AND ("impact" OR "effect" OR "influence" OR "outcome")
- ✓ **Generating summary**

Scopus AI

- Summary with scientific references
- Generated with an integrated Large-Language-Model (LLM)

Summary

Artificial Intelligence (AI: An Overview)

Artificial Intelligence (AI) is a branch of computer science focused on creating systems capable of performing tasks that typically require human intelligence. These tasks include learning, reasoning, problem-solving, perception, and language understanding [1](#) [2](#) [3](#) [4](#). AI aims to develop algorithms and technologies that enable machines to mimic cognitive functions such as learning from data and experiences [5](#) [6](#).

Key Components and Techniques

- **Machine Learning (ML):** A subset of AI that involves training algorithms to learn from and make predictions based on data. ML is widely used in various applications, including image and speech recognition, and predictive analytics [1](#) [3](#) [7](#).
- **Deep Learning (DL):** A specialized form of ML that uses neural networks with many layers (deep neural networks) to analyze complex patterns in large datasets. DL is particularly effective in tasks such as image and speech recognition [1](#) [8](#).
- **Natural Language Processing (NLP):** A field of AI that focuses on the interaction between computers and humans through natural language. NLP enables applications like chatbots, language translation, and sentiment analysis [2](#) [7](#).

References

Reference 1

Artificial intelligence and machine learning in the fields of education, medical, and smart phones
Mogili U., Mohamed A.

AIP Conference Proceedings ↗ 2023

Reference 2

Artificial intelligence technology in intelligent health informatics
Salem A.-B.M.

Advances in Intelligent Systems and Computing ↗ 2019


Reference 3

Artificial intelligence in oncologic imaging
Cappello G., Defeudis A., Giannini V., (...), Regge D.


Multimodality Imaging and Intervention in Oncology ↗ 2023


[Show all 18 references](#)

Scopus AI

Expanded summary 

Concept map 

Topic experts 

Emerging themes Beta 

Go deeper

↳ What are the different types of artificial intelligence?

↳ How is artificial intelligence used in healthcare?

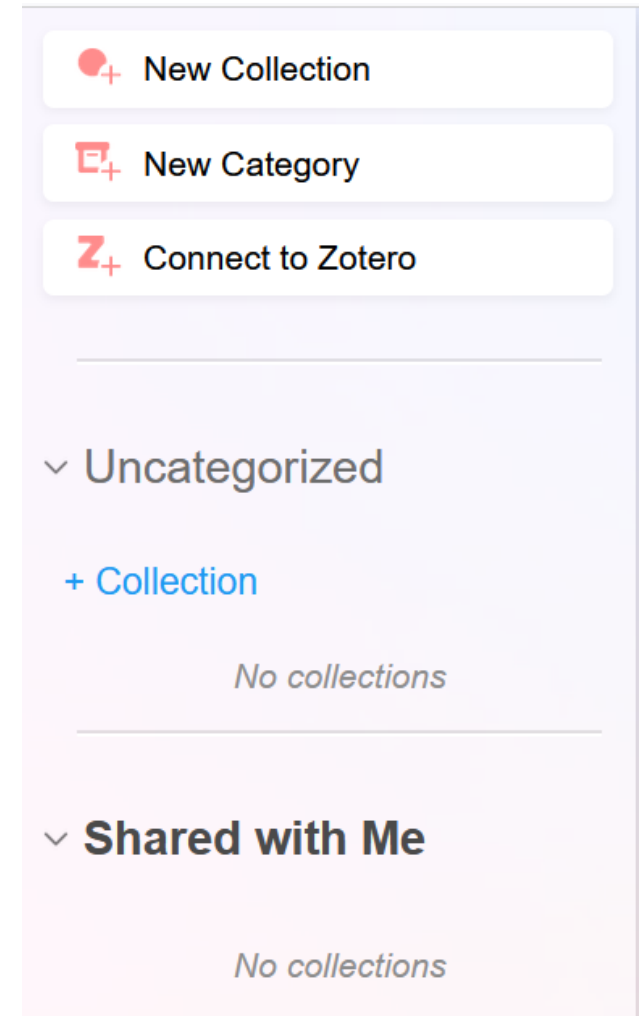
↳ What ethical considerations are important in artificial intelligence development?

Research Rabbit



- Free
- User account required
- Database: PubMed, Semantic Scholar
- Connector-Tool
- Focus: publications in English
- Especially helpful when relevant articles are already known → Seed Paper
- Finds related publications based on a created collection of relevant articles
- Creates visual networks of publications and authors
- „Timeline“-concept
- Can be connected to Zotero

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

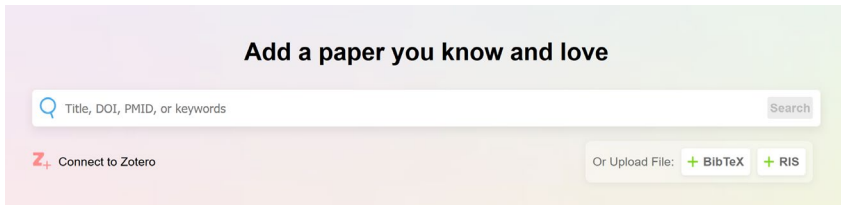


Research Rabbit

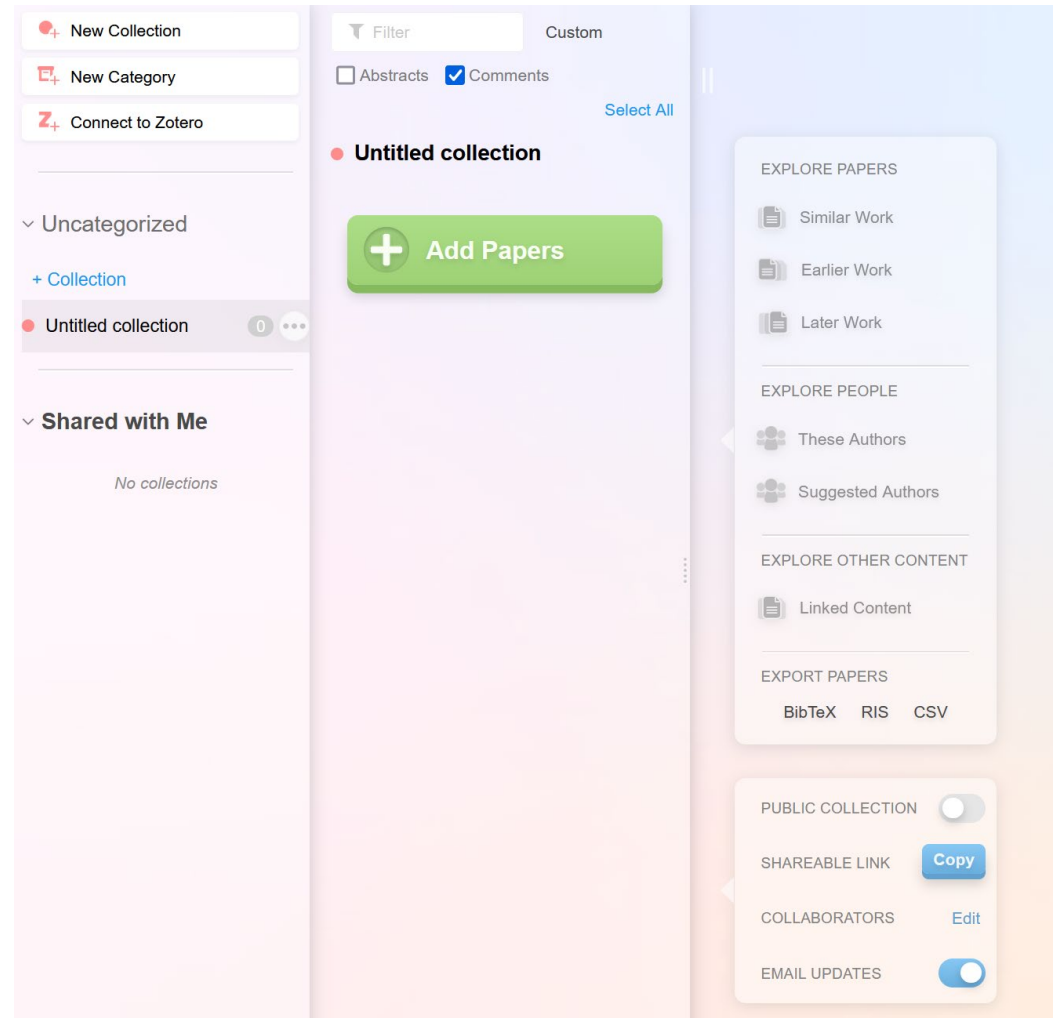
- Initially, no search slot available
- Add a collection to start a search



- Papers need to be added to the collection to find related ones



- These papers can be known ones or found through keywords
- Example: Artificial Intelligence



Research Rabbit

The screenshot shows the Research Rabbit search interface. At the top, there is a search bar with the text 'Artificial Intelligence' and a 'Search' button. Below the search bar, there are filters for 'Biomedical & Life Sciences' and 'All Subject Areas'. The main content area features a heading 'Choose Papers to Power ResearchRabbit's Recommendations' and a note 'Results powered by SemanticScholar'. Two search results are displayed:

- Arrieta** *et al.* **Herrera** 2019
Explainable Artificial Intelligence (XAI): Concepts, Taxonomies, Opportunities and Challenges toward Responsible AI
Information Fusion
[Add to Collection](#)
- Bubeck** *et al.* **Zhang** 2023
Sparks of Artificial General Intelligence: Early experiments with GPT-4
arXiv.org
Artificial intelligence (AI) researchers have been developing and refining large language models (LLMs) that exhibit remarkable capabilities across a variety of domains and tasks, challenging our understanding of learning and cognition. The latest model developed by OpenAI, GPT-4, was trained using an unprecedented scale of compute and data. In this paper, we report on our investigation of an early version of GPT-4, when it was still in active development by OpenAI. We contend that (this early version of) GPT-4 is part of a new cohort of LLMs (along with ChatGPT and Google's PaLM for example) that exhibit more general intelligence than previous AI models. We discuss the rising capabilities and implications of these models. We demonstrate that, beyond its mastery of language, GPT-4 can solve novel and difficult tasks that span mathematics, coding, vision, medicine, law, psychology and more, without needing any special prompting. Moreover, in all of these tasks, GPT-4's performance is strikingly close to human-level performance, and often vastly surpasses prior models such as ChatGPT. Given the breadth and depth of GPT-4's capabilities, we believe that it could reasonably be viewed as an early (yet still incomplete) version of an artificial general intelligence (AGI) system. In our exploration of GPT-4, we put special emphasis on discovering its limitations, and we discuss the challenges ahead for advancing towards deeper and more comprehensive versions of AGI, including the possible need for pursuing a new paradigm that moves beyond next-word prediction. We conclude with reflections on societal influences of the recent technological leap and future research directions.
[Add to Collection](#)

- View: + Add Papers
- Search slot on top, relevant papers can be added to the collection
- More papers added = more precise recommendations
- No number of hits, unclear order of results → Preferred: known publications instead of keywords

Research Rabbit

- Added the first three publications to the collection
- Based on the collection, similar works, later and earlier ones can be found
- Research Rabbit shows the authors of the collection and gives suggestions for further ones based on it
- Networks based on publications or authors can be generated
- „Timeline“-concept

The screenshot displays the Research Rabbit interface for an 'Untitled collection'. It features three paper cards with author names, titles, and publication years. A green 'Add Papers' button is at the bottom. On the right, a sidebar offers exploration options: 'EXPLORE PAPERS' (Similar Work: 1461, Earlier Work: 50, Later Work: 404), 'EXPLORE PEOPLE' (These Authors: 44, Suggested Authors: 702), 'EXPLORE OTHER CONTENT' (Linked Content: 4), and 'EXPORT PAPERS' (BibTeX, RIS, CSV).

Untitled collection

Bubeck ... Zhang 2023
Sparks of Artificial General Intelligence: Early experiments with GPT-4
arXiv.org

Arrieta ... Herrera 2020
L 1884
Explainable Artificial Intelligence (XAI): Concepts, Taxonomies, Opportunities and Challenges toward Responsible AI
Information Fusion

Adadi ... Berrada 2018
L 2572
Peeking Inside the Black-Box: A Survey on Explainable Artificial Intelligence (XAI)
IEEE Access

+ Add Papers

EXPLORE PAPERS

- Similar Work 1461
- Earlier Work 50
- Later Work 404

EXPLORE PEOPLE

- These Authors 44
- Suggested Authors 702

EXPLORE OTHER CONTENT

- Linked Content 4

EXPORT PAPERS

BibTeX RIS CSV

Research Rabbit

➔ Add to Other Collection

EXPLORE PAPERS

- Similar Work **1461**
- Earlier Work **50**
- Later Work **404**

EXPLORE PEOPLE

- These Authors **44**
- Suggested Authors **702**

EXPLORE OTHER CONTENT

- Linked Content **4**

EXPORT PAPERS

BibTeX RIS CSV

PUBLIC COLLECTION

Similar Work

Filter Relevance

Abstracts Comments [Select All](#)

Ribeiro ... Guestrin **2016**
↳ 8812

**"Why Should I Trust You?":
Explaining the Predictions of Any
Classifier**

Guidotti ... Pedreschi **2018**
↳ 2469

**A Survey of Methods for Explaining
Black Box Models**
ACM Computing Surveys

Rudin ... Rudin **2019**
↳ 3313

**Stop explaining black box machine
learning models for high stakes
decisions and use interpretable
models instead**
Nature Machine Intelligence

Connections
Click to Hide

Connections between your collection and 52 papers

Graph Type: **Network** Timeline

Labels: **First Author** Last Author

Filter these items

Zoom Out Fit All Zoom In

Conclusion

- There are a lot of AI tools for literature research, **choose wisely**
 - What databases are used? Do they fit my needs?
 - Is it free or available at my university?
 - What about data protection?
- Best results can be achieved by **combining** the traditional literature research with the AI-supported one
- Not recommendable for every topic

Feedback?

- The University Library evaluates different AI tools for literature research
 - See here: <https://www.ub.rwth-aachen.de/go/id/blhopt?lidx=1#aaaaaaaaaablhoqq>
- But we can not do that alone
- We look forward to **your feedback** on tools for AI-supported literature research
 - How useful is this tool for your scientific work?
 - What challenges have you encountered?

Please send your suggestions or feedback to bibliometrie@ub.rwth-aachen.de

Quellen

- Scopus
- Research Rabbit
- Foliensatz: Lahrso, Miriam; Petrovska, Lelde (2024): Literaturrecherche mit KI – Tipps und Tools. Eberhard Karls Universität Tübingen: <https://rwth-aachen.sciebo.de/s/IIHjGcMUOEMS7dv>

Many thanks! Questions? Comments?

Anna-Lena Lorenz, TIB – Leibniz Information Centre for Science and Technology, University Library
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