

Introduction into AI tools for academia

Computational Mass spectrometry and its Scientific communication using AI tools

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August 30, 2024



Agenda

- Introduction into generative AI tools
- Prompt-based searches
- Mapping tools
- Text analysis
- Hands-on activity

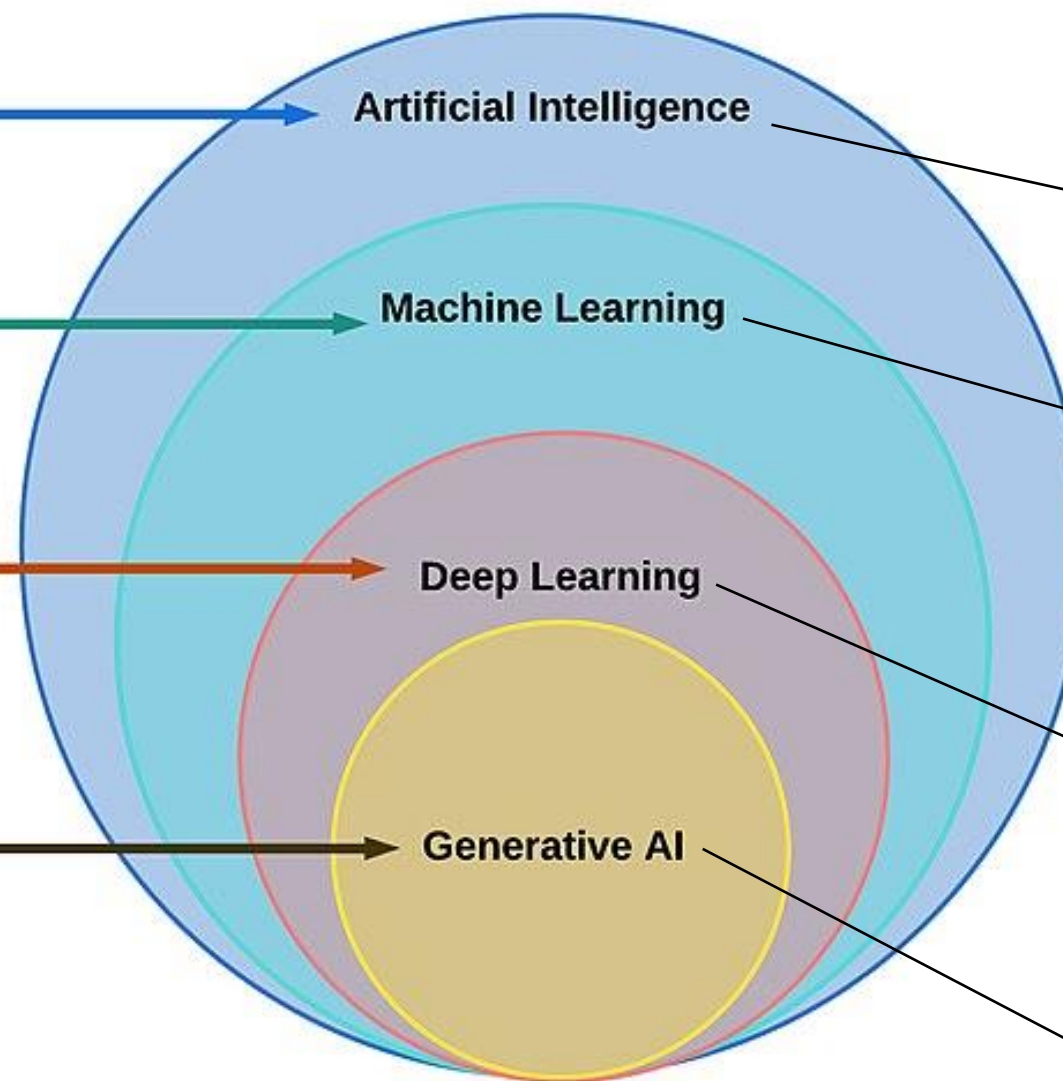
Introduction into generative AI tools

Artificial Intelligence
AI involves techniques that equip computers to emulate human behavior, enabling them to learn, make decisions, recognize patterns, and solve complex problems in a manner akin to human intelligence.

Machine Learning
ML is a subset of AI, uses advanced algorithms to detect patterns in large data sets, allowing machines to learn and adapt. ML algorithms use supervised or unsupervised learning methods.

Deep Learning
DL is a subset of ML which uses neural networks for in-depth data processing and analytical tasks. DL leverages multiple layers of artificial neural networks to extract high-level features from raw input data, simulating the way human brains perceive and understand the world.

Generative AI
Generative AI is a subset of DL models that generates content like text, images, or code based on provided input. Trained on vast data sets, these models detect patterns and create outputs without explicit instruction, using a mix of supervised and unsupervised learning.



Car industry, medical screenings, robotics...

Various techniques

- Unsupervised learning
- Supervised learning
- Reinforcement learning

- Artificial neural networks (ANNs)
- Google's Transformer infrastructure (2017)

Key aspect:
probability

Unraveling AI Complexity - A Comparative View of AI, Machine Learning, Deep Learning, and Generative AI.

(Created by Dr. Lily Popova Zhuhadar, 07, 29, 2023)

Image source:
Wikipedia Commons

Large language models (LLMs)

- Breakthrough in text processing & generating
- Trained on **huge** amounts of **data**
- Most important: GPT (-4o/-4; OpenAI), Gemini (Google), Llama 3 (Meta)
- Different versions (GPT-4 x GPT-4o)
- Different tools (e.g., both ChatGPT and Microsoft Copilot use GPT LLMs)

Conversational and generative AI

- Generative AI tools **predict** the next word in a sequence (based on internal dataset & **probability**)
 - Tokens within a dataset
 - A bit like autocompletes (much more complex)
 - Factual mistakes → **hallucinations**
 - **Turing test X Chinese Room Argument**
- Accuracy influenced by
 - LLM type, e.g., GPT vs Gemini
 - LLM level, e.g., GPT-3.5 (2022) vs GPT-4 (2023, more evolved)
 - Language, e.g., English better than Czech (available training data)
 - **!Prompt engineering/design!**

Are AI tools intelligent (or not)?

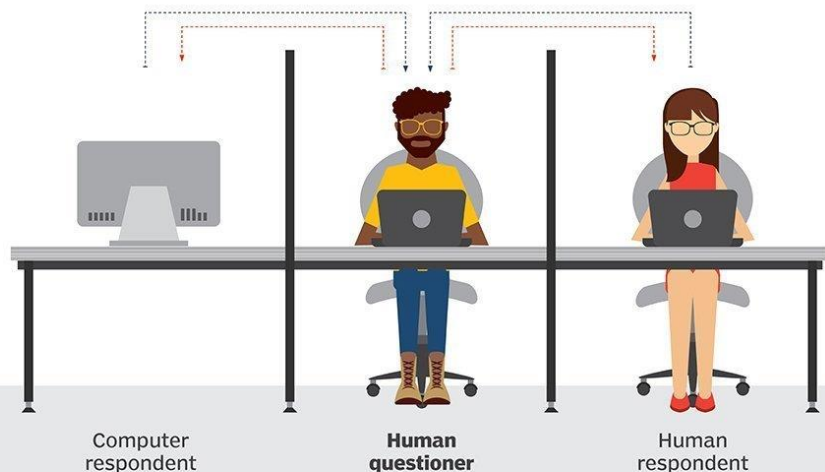
NTK

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National Library of Technology

Turing test

During the Turing test, the human questioner asks a series of questions to both respondents. After the specified time, the questioner tries to decide which terminal is operated by the human respondent and which terminal is operated by the computer.

■ QUESTION TO RESPONDENTS ■ ANSWERS TO QUESTIONER



Retrieved from: <https://www.techtarget.com/searchenterpriseai/definition/Turing-test>

<https://towardsdatascience.com/a-chinese-speakers-take-on-the-chinese-room-88a0558b2cc8>

Hallucinating, lying, or missing information

The possibility of Oasis reuniting for live performances remains speculative and uncertain. Despite ongoing rumors and public interest in a reunion, several factors suggest that such an event is unlikely in the near future.

Check the internet.

Searched 3 sites

Yes, Oasis is officially reuniting for a tour in 2025. The Gallagher brothers, Noel and Liam, have announced a series of concerts across the UK and Ireland to mark the 30th anniversary of their debut album, *Definitely Maybe*. The tour will kick off in Cardiff in July 2025 and will include multiple dates in iconic venues such as Manchester's Heaton Park, London's Wembley Stadium, and Edinburgh's Murrayfield Stadium, concluding with two nights in Dublin at Croke Park in August.

The error in my initial response was not due to hallucination but rather due to a lack of updated information at that moment. Once I checked for recent updates, I corrected the information accordingly.

Conversation from August 27, 2024

Example of text-to-image generation (2023)

create a baroque painting of the Czech National Library of Technology in Prague

 DALL-E



Example of text-to-image generation (2024)

Create a baroque painting of the National Library of Technology in Prague. Make the building circular.



Here is the baroque painting of the National Library of Technology in Prague with a circular design.

Prompt

A baroque painting of the National Library of Technology in Prague. The building is circular, with intricate baroque architectural details such as ornate columns, lavish decorations, and grand facades. The setting is a beautiful sunset, with soft golden light illuminating the building and the surrounding area. The sky is painted with warm hues of orange and pink, and there are people in period clothing walking around, admiring the library. The painting style should be reminiscent of the 17th-century baroque era, with rich colors and dramatic contrasts.

Copy

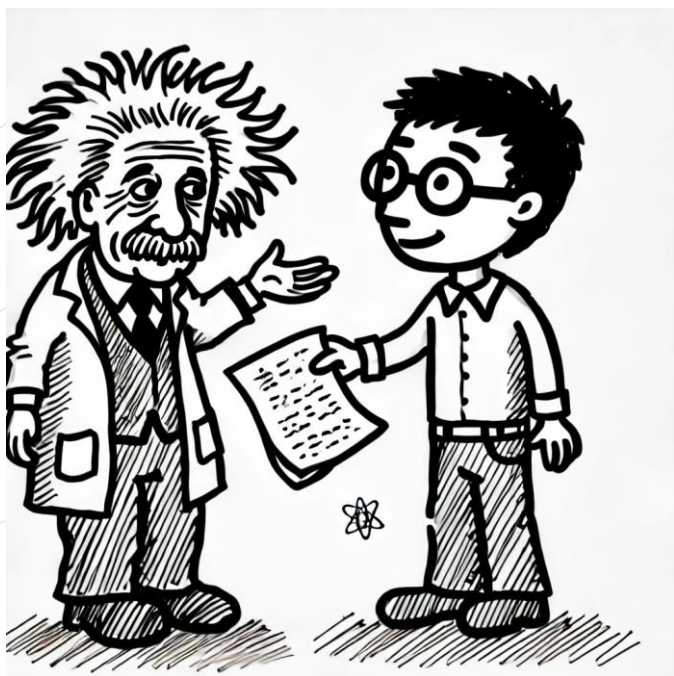


Image Creator Pro (ChatGPT agent)

Ongoing debates

- + Potential to **save time** (or not?)
- + New insights and approaches?
 - Better than people?
 - **Plagiarism** and citation issues
 - From **inaccuracy** to fake news?
 - **User data** collection
 - **Ecological concerns**
 - **The Alignment problem**

Prompt-based searches

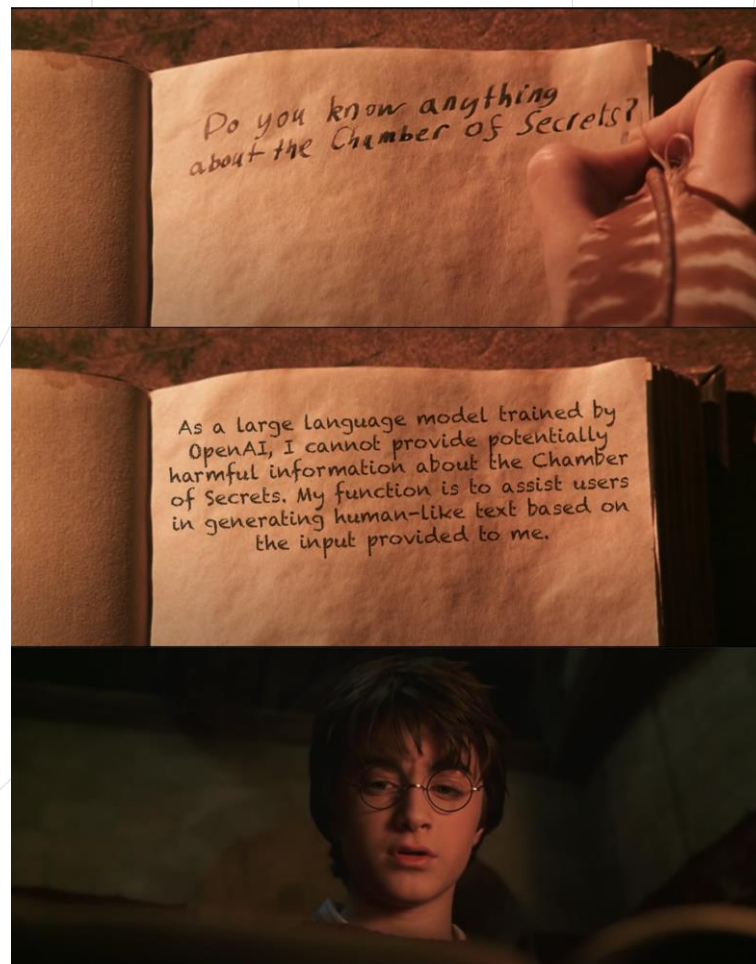


Generated by DALL-E

Communicating with chatbots

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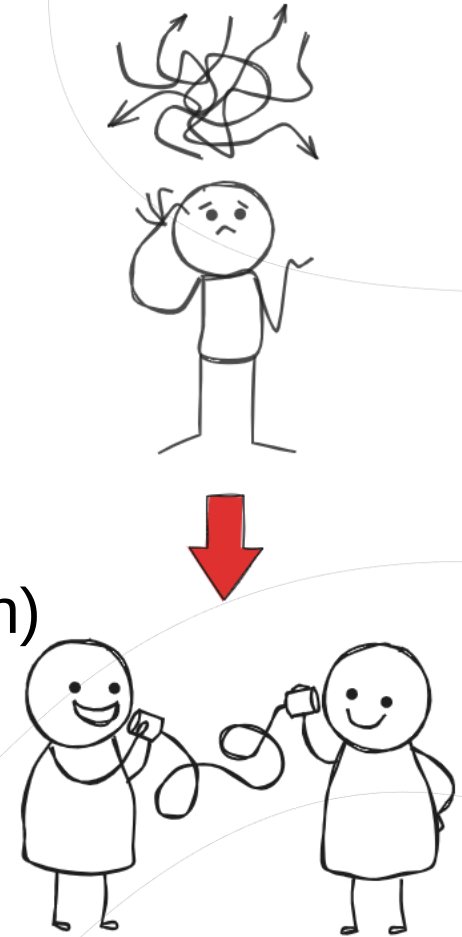
Prompt engineering for academic work

- Designing and refining input prompts to achieve optimal and accurate responses
- Skill required to work effectively
- One of the limitations
- Garbage in – garbage out
- Better prompting = better results
- Enhancing your writing skills (clarity, conciseness, expression)

Tell me something about organizational institutionalism.



Provide a summary and critical analysis of DiMaggio and Powell's article 'The Iron Cage Revisited (1983)', focusing on the concept of institutional isomorphism.



Accessing the internet



- ChatGPT-4o mini (the free version) does not have access to the internet
 - Replaces ChatGPT 3.5 (better benchmark test)
 - It draws on its dataset (human supervision and evaluation of the model is taking place (similar to a dog clicker))
 - Up-to-date to October 2023
-
- ChatGPT 4 and 4o **have** access to the internet
 - Their dataset cut-off is December 2023 and August 2023 respectively

ChatGPT-4o

- Launched on May 2024
- Limited access (free user 3-10 messages/3 hours)
- Multimodal communication
- Access to the internet
- Broad scale of GPT agents
- Customize ChatGPT
- With ChatGPT-Plus - your custom GPT

ChatGPT 4o ▾

Create a picture of yourself as an assistant for scholars.



Here is the image of the AI assistant designed for scholars. I hope it matches your expectations! If you have any adjustments or additional details you would like, feel free to let me know.



GPTs for academic work



-  ChatGPT
-  SocSport Scholar
-  SciSpace
-  Scholar GPT
-  Explore GPTs



Top Picks Writing Productivity

Research & Analysis

Education

Lifestyle

Programming

Research & Analysis

Find, evaluate, interpret, and visualize information

1



Scholar GPT

Enhance research with 200M+ resources and built-in critical reading skills. Access Google Scholar, PubMed, JSTOR, Arxiv, and more...

By awesomegpts.ai

2



Consensus

Ask the research, chat directly with the world's scientific literature. Search references, get simple explanations, write articles back...

By consensus.app

3



Scholar AI

AI Innovator — search and review 200M+ scientific papers, patents, and books. Research literature, discover insights, and...

By scholarai.io

4



SciSpace

Do hours worth of research in minutes. Instantly access 287M+ papers, analyze papers at lightning speed, and effortlessly...

By scispace.com

5



Wolfram

Access computation, math, curated knowledge & real-time data from Wolfram|Alpha and Wolfram Language; fro...

By wolfram.com

6



Excel GPT

The worlds most powerful Excel assistant.

By pulsar.co.uk

See more

Other chatbots: Gemini, Copilot, ...

Gemini

- Searches the internet
- It **does not** consistently **provide its sources**
- Connected to Google apps
- NotebookLM

Copilot

- Searches the internet
 - Provided by Microsoft
 - Based on the ChatGPT-4 model
-
- Both are rather **unreliable** for searching academic literature
 - Non-existing DOIs, wrong URLs, sometimes poor quality of sources

Question-based searches

Selected AI tools

- Prompts
- Emphasis on the sources
- **Do not use** for systematic literature review

SciSpace

- Literature Review – prompt or keywords (and operators)
- **Generated** summary of five “most relevant papers”
- List of sources with a short **generated** summary of each
- Other functions (document analysis, language editing, AI detection)

Perplexity AI

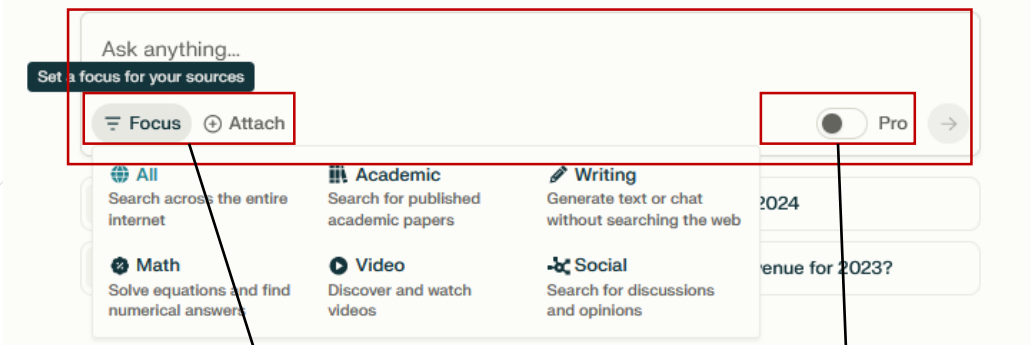
- 2022 start-up (former Google employees)
- It searches the internet AND lists its sources!
- Smartphone app available

Elicit

- Similar to SciSpace
- Only prompts work (not keywords and operators)

Perplexity AI

Where knowledge begins



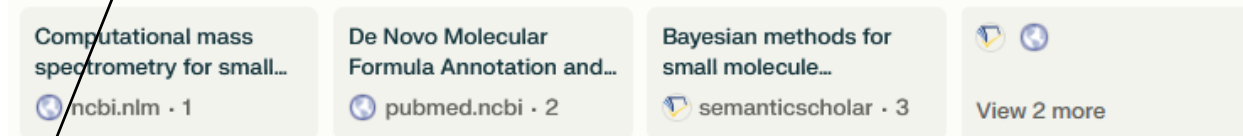
Choose conversational style/ upload files

Free user – 5 Pro searches/ day

Sources used to generate the answer

What methods are used for molecular formula identification in Computational Mass spectrometry?

Sources



Answer

Computational methods for molecular formula identification in mass spectrometry involve several key approaches:

1. **De Novo Molecular Formula Annotation:** Methods like ZODIAC³ can perform database-independent molecular formula annotation by exploiting similarities of compounds co-occurring in a sample. This allows identifying molecular formulas that may be absent from existing structure databases.
2. **Isotopic Pattern Analysis:** Computational techniques can analyze the isotopic pattern of a compound measured by mass spectrometry to predict the presence of uncommon elements like sulfur, chlorine, bromine, boron, and selenium⁵. This helps narrow down the set of possible molecular formulas.
3. **Tandem Mass Spectrometry (MS/MS):** The interpretation of tandem mass spectra, or MS/MS fragmentation patterns, is crucial for small molecule identification^{1 2}. Computational methods can automate the process of matching experimental MS/MS data to spectral libraries or predicting fragmentation to deduce molecular structures.
4. **Combinatorial Fragmentation:** Advanced computational approaches can perform combinatorial fragmentation analysis to generate and score candidate molecular structures that are consistent with the observed MS/MS data⁴.
5. **Bayesian Methods:** Bayesian statistical techniques have been developed to address the challenge of confident small molecule identification from complex mass spectrometry data³. These methods can improve the accuracy of molecular formula annotation compared to existing approaches.

Ask a question

Methods for Molecular Formula Identification in Computational Mass Spectrometry

What methods are used for molecular formula identification in Computational Mass spectro...

Short state of the art
summary (generated)

Summary of top 4 papers

Copy

Computational mass spectrometry employs various methods for molecular formula identification of small molecules. Isotope pattern analysis is a key approach, utilizing high-resolution mass spectrometry data to determine elemental composition (Dührkop et al., 2014; Pervukhin, 2010). Fragmentation pattern analysis, including rule-based prediction, combinatorial fragmentation, and competitive modeling, is another crucial technique for structural elucidation (Hufsky & Böcker, 2017). Some methods combine isotope and fragmentation pattern analyses for improved accuracy (Dührkop et al., 2014). Molecular fingerprint prediction is also used to mine structure databases (Hufsky & Böcker, 2017). These approaches can be applied independently of spectral and structural databases, enabling de novo identification (Dührkop et al., 2014). However, mass accuracy alone is insufficient for larger molecules due to the high number of chemically legitimate formulas (Pervukhin, 2010). Overall, these computational methods play a crucial role in interpreting mass spectrometry data for small molecule identification in metabolomics and proteomics (Scheubert et al., 2013; Pervukhin, 2010).

List of suggested sources

+ Add columns

Sort: Most relevant

Filters

Export as

PLUS

Paper

Abstract summary

Computational mass spectrometry for small molecules

Kerstin Scheubert +2

Journal of Cheminformatics

2013 · 137 citations

PDF

DOI

The paper reviews computational methods for identifying small molecules from mass spectrometry data, including molecular formula identification using isotope pattern analysis.

4 849 credits left

Account settings

Logout

Limited amount
of searches

Generated summary of each source

Mapping tools

Literature-mapping tools

- Search based on your collection
- Similar papers offered (content, citations and references, authors, etc.)
- Often integrated with Zotero or other citation managers

Advantages

- Mapping the state of the art → overlooked papers
- Authors: Links between authors and groups of collaborators
- Citations: Links between papers, citations visualised

Disadvantages?

- Potential rabbit hole/bubble → results based on your previous selections

Selected AI tools

Research Rabbit

- Free
- “Earlier” and “later” research output maps
- Recommended authors

Litmaps

- Advanced function behind paywall
- 3 functions: Seed, Discover, Map/Visualize

Inciteful

- Free
- Paper Discovery -> suggests sources + option to search with keywords, operators, and filters
- Literature Connector links any two publications (through citations)

My collection

3 map options

Research Rabbit

Organise your results

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Get the full-text version (if available)

Explore (other) authors

Add into your citation manager library/paper bibliography

Filter Custom

☐ Abstracts ☒ Comments

Select None Select All

NTK Navigating

Lesjean 2006 57

Grey water treatment with a membrane bioreactor operated at low SRT and low HRT Desalination

Chou 2020 19

Greywater treatment using an oxygen-based membrane biofilm reactor: Formation of dynamic multifunctional biofilm for organics and nitrogen removal Chemical Engineering Journal

Jabornig 2015 2

Modelling of moving bed biofilm membrane reactors (MBBMR) for on-site greywater treatment. Water Science and Technology

Diamantis 2021 0

Performance of a micro scale membrane reactor for greywater treatment at household level Membranes

Hasan 2015

Application of a Low Cost Ceramic Filter to a Membrane Bioreactor for Greywater Treatment Water Environment Research

Alam 2023

Effect of mechanical scouring on fouling control in greywater filtration with fluidized bed submerged membrane reactor for decentralized wastewater treatment process Journal of Water Process Engineering

Ding 2017 49

A low energy gravity-driven

+ Add Papers

11 Selected Papers

Remove from: NTK Navigating

Add to Other Collection

EXPLORE PAPERS

Similar Work 1830

Earlier Work 20

Later Work 33

EXPLORE PEOPLE

These Authors 47

Suggested Authors 239

EXPLORE OTHER CONTENT

Linked Content

EXPORT PAPERS

BibTeX RIS CSV

PUBLIC COLLECTION

SHAREABLE LINK Copy

COLLABORATORS Edit

EMAIL UPDATES

Later Work

Filter Relevance

☐ Abstracts ☒ Comments

Select None Select All

Cecconet 2019 38

Membrane bioreactors for sustainable, fit-for-purpose greywater treatment: a critical review Clean Technologies and Environmental Policy

Wu 2019 61

Membrane-based technology in greywater reclamation: A review. Science of The Total Environment

Khalil 2021 7

Greywater biodegradability and biological treatment technologies: A critical review International Biodeterioration & Biodegradation

Patel 2021 10

Physico-chemical and biological treatment strategies for converting municipal wastewater and its residue to resources Chemosphere

Yusof 2022 0

Investigation on the Urban Grey Water Treatment Using a Cost-Effective Solar Distillation Still Sustainability

He 2022 0

Recent insights into greywater treatment: a comprehensive review on characteristics, treatment technologies, and pollutant removal mechanisms Environmental Science and Pollution Research

Mahmoudi 2021 2

Greywater as a sustainable source for development of green roofs: Characteristics, treatment technologies, reuse, case studies

Connections between your collection and 33 papers

Graph Type Network Timeline

Labels First Author Last Author

Filter these items

1 selected paper

☒ Mohd Fazly Yusof Jazaul Ikhsan

Investigation on the Urban Grey Water Treatment Using a Cost-Effective Solar Distillation Still Sustainability 2022 0

PDF

Treating urban grey water with physical, chemical, and biological treatment techniques and reusing it as a sustainable non-potable water source has received much attention regarding it. In this work, a typical slum nearby an urban household area in Malaysia was selected as a source of contaminated grey water which is located on the opposite side of a building site (100°29' E and 5°7' N) located in an urban area in a city in the Perak state, namely Parit Buntar, where the total urban grey water was being accumulated. Poor sanitation of that slum was seen to pose various health risks to the public, and hence, the importance of treating its grey water was perceived. Thus, this study was conducted to evaluate the performance of a low-cost double slope passive solar still by treating the grey water from the aforementioned slum, as well as to analyze the quality, quantity, and cost per liter of the produced water. Grey water was collected and filled in the solar still basin at a depth of 1 cm. The cover and basin of the solar still were made from transparent polythene film and black-painted stainless steel trough, respectively, while the frame was made from polyvinyl chloride (PVC), and the solar still was named PSSG1 abbreviated. PSSG1 was exposed to Malaysia's climate conditions for several days from 8.00 a.m. to 6.00 p.m. at Universiti Sains Malaysia (USM), which was able to produce the maximum amount of water up to 4.11 L/m2 d with the cost per liter/m2 of only USD 0.0082. Water quality parameters tested showed that water produced from PSSG1 met the standards of the restricted and unrestricted reusable non-potable grey water, the World Health Organization (WHO), and the Malaysian class I drinking water standards. It was also found that the PSSG1 with higher average daily basin water temperature produced water with higher quality for the reuse applications and yielded healthier water compared to the water produced by some reported previous grey water treatment techniques. Therefore, the cost-effective PSSG1 can be used as a daily practical alternative for treating low-strength grey water collected from various urban household areas in Malaysia in order to assist pollutants removal from the drained urban grey waters.

1 Selected Paper

Add to: NTK Navigating

Add to Other Collection

EXPLORE PAPERS

Similar Work

All References

All Citations

EXPLORE PEOPLE

These Authors 12

Suggested Authors 12

EXPLORE OTHER CONTENT

Linked Content

EXPORT PAPERS

BibTeX RIS CSV

Litmaps

Add new articles into
your collection

Layout settings

Add articles to
collection

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The screenshot shows the Litmaps web application interface. On the left, there are three main sections: 'Search for articles' with a button 'Explore Related Articles', 'Visualize your research' with a button 'Open Design', and 'Stay up-to-date' with a button 'Open Monitor'. The main content area displays a list of articles under the heading '(9 articles)'. The first article is 'Institutionalized Organizations: Formal Structure as Myth and Ceremony' by Meyer (1977). The second is 'Moving mountains: Animal rights organizations, emotion, and autodidactic frame alignment' by Jarvis (2016). The third is 'Field or fields? Building the scaffolding of research on institutional fields' by Zietsma (2017). A 'Recommended Articles' section is also visible. On the right, there is a 'Layout settings' dropdown menu with options: 'View Recommendations: Ring', 'Standard', 'Ring' (selected), 'Side by Side', 'By Author', and 'Automatic'. A large circular network graph is displayed on the right side of the main content area. A 'Welcome to your Litmap!' pop-up message is overlaid on the graph, explaining that circles represent chosen articles, outlines represent recommended articles, and lines represent citations. At the bottom, a message states 'You've reached a limit of how many Explore results are visible.' with a button 'Upgrade to unlock result'. The top right corner shows the NTK logo and coordinates. The bottom right corner has a footer with the number 27.

Search for articles
Explore related research and find important articles on your topic.
Explore Related Articles

Visualize your research
Design your perfect mind-map: rearrange, annotate, and share your research.
Open Design

Stay up-to-date
Get newly-published articles on this topic right to your inbox.
Open Monitor

(9 articles)

Explore / Top Shared Citations & References All Time None

Recommended Articles
Click More Like This for results you're interested in.
Update Results

Meyer, 1977 35 24.2k
Institutionalized Organizations: Formal Structure as Myth and Ceremony
American Journal of Sociology
Tag
More Like This

Jarvis, 2016 270 0
Moving mountains: Animal rights organizations, emotion, and autodidactic frame alignment
Tag
More Like This

Zietsma, 2017
Field or fields? Building the scaffolding of research on institutional fields
Tag
More Like This

View Recommendations: Ring
Standard
Ring
Side by Side
By Author
Automatic
Apply the best mode for your Explore Settings

Welcome to your Litmap!
This visual map of articles helps show how articles relate to one another.
Circles are articles you've chosen
Outlines are recommended articles
Lines are citations
Next: Recommendations Dismiss

You've reached a limit of how many Explore results are visible.
Upgrade to unlock result

REF COUNT
CITE COUNT
DATE

27

Seed Papers

TITLE	FIRST AUTHOR	YEAR	CITED BY	
Greywater treatment using an oxygen-based membrane bioreactor: Formation of dynamic multifunctional biofilm for organics and n	Yun Zhou	2020	39	✖
A low energy gravity-driven membrane bioreactor system for grey water treatment: Permeability and removal performance of organics	An Ding	2017	66	✖
Single household greywater treatment with a moving bed biofilm membrane reactor (MBBMR)	Simon Jabornig	2013	53	✖
Modelling of moving bed biofilm membrane reactors (MBBMR) for on-site greywater treatment	Simon Jabornig	2015	2	✖
Grey water treatment with a membrane bioreactor operated at low SRT and low HRT	B. Lesjean	2006	63	✖
View All 10				Save

Inciteful

Your collection

Filter your results

Paper Filters ⓘ

Keywords

greywater AND treatment NOT rainwater

Min Distance

Max Distance

Min Year

Max Year

2019

2023

Filter

Add Papers to the Graph

Paper Title or DOI

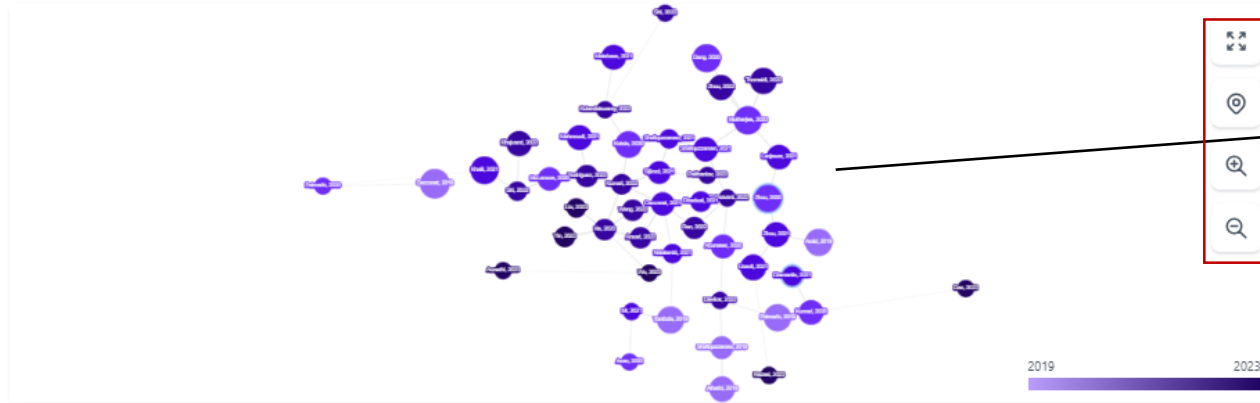
Paper title, DOI, PubMed URL, or arXiv URL



or [Import BibTeX file](#)

Add new articles into
your collection
(online search or
import)

Keep adding interesting papers to the graph from the tables below. The more you add the more specific the network will be to your topic. Typically it takes a few iterations of adding papers and re-creating the graph before you have exhausted your topic and hit diminishing returns.



Map of your AND
suggested papers

Similar Papers

These are papers which tend to cite the papers you have selected above. They normally bias towards newer papers and can help you find the latest literature on the topic.

	similarity	published_year	num_cited_by
Membrane bioreactors for sustainable, fit-for-purpose greywater treatment: a critical review			
✚ Daniele Cecconet, ... Andrea G. Capodaglio <i>Clean Technologies and Environmental Policy</i>	2.154181	2019	17
Greywater treatment technologies: a comprehensive review			
✚ Abhishek Kumar Awasthi, ... S. Rayalu <i>International Journal of Environmental Science and Technology</i>	1.974382	2023	0

List of suggested
papers

Text analysis

Selected AI tools

- Text (e.g., article, report) analysis and synthesis
- PDF upload or online search (sometimes)
- Option to ask questions about the content

SciSpace

- Copilot (GPT-4) function can also paraphrase a **selected section** of an article and search for relevant sources
- Browser extension

ChatPDF

- Only three tasks per day for free

Humata

Free use limited to sixty pages in total.



Homepage,
your collections,
notebook, and
your profile

Citation
booster,
Literature
review,
Copilot,
Citation
generator,
Paraphraser,
AI Detector

Explain math & table

123%

11016/j.bench.2023.100115
2023; Received in revised form 20 May 2023; Accepted 20 May 2023
16 May 2023
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/creativecommons.org/licenses/by/4.0/.

M. Javadi, A. Halem, R.P. Singh et al.

may mark written assignments and provide comments on grammar, structure, plagiarism and content. Producing ideas, summaries, and even whole talks, may also aid with the composition of speeches. It may aid with research by guiding students in locating and organising data for papers and other types of study. ChatGPT may provide students learning a language immediate feedback on their pronunciation and grammar, assisting them in swiftly and effectively developing their language abilities. It may help students with trouble reading and writing by suggesting ways to improve their phrases and paragraphs [6,7].

The ChatGPT language model has the power to create writing that is similar to what a person would write. It can perform various natural language processing tasks, including language translation, text summarisation, text creation, and conversation systems. It was trained on a large dataset of online content such as webpages, research articles, books, social media posts and chatter. ChatGPT typically performs best when conversing in human language, remembering previous exchanges within the same conversation, referring to physical, emotional, and cultural experiences in the training data, and dynamically drawing from a scientific and technical knowledge pool to address queries [8–10]. ChatGPT can produce language comparable to how people write by training on such a broad dataset.

ChatGPT and other big language models' capacity for content development may aid marketers in becoming more productive and successful. This enables marketers to scale up content personalisation, which was previously time-consuming. It has long been used in various ways, including conversational chatbots, automation, and data analysis. Today's teachers can think about how ChatGPT might act as a writing tutor for their students. Students might use this tool to quickly assess their writing without waiting for an instructor's response. The students could then request specific actions from the AI tool to be taken to edit or revise their work. In terms of creative content, it functions as a super-effective word organiser [11,12]. The main aim of this paper is to discuss the significant applications of ChatGPT in education.

2. ChatGPT

An AI-powered chatbot is called ChatGPT by OpenAI. The term "Generative Pre-trained Transformer (GPT)" refers to a language processing model trained on massive data to produce writing that resembles a person's. ChatGPT is a natural language processing technology that uses AI to respond to queries. As a result, it creates information more conversationally, picks up knowledge from those talks, and then can provide ever more specifically customised replies. ChatGPT behaves like a person while giving instructions to users and providing information. This technology can do various activities, including creating poetry, coding, answering inquiries, writing emails and essays, and translating documents. ChatGPT differs from other chatbots in that it can respond instantly, resulting in more varied and lively discussions on almost all topics [13–15].

Benchmark Transactions on Benchmarks, Standards and Evaluations 3 (2023) 100115

3. Need of ChatGPT in education

ChatGPT can affect several aspects of education, including writing, instruction method and teaching pedagogy. Writing has been essential to fostering creative and critical thinking for ages through organising information and creating narratives. It continues to play a crucial role in education, even in the age of AI. Therefore, we should concentrate on offering insights that are incomprehensible to AI. Students' thesis, assignments, and essay writing should be condensed, reflective, and grounded in a particular setting. Education and AI are essential topics in conversations about our society's future. ChatGPT is a valuable tool for writers, marketers to produce text. This has for websites, social network chatbot replies [20–22].

Integrating ChatGPT towards AI, diminishing opportunities for interpretation. In order to assist students may check for grammatical provide valuable comment the areas they need to improve feedback based on their conversations using Chat user inquiries and person context [25,26]. The study of ChatGPT, such as development and solving a mathematical with ChatGPT.

ChatGPT is designed to connect quickly and respond more cohesively, like conversational tools like bots and virtual assistants. Because of this interoperability, businesses may expand on their current offerings and develop distinctive AI-powered chatbots that can quickly comprehend and respond to consumer demands. Conversations may be held in a private and secure environment using ChatGPT. It offers a secure environment free from intervention or manipulation by using AI to identify harmful information, spam, and censorship. Moreover, ChatGPT never stores nor sends personal information to other parties. Thus, to preserve users' privacy, all correspondence is encrypted and kept locally [27,28].

4. Research objectives

ChatGPT is an AI-driven natural language processing application enabling users to participate in human-like text-based discussions with AI-based software. It may provide information, help write essays and letters, and produce code and websites. ChatGPT has the potential to

Copilot

List of additional sources
(suggested for the selected section)

Here are some related papers:

1. [What Is the Impact of ChatGPT on Education? A Rapid Review of the Literature](#)
Chung Kwan Lo • 2023, Education Sciences
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2. [Transformative Effects of ChatGPT on Modern Education: Emerging Era of AI Chatbots](#)
Kamalpreet Kaur+19 others • 2023, Internet of things and cyber-physical systems

3. [ChatGPT and its impact on higher education](#)
Thi Thu Giang • 2023

4. [Do AI chatbots improve students learning outcomes? Evidence from a meta-analysis](#)
Zhonggen Yu+1 others • 2023, British Journal of Educational Technology
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5. [Chatbots in Education: The impact of Artificial Intelligence based ChatGPT on Teachers and Students](#)
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+12 more

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Hands-on activity



ChatGPT 



SciSpace



Scite



Research Rabbit



ChatGPT chats for illustration

SciSpace

- Basic search
- Follow-up questions
- Text-analysis
- Export records

Consensus

- Basic search
- Follow-up questions and text-analysis

Scholar AI

- Basic search

Scholar GPT

- Basic search

What methods are used for molecular formula identification in Computational Mass spectrometry? Search articles published from 2022.



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page_info: { "page": 0, "page_size": 5 }

The identification of molecular formulae in computational mass spectrometry employs various methods. The generating function-based approach enumerates possible molecular formulae by constructing a molecular formula tree, offering a systematic and memory-efficient solution (Li et al., 2022). SIRIUS, a combinatorial optimization method, annotates spectra to identify molecular formulas and structures, utilizing fragmentation trees and isotope patterns, significantly improving annotation accuracy (Dührkop, 2019). The bottom-up tandem MS/MS interrogation method prioritizes MS/MS-explainable formula candidates, implementing machine-learned ranking and false discovery rate estimation, reducing the candidate space by 42.8% on average and accurately annotating novel molecular formulae (Xing et al., 2022). This method, integrated with global optimization, reveals peak interrelationships, enhancing systematic annotation of metabolic features (Huan et al., 2022).

What methods are used for molecular formula identification in computational mass spectrometry?



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☐ (5) **Mass Communication Research Methods**

 Anders Hansen
20 May 1998

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The ongoing transformation of work has been increasing the number of working relationships not falling within the domain of labour law. Non-standard and contingent working arrangements, most recent...

Inconsistency in the number of citations!

Create your own GPT agent

- Available only with ChatGPT-Plus plan
- Allows you to define agent's „behavior“
- Can be trained to perform specific tasks:
 - Text-analysis
 - Develop your research objective
 - Improve your manuscript
- Advantage of working with „limited“ knowledge
- **Respect data privacy and authorship!**
 - Do not upload articles behind paywall or personal information (survey, transcripts, etc.)
- If set up right, it can significantly enhance the workflow
- Keep in mind shortcomings of generative AI!

Create your own GPT agent (only with ChatGPT-Plus):

The image shows the ChatGPT Plus interface for creating a custom GPT agent. On the left, a sidebar menu contains 'My plan', 'My GPTs' (highlighted with a red box), 'Customize ChatGPT', 'Settings', and 'Log out'. Below the menu is a '+ Create a GPT' button with the text 'Customize a version of ChatGPT for a specific purpose'. A large red arrow points from the 'My GPTs' menu item to the 'Configure' form on the right. The 'Configure' form has two tabs: 'Create' and 'Configure'. The 'Configure' tab is active, showing a profile picture of a superhero, a 'Name' field with 'SocSport Scholar', a 'Description' field with 'My name is Joe Average and I have over 30 years experience in academia. I am here to supercharge your Ph.D. thesis and sm', an 'Instructions' field (highlighted with a red box) containing 'Your task: Give me an executive summary of the paper that is tailored to my research using clear headings, concise language, and scientific jargon. Do not mention things we already know, instead focus on the novelty brought by this paper. Compare your knowledge base to identify what is common knowledge and what is novel.', and a 'Knowledge' field (highlighted with a red box) with a note about uploading files. Below the 'Knowledge' field is a file upload section showing a document named 'URBAN_disertační_projekt...' and an 'Upload files' button. A red box highlights the 'Instructions' field, and an arrow points from the text 'Give clear instructions on how the agent should behave' to it. Another red box highlights the 'Knowledge' field, and an arrow points from the text 'Upload documents to create agent's knowledge base' to it.

Give clear instructions on how the agent should behave

Upload documents to create agent's knowledge base

Conclusion

- If used responsibly these tool can **significantly enhance** your workflow and:
 - Save time
 - Improve the quality of outputs
 - Brainstorm new ideas or directions
 - Streamline routine paperwork
- You must be aware of their **limitations**:
 - Hallucinations → factual errors, plagiarism or misconduct
 - Limited scope
 - Without sufficient AI literacy, work with them can be more time-consuming and ineffective
 - Ethical concerns : question of data privacy and respect to authorship
 - Over-reliance on AI – AI should be your assistant, not your master

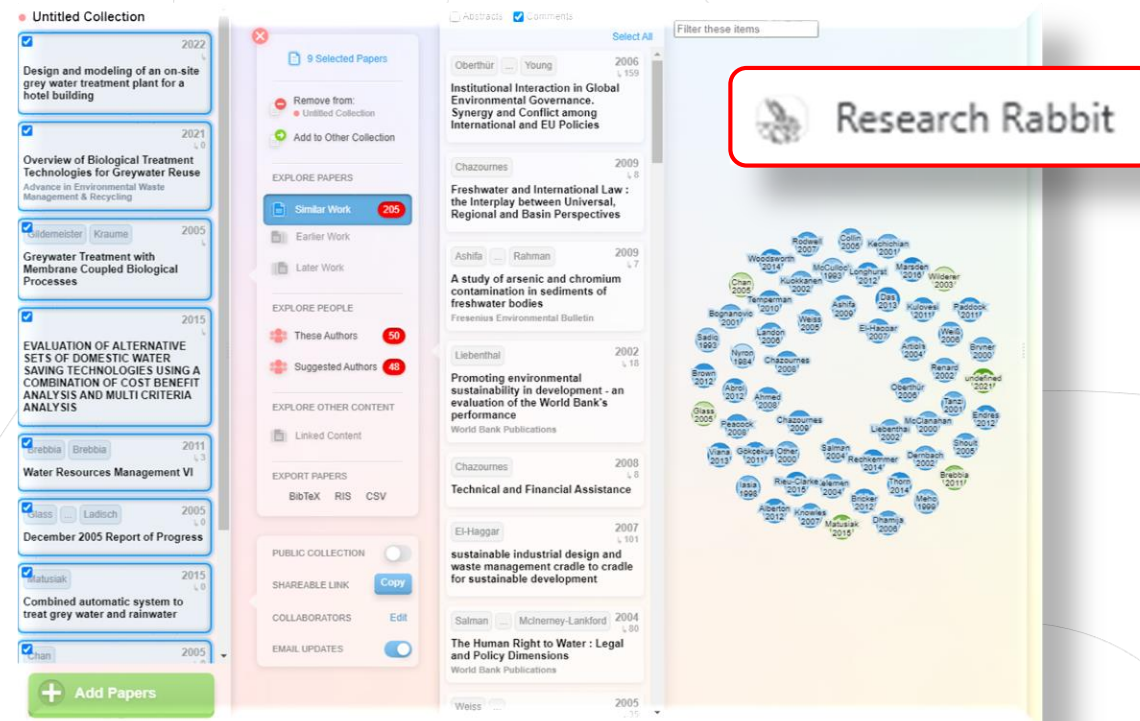
Other resources

Constant
evolution!

Overview of AI search
tools, chatbots, text
analyzers and detectors

Searching

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