ISA

Artificial Intelligence for Research:

Ethics, Integrity and Tools

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Biblioteca do ISA

Ano 2024/25

U LISBOA | UNIVERSIDADE DE LISBOA

INSTITUTO SUPERIOR DE AGRONOMIA

Contents

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1. Ethics and Integrity for AI in research

- ✓ Fundamental rules for interacting with generative AI (GenAI)
- ✓ Violations of integrity (unethical behaviors)
- ✓ Recommendations for a responsible use of AI in research
- ✓ Authorships

2. AI research assistant tools

- ✓ AI for literature review, research paper summarization , key insight extraction

Artificial Intelligence (AI)

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"AI refers to machine-based systems that can, given a set of human-defined objectives, make predictions, recommendations, or decisions that influence real or virtual environments……" UNICEF, 2021

IA for Research

- Speed up large volumes of information
- Automatic generation of text, video, presentations
- Permanent availability
- Qualitative data analysis, transcriptions, translations, writing support, etc

SaikiraiChandra**, The impactof AI in research** Open ScienceFair 2023

https://www.unicef.org/innocenti/media/1326/file/UNICEF-Global-Insight-policy-guidance-AI-children-draft-1.0-2020.pdf

Fundamental rules for interacting with generative AI (GenAI)

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➢ Precaution

" Users are responsible for ensuring reliability of the results"

(Figueiredo, A.D., 2024)

Concerns with IA:

"Hallucinations"

False or misleading information

e.g generation of non-existent bibliographic references

Copyright infringement

Appropriation of authors' intellectual property

António Dias Figueiredo. Fatores-Chave para a Integração da Inteligência Artificial nas Escolas. 2024. Available from: https://www.researchgate.net/publication/384054462_Fatores-Chave_para_a_Integracao_da_Inteligencia_Artificial_nas_Escolas

Fundamental rules for interacting with generative AI (GenAI)

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Concerns with IA:

Bias

- Distortion of the reality
- Reduced representation of particular groups (e.g., gender stereotype)

António Dias Figueiredo. Fatores-Chave para a Integração da Inteligência Artificial nas Escolas. 2024. Available from: https://www.researchgate.net/publication/384054462_Fatores-Chave_para_a_Integracao_da_Inteligencia_Artificial_nas_Escolas

AI for Research

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Identify Research Problem	Literature Review	Hypothesis Formulation	Data Analysis	Writing & Publication	Results Comunication
• Highlight research gaps • Extract relevant topics	• Automate & speed up literature search • Scan vast amount of literature • Summary extraction • Provides suggestions for deeper research.	• Formulate hypotheses from existing insights	• Assists with data preparation and analysis	• Paper drafting • Ensures format standards and correct grammar	• Repurpose research papers as vídeo, podcast and ppt's • Personalise based on the reader background

Research Integrity

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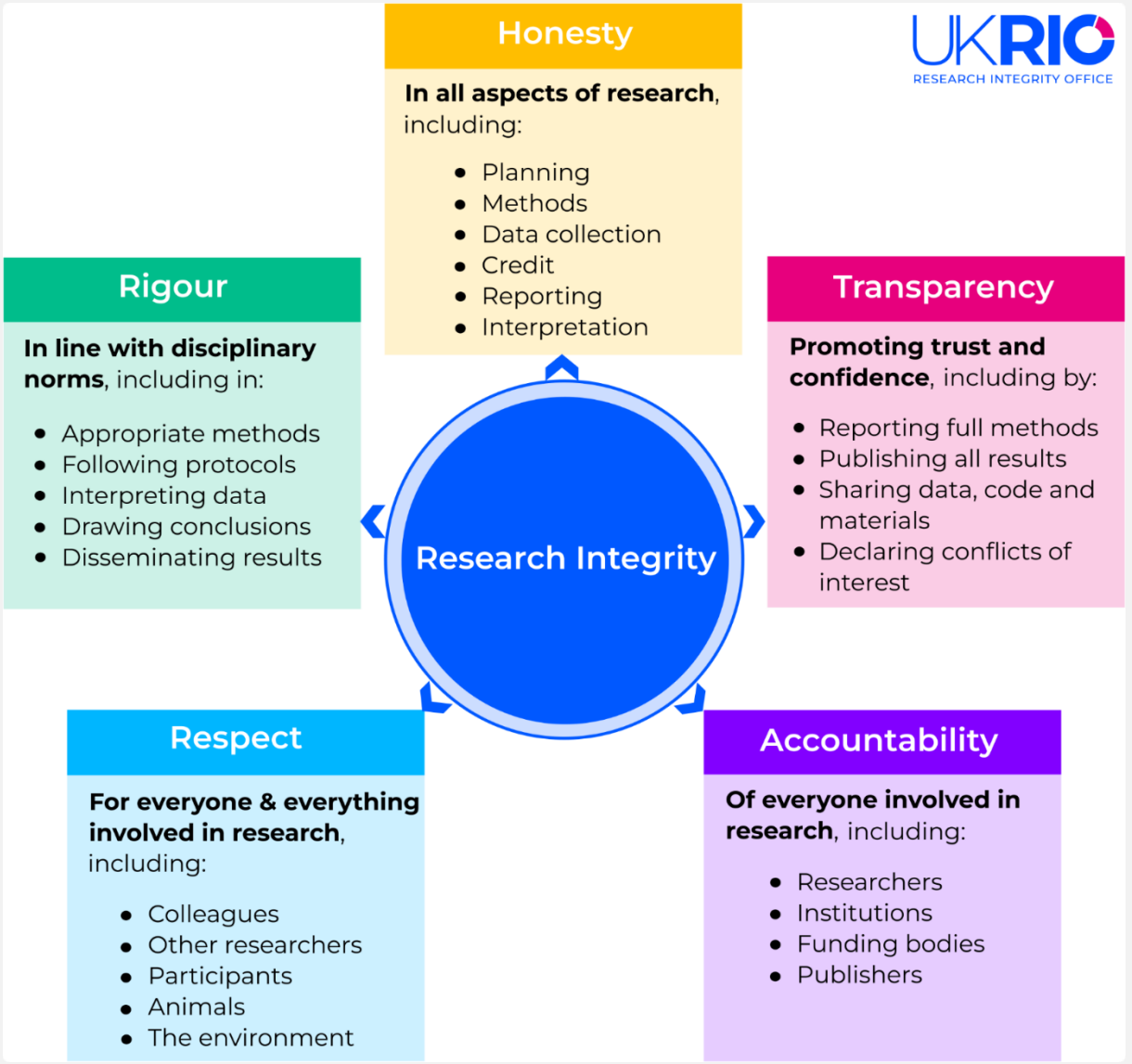

https://ukrio.org/research-integrity/what-is-research-integrity/

Violations of research integrity

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Research misconduct/ unethical behaviors (FFP)

Fabrication (F) – making up data as if they were real

Falsification (F) – Manipulating materials (e.g. images, processes)

Plagiarism (F) – using other people's work without giving proper credits

Further violations :

"Hiding the use of AI tools in the creation of content or drafting of publications"

ALLEA (2024) The European Code of Conduct for Research Integrity REVISED EDITION 2023. Berlim. DOI 10.26356/ECOC
https://allea.org/wp-content/uploads/2023/06/European-Code-of-Conduct-Revised-Edition-2023.pdf

Research Integrity

ULisboa Code of Conduct

ISA

Artigo 5.º

Deveres dos estudantes

3 - Respeitar as normas de avaliação de conhecimentos, abstendo-se de qualquer conduta que possa injustamente prejudicar ou beneficiar o próprio ou outro estudante;

Capítulo II

Princípios de conduta e de boas práticas

Artigo 8.º

Princípios de conduta

1 - Constituem condutas que violam o presente Código:

a) A realização de atos de plágio,

b) A realização de atos de auto plágio,

c) A usurpação de criações intelectuais,

d) A apresentação seletiva de resultados,

f) A interpretação de resultados de investigação negligente ou deliberadamente falsa;

Unethical behaviors
Plagiarism,
Manipulation of results,…

https://www.ulisboa.pt/sites/default/files/documents/page/2024/codigo-de-conduta-e-boas-praticas-ulisboa-2015-apos-senado-e-cg-vf.pdf

Ethics for AI (HHH principles)

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Helpful, Honest and Harmless AI (HHH)

What is Helpful AI:

- ✓ Trained and fine-tuned with users' needs and values in mind
- ✓ Clearly attempt to conduct the operation prompted by the user, or suggest an alternative approach when the task requires it
- ✓ Enhance productivity, save time, or make tasks easier for users within a given use case or range of use cases

What is Honest AI?

- ✓ Provide accurate information when they can, and communicate clearly to users when they can't produce an accurate output
- ✓ Express uncertainty and the reason behind it
- ✓ Are developed and operate transparently so users can understand how they work and trust what they generate

https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence

https://www.invisible.co/blog/helpful-honest-harmless-ai

Ethics for AI (HHH principles)

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Helpful, Honest and Harmless AI (HHH)

What is Harmless AI?

- ✓ Don't comply when prompted to perform a dangerous task
- ✓ Are trained within frameworks that transparently and actively mitigate bias
- ✓ Don't discriminate or demonstrate bias explicitly or implicitly
- ✓ Communicate sensitively when engaging with a user on a sensitive topic

The best way to reinforce a model's helpfulness, honesty, and harmlessness is through
Reinforcement Learning Human Feedback (RLHF)

https://digital-strategy.ec.europa.eu/en/policies/european-approach-artificial-intelligence

https://www.invisible.co/blog/helpful-honest-harmless-ai

Responsible use of GenAI in Research

Recommendations:

- **Researchers/Users**
- Research organizations
- Research funding organizations

Responsibility and Transparency

https://research-and-innovation.ec.europa.eu/document/download/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en?filename=ec_rtd_ai-guidelines.pdf

Responsible use of GenAI in research

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Recommendations for researchers

1. Researchers are responsible for the scientific outputs

   (AI systems are neither authors nor co-authors)

2. The use of AI systems must be reported in work

   (name, version, date, etc. and how it was used and affected the research process)

3. Sensitive data should not be uploaded into AI systems

   (could be used to train future language models or to the untraceable and unverifiable reuse of data)

4. AI systems should not be used in activities that could impact other researchers or organizations

   (e.g. peer reviews or evaluations of research proposals)

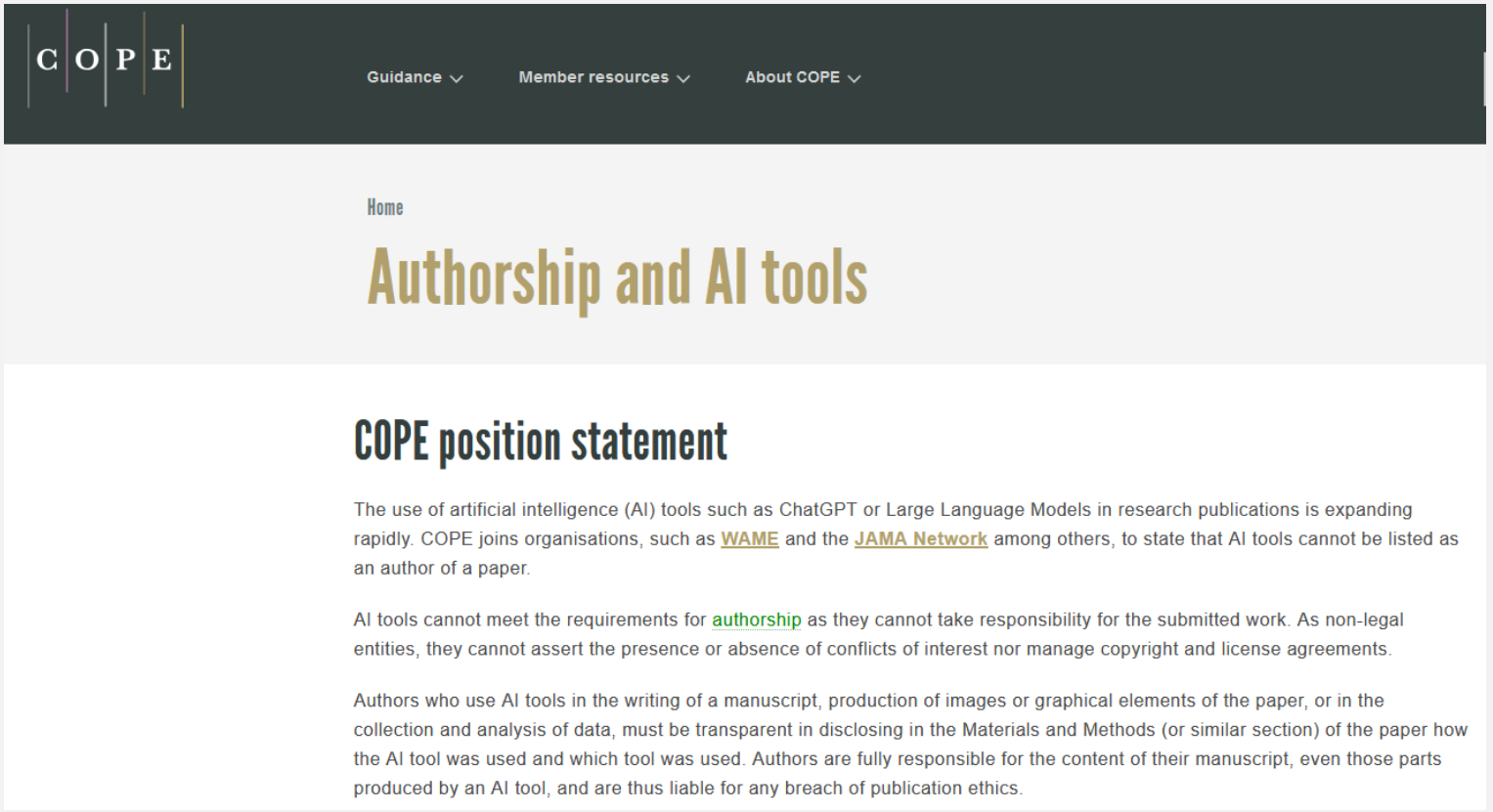
5. Respect applicable national, EU and international IA legislation

   (EU Artificial Intelligence Act – Agust 2024 , awaiting national transposition)

6. Continuously learn how to use generative AI tools

https://research-and-innovation.ec.europa.eu/document/download/2b6cf7e5-36ac-41cb-aab5-0d32050143dc_en?filename=ec_rtd_ai-guidelines.pdf

Authorship



COPE

Guidance Member resources About COPE

Home

Authorship and AI tools

COPE position statement

The use of artificial intelligence (AI) tools such as ChatGPT or Large Language Models in research publications is expanding rapidly. COPE joins organisations, such as WAME and the JAMA Network among others, to state that AI tools cannot be listed as an author of a paper.

AI tools cannot meet the requirements for authorship as they cannot take responsibility for the submitted work. As non-legal entities, they cannot assert the presence or absence of conflicts of interest nor manage copyright and license agreements.

Authors who use AI tools in the writing of a manuscript, production of images or graphical elements of the paper, or in the collection and analysis of data, must be transparent in disclosing in the Materials and Methods (or similar section) of the paper how the AI tool was used and which tool was used. Authors are fully responsible for the content of their manuscript, even those parts produced by an AI tool, and are thus liable for any breach of publication ethics.

- AI systems are neither authors nor co-authors
- AI tools must be reported in the work

https://publicationethics.org/cope-position-statements/ai-author

Authorship

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How to cite and reference generative AI? – APA stlyle

1) Reference list

Company. (Year). *AI Name* (version) [Descriptor]. URL

OpenAI. (2023). *ChatGPT* (Mar 14 version) [Large language model]. https://chat.openai.com/chat

2) In-text citation

AI-generated text must be enclosed in quotation marks and the prompt must be included

When asked to summarize Nagel's essay, OpenAI's ChatGPT described it as an argument that "it is impossible for humans to fully understand the subjective experience of other beings, particularly animals" (2023).

If the use of AI clearly impact the research, the conversation should be detailed in appendix

An example of convergent evolution is the independent development of winged flight in both birds and bats (OpenAI, 2023; See Appendix B for the full transcript).

https://www.grammarly.com/blog/citations/ai-citations-apa/

Authorship

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How to cite and reference generative AI? – APA stlyle

3) How to cite images?

An example of how to cite an AI image in APA would look like this:

Figure 5

Portrait of Jean Baudrillard in postmodern style

[IMAGE]

Note. Image generated with the prompt "Jean Baudrillard in postmodern style" by OpenAI, *ChatGPT*, 2023 (https://chat.openai.com/chat).

https://www.grammarly.com/blog/citations/ai-citations-apa/

Authorship

Another example:

I acknowledge the use of Copilot [https://copilot.microsoft.com/] to generate ideas and material for background research and project planning in the drafting of this assignment. The following prompts were entered into Copilot on 22 march 2024: "Is there any evidence that a large Volcanic eruption changed the nature of planet earth*?*"

Microsoft. (2024). *Copilot (*March 22 version*)* [Large language model]. https://copilot.microsoft.com

https://www.grammarly.com/blog/citations/ai-citations-apa/

GenAI research assistant – some tools

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Chatbots	OpenAI ChatGPT 4.0	**Acess** : Free and Paid **Knowledge base**: Web content
AI research assistants	Copilot, Gemini, Anthropic - Claude	**Acess:** Free and Paid **Knowledge base:** Web content
AI assistants for bibliographic discovery, literature review, paper summarization, key insight extraction	consensus, www.researchrabbit.ai, SCISPACE, scite_, perplexity, Elicit	**Acess:** Free (ResearchRabbit) and Paid **Knowledge base:** Semantic Scholar and OpenAlex (mainly *Open Access*)
AI assistants for content summarization	ChatPDF, PDF, scholarcy	**Acess:** Free and Paid **Knowledge base:** Upload content
AI tools integrated in Data Bases	Scopus AI, Trusted content. Powered by responsible AI., Clarivate, Web of Science Research Assistant	**Acess:** Paid (subscription-based) **Knowledge base :** Reference Data Bases (Scopus e WoS)

GenAI research assistant – some tools

ISA

Chatbots	OpenAI ChatGPT 4.0	Acess : Free and Paid Knowledge base: Web content
AI research assistants	Copilot, Gemini, Anthropic - Claude	Acess: Free and Paid Knowledge base: Web content
AI assistants for bibliographic discovery, literature review, paper summarization, key insight extraction	consensus, www.researchrabbit.ai, SCISPACE, scite_, perplexity, Elicit	**Acess:** Free (ResearchRabbit) and Paid **Knowledge base:** Semantic Scholar and OpenAlex (mainly *Open Access*)
AI assistants for content summarization	ChatPDF, PDF, scholarcy	Acess: Free and Paid Knowledge base: Upload content
AI tools integrated in Data Bases	Scopus AI, Clarivate Web of Science Research Assistant	Acess: Paid (subscription-based) Knowledge base : Reference Data Bases (Scopus e WoS)

GenAI research assistant – some tools

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consensus

https://consensus.app/search/

- Finds and summarizes a set of articles in response to a question -"*prompt*". Suitable for direct questions (YES/No))
- Classify the results in the "consensus meter" according to the number of articles that support a positive result
- Knowledge Base: Semantic Scholar, GPT-4 Content-based generation (OPEN AI)
- Summarize the content of 5 up to 10 articles in the "Summary" option)
- **Limite of the free version: 20 credits per month**

consensus

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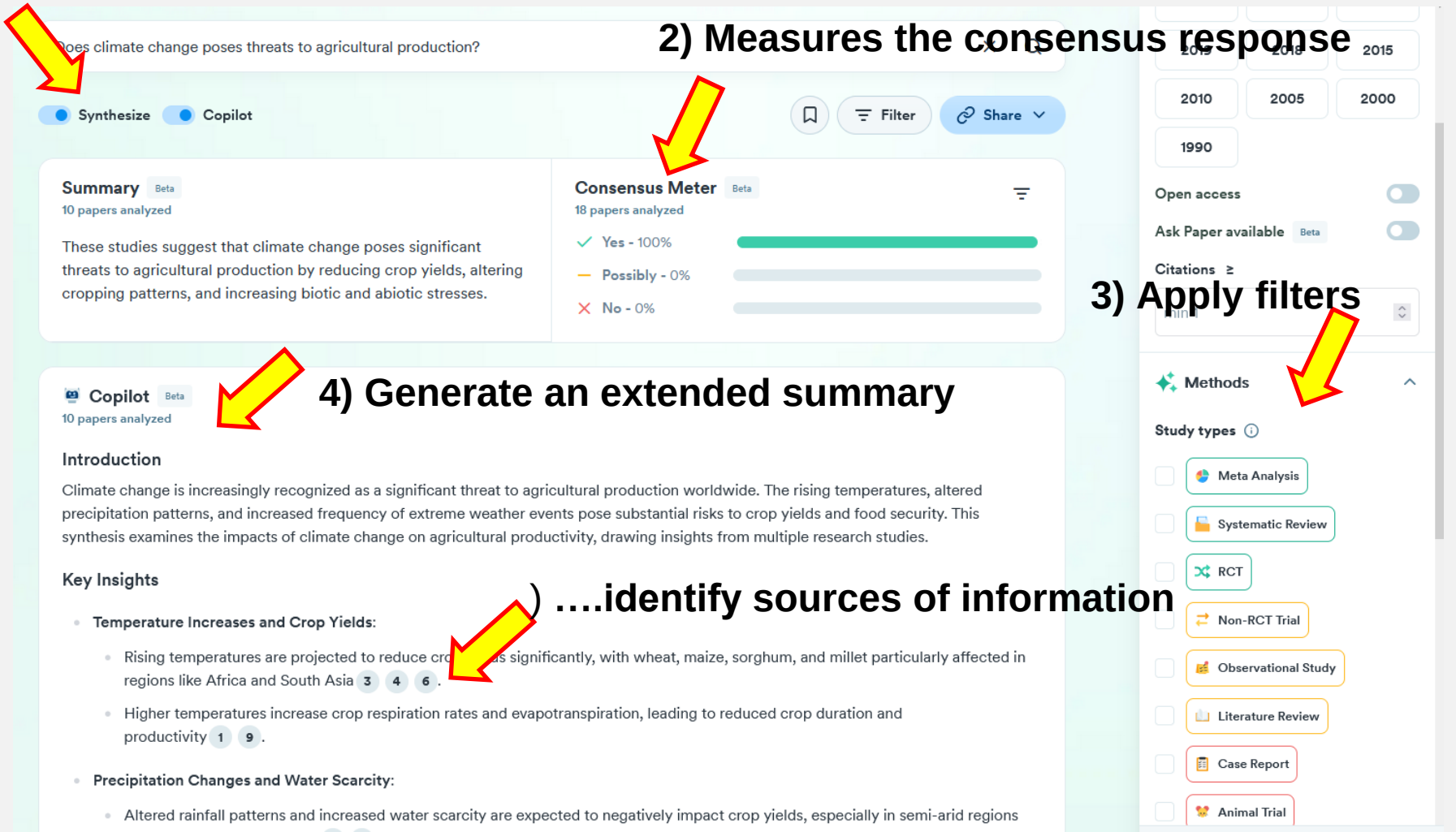
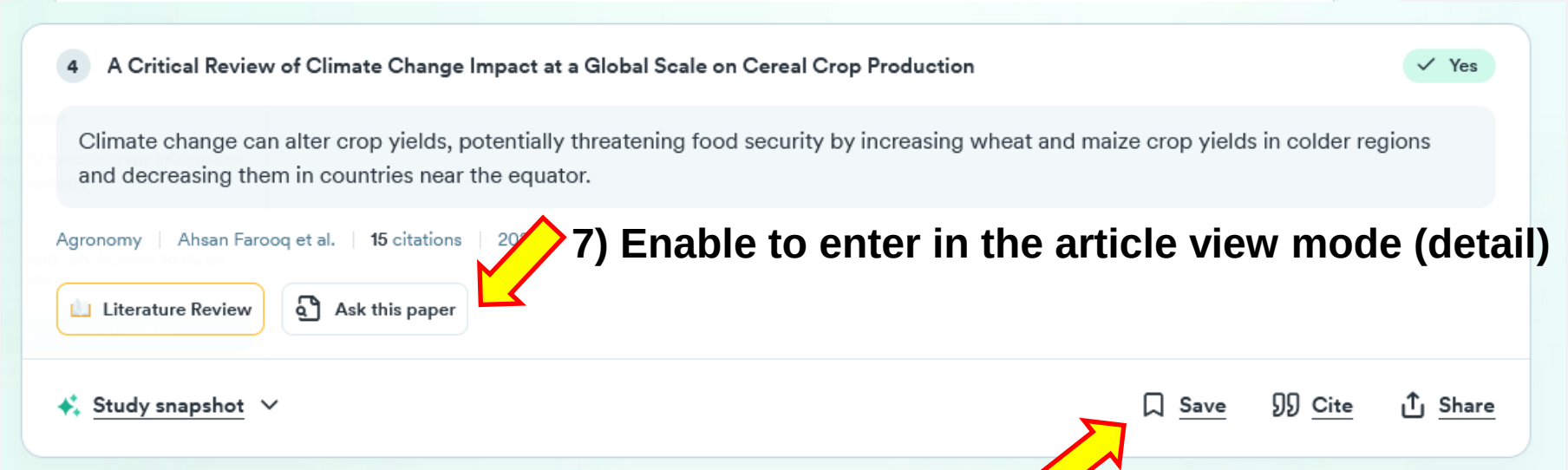
1) Generate a summary using all documents identified



consensus

ISA



GenAI research assistant – some tools

ISA

https://www.researchrabbit.ai/

- **Free**
- Literature mapping tool
- Generates a visual network of similar articles, from a base article (*seed*) or a set of base articles, using authors and citations relations (*similar works, all references, all citations*)
- Knowledge base: OpenAlex and Semantic Scholar (mainly scientific articles in *Open Access*)
- Options of search by title, DOI, keywords or upload articles

www.researchrabbit.ai

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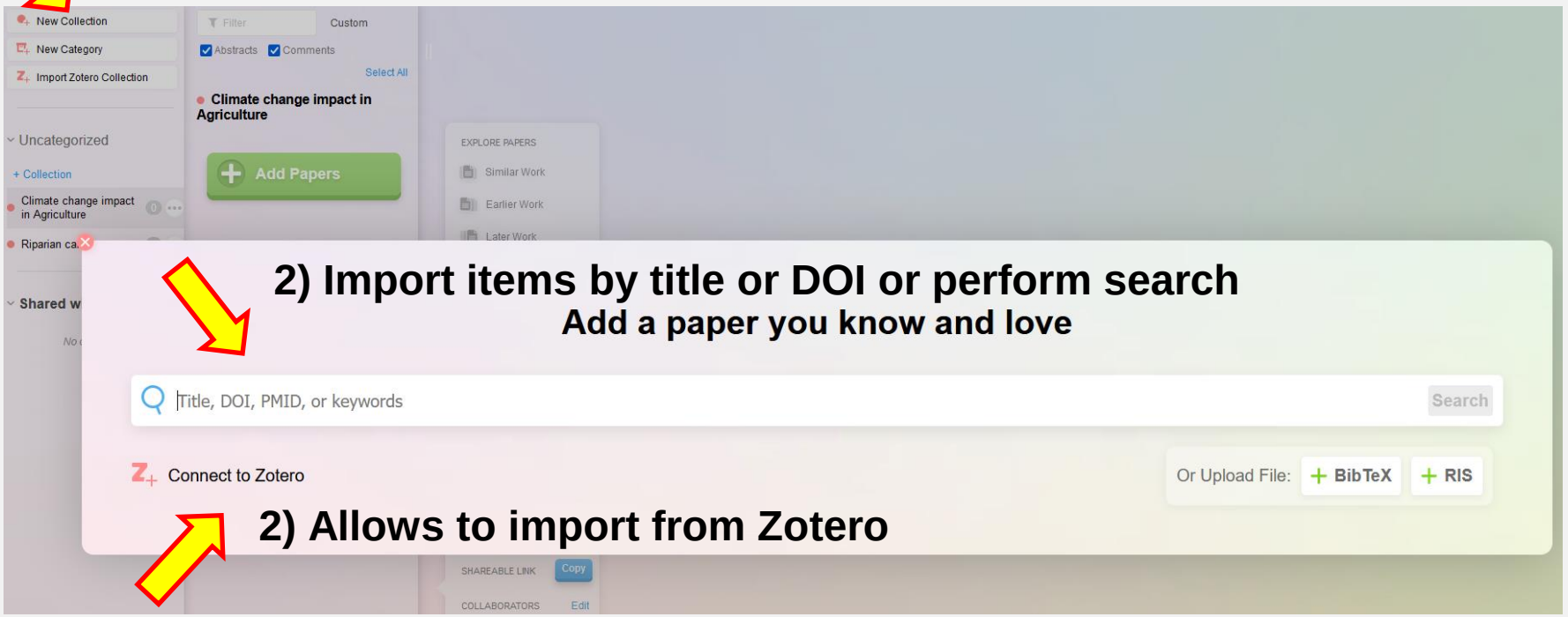
1) Create collections or categories



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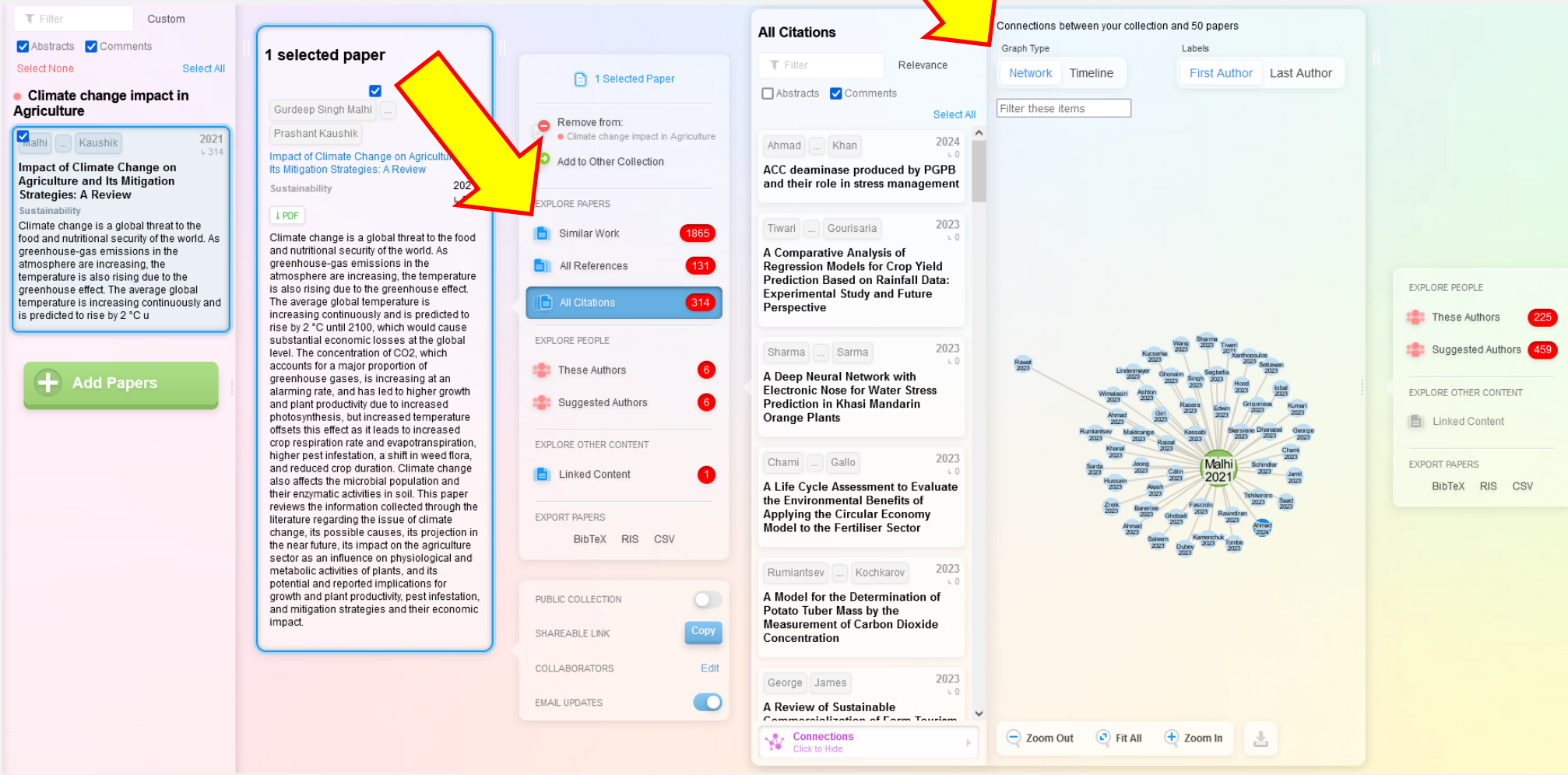
Option 1) Start from one article (*seed*)

1) Find similar articles based on references and citations

2) View by network or by timelin



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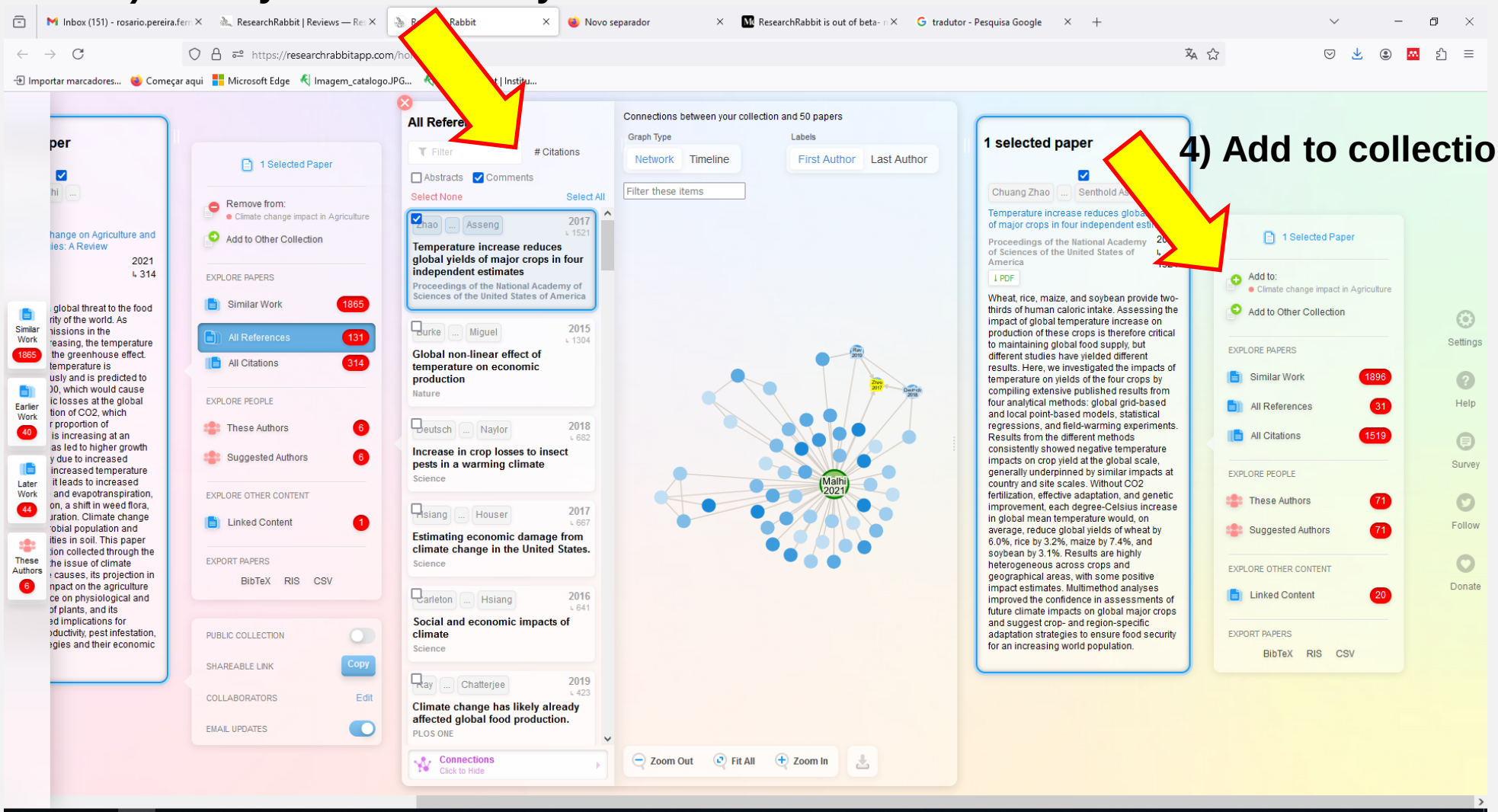
Option 1) Start from one article (*seed*)

3) Sort by relevance or by citations

4) Add to collection



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Option 1) Start from one article (*seed*)

Filter Custom

Abstracts Comments

Select None Select All

Climate change impact in Agriculture

Malhi ... Kaushik 2021 ↳ 314

Impact of Climate Change on Agriculture and Its Mitigation Strategies: A Review

Sustainability

Climate change is a global threat to the food and nutritional security of the world. As greenhouse-gas emissions in the atmosphere are increasing, the temperature is also rising due to the greenhouse effect. The average global temperature is increasing continuously and is predicted to rise by 2 °C u

Zhao ... Asseng 2017 ↳ 1521

Temperature increase reduces global yields of major crops in four independent estimates

Proceedings of the National Academy of Sciences of the United States of America

Wheat, rice, maize, and soybean provide two-thirds of human caloric intake. Assessing the impact of global temperature increase on production of these crops is therefore critical to maintaining global food supply, but different studies have yielded different results. Here, we investigated the impact

Add Papers

2 Selected Papers

Remove from: Climate change impact in Agriculture

Add to Other Collection

EXPLORE PAPERS

Similar Work 1674

Earlier Work 3

Later Work 9

EXPLORE PEOPLE

These Authors 77

Suggested Authors 184

EXPLORE OTHER CONTENT

Linked Content 21

EXPORT PAPERS

BibTeX RIS CSV

PUBLIC COLLECTION

SHAREABLE LINK Copy

COLLABORATORS Edit

EMAIL UPDATES

Similar Work

review Relevance

Abstracts Comments

Select All

Lobell ... Gou 2012 ↳ 809

The Influence of ... Change on Global Crop Produ...

Plant Physiology

Raza ... Xu 2019 ↳ 805

Impact of Climate Change on Crops Adaptation and Strategies to Tackle Its Outcome: A Review.

Daryanto ... Jacinthe 2016 ↳ 569

Global Synthesis of Drought Effects on Maize and Wheat Production

PLOS ONE

James ... Conway 2017 ↳ 172

Characterizing half-a-degree difference: a review of methods for identifying regional climate responses to global warming targets

Wiley Interdisciplinary Reviews: Climate Change

Rojas-Downing ... Woznicki 2017 ↳ 732

Climate change and livestock: Impacts, adaptation, and mitigation

Climate Risk Management

Load More

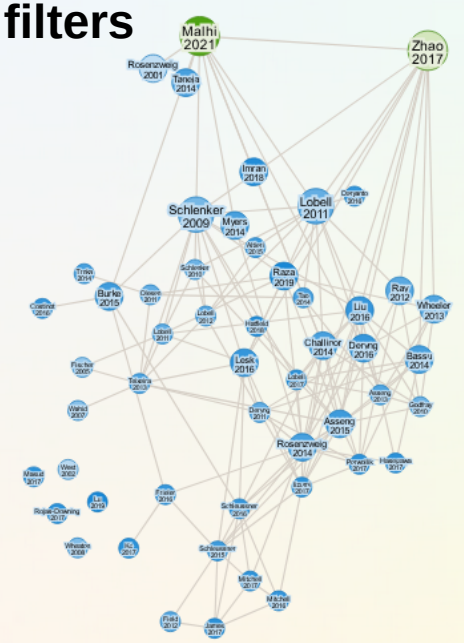
Connections between your collection and 50 papers

Graph Type Network Timeline

Labels First Author Last Author

Filter these items

5) Apply filters

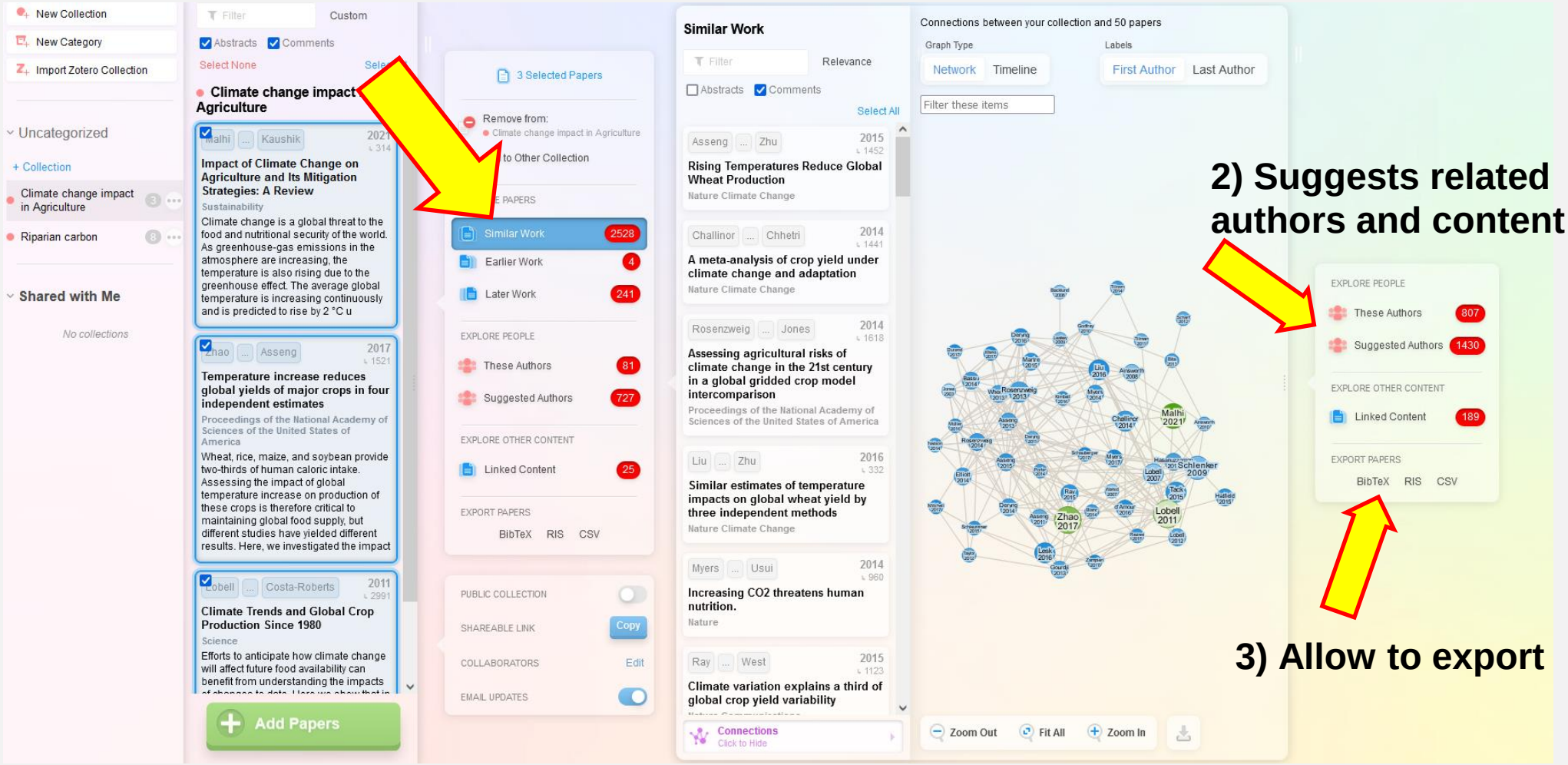


www.researchrabbit.ai

1) Encontra trabalhos similares, trabalhos anteriores e posteriores

Option 2) Start from a set of articles

1) Find similar articles, previous and later studies



GenAI research assistant – some tools

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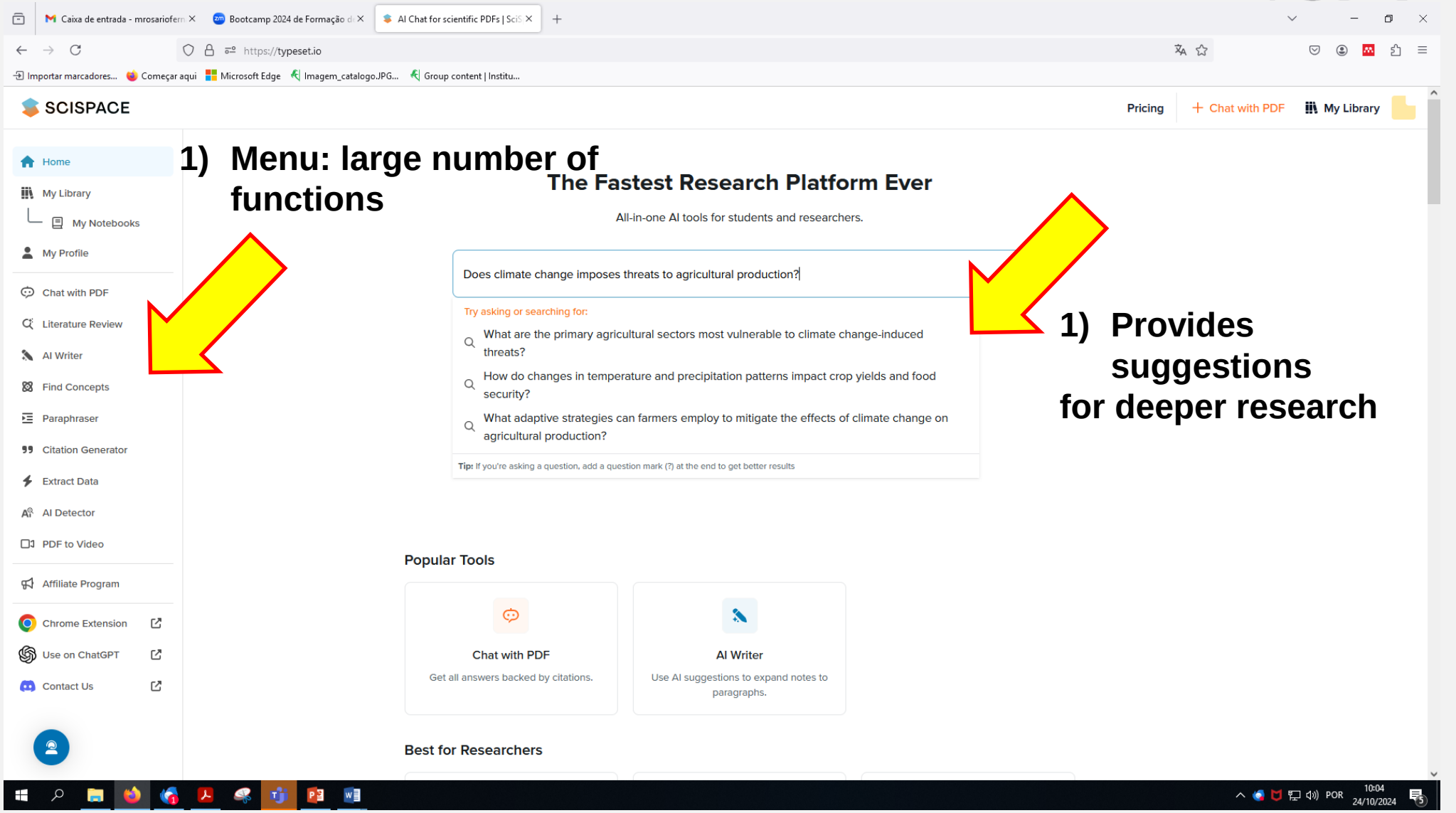
https://scispace.com/

- Search articles and other scientific publications in response to a research question -"*prompt*"
- Analyse, summarize and compare scientific articles
- Includes writing assistant, AI detector, video generator, concept and paraphraser generator
- Knowledge base: OpenAlex and Semantic Scholar (mainly scientific articles in *Open Access*)
- **Low availability of all functions (max 5 columns in the review grid, no exportation, limited number of searches for concepts, paraphrases etc.)**

SCISPACE

ISA



SCISPACE 1) Literature review

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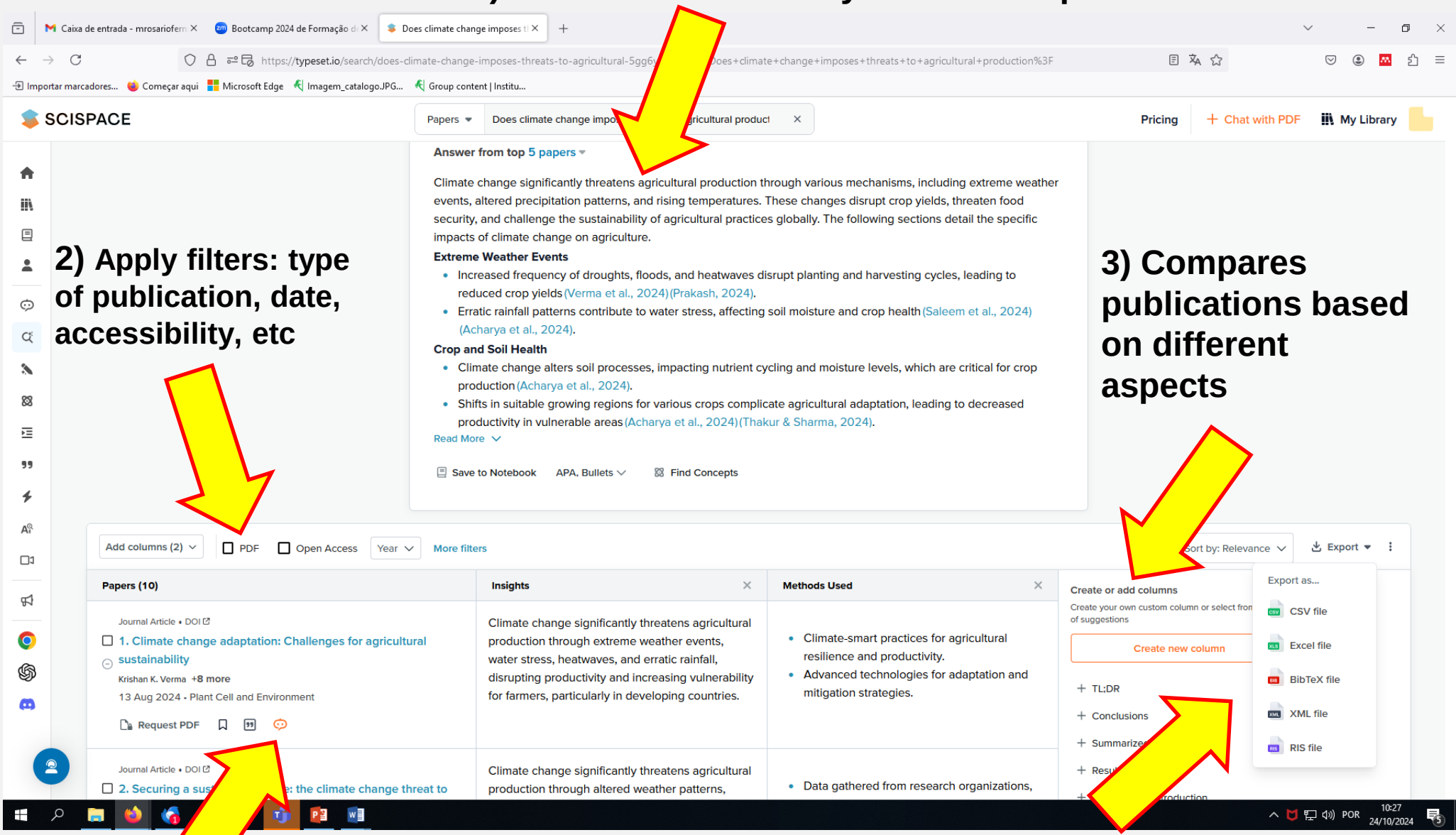
1) Generate a summary based on top 5 articles



2) Apply filters: type of publication, date, accessibility, etc

3) Compares publications based on different aspects

4) Exports the comparison (paid version)

5) Details the article

SCISPACE 2) Identification of concepts

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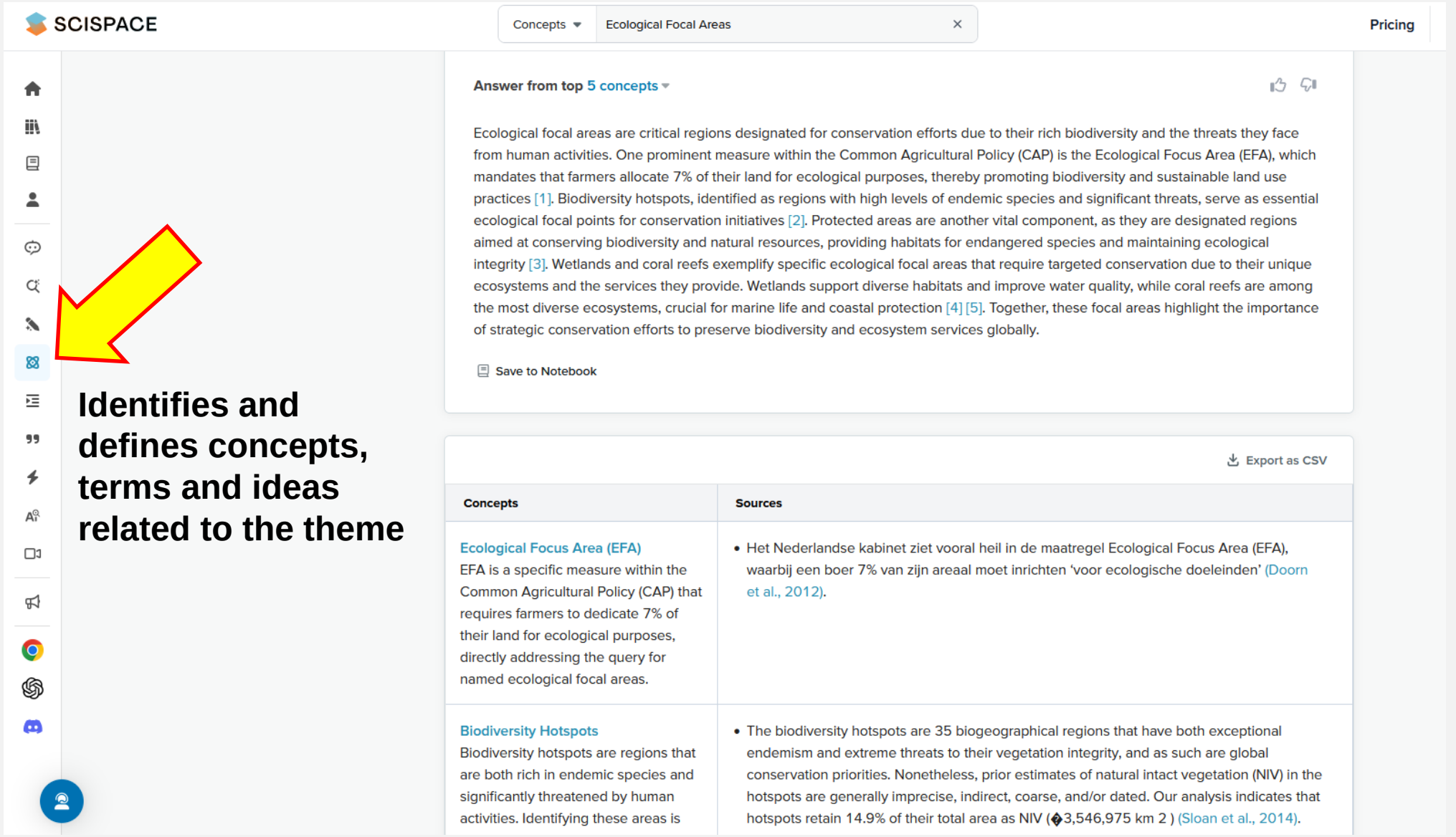

Identifies and defines concepts, terms and ideas related to the theme

SCISPACE 3) Paraphraser

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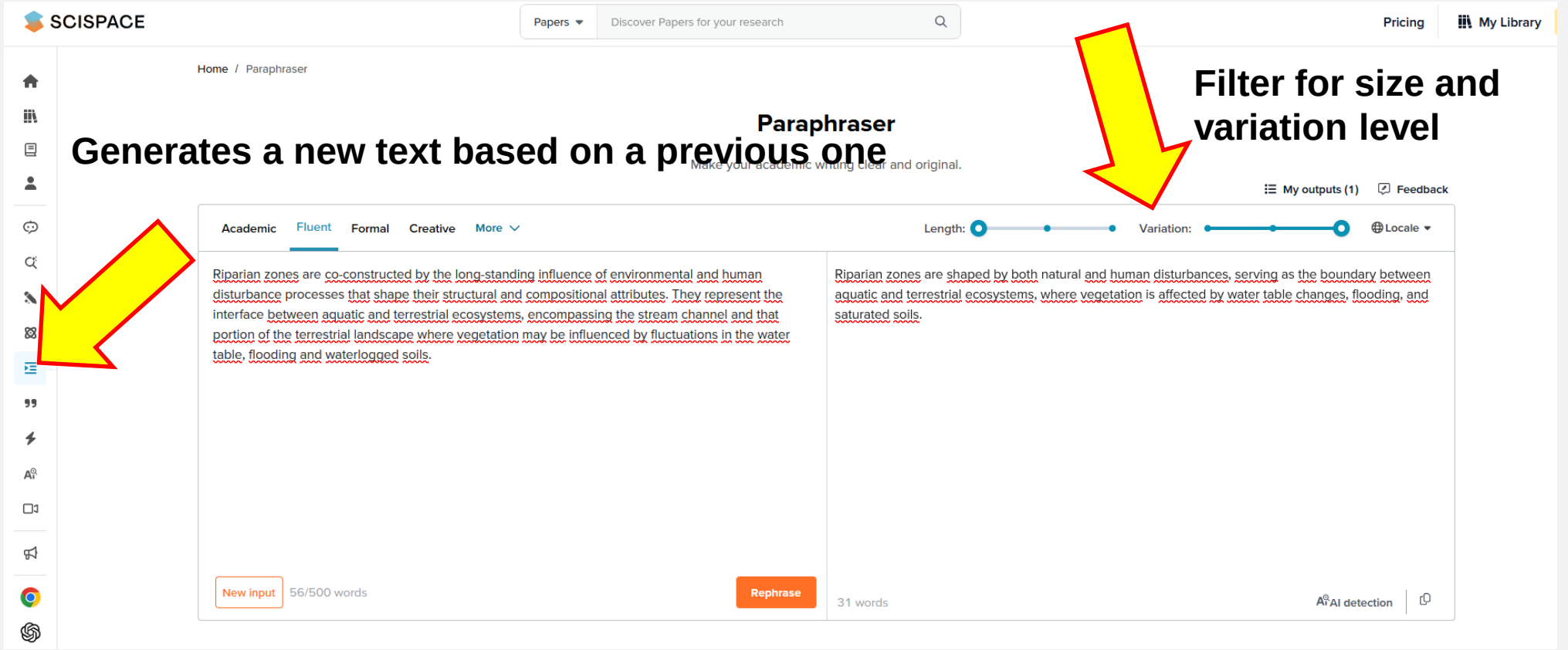

SCISPACE 4) Citation generator

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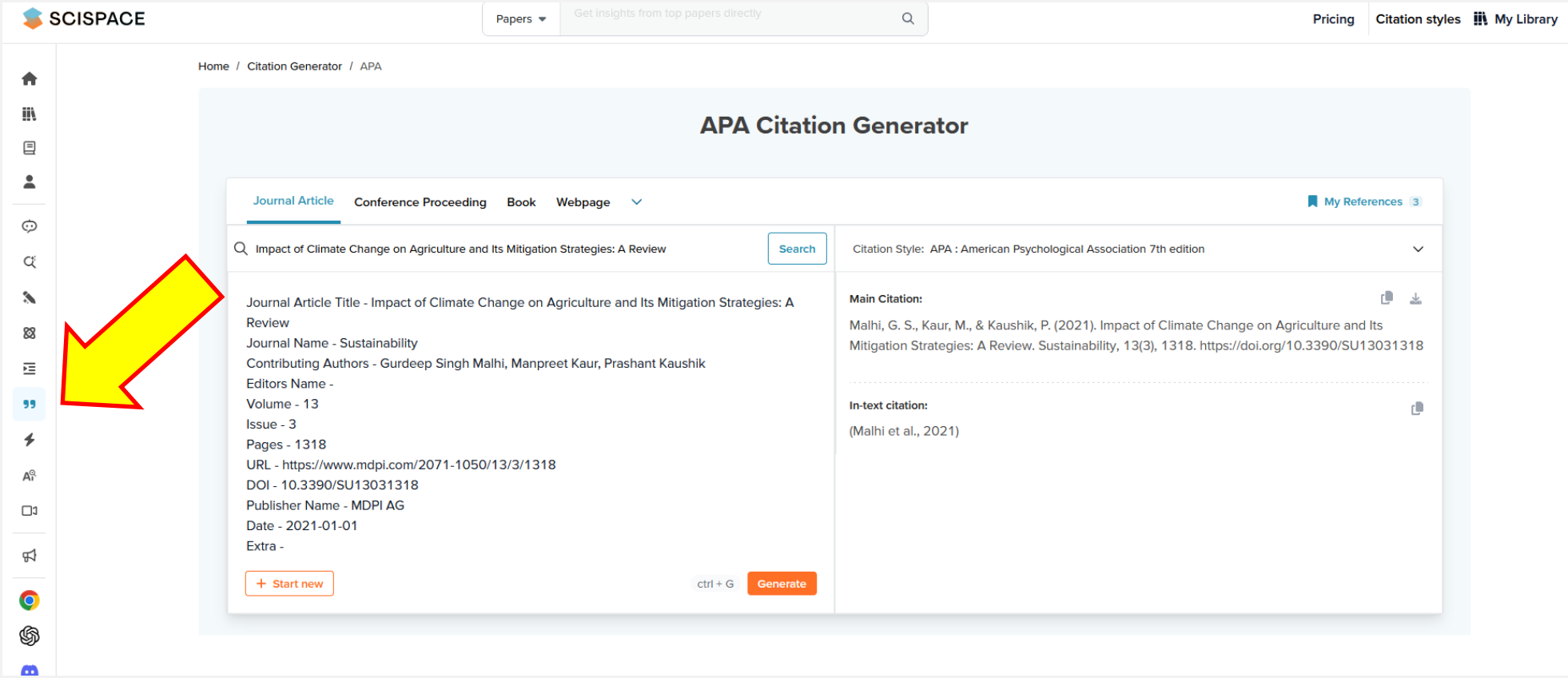
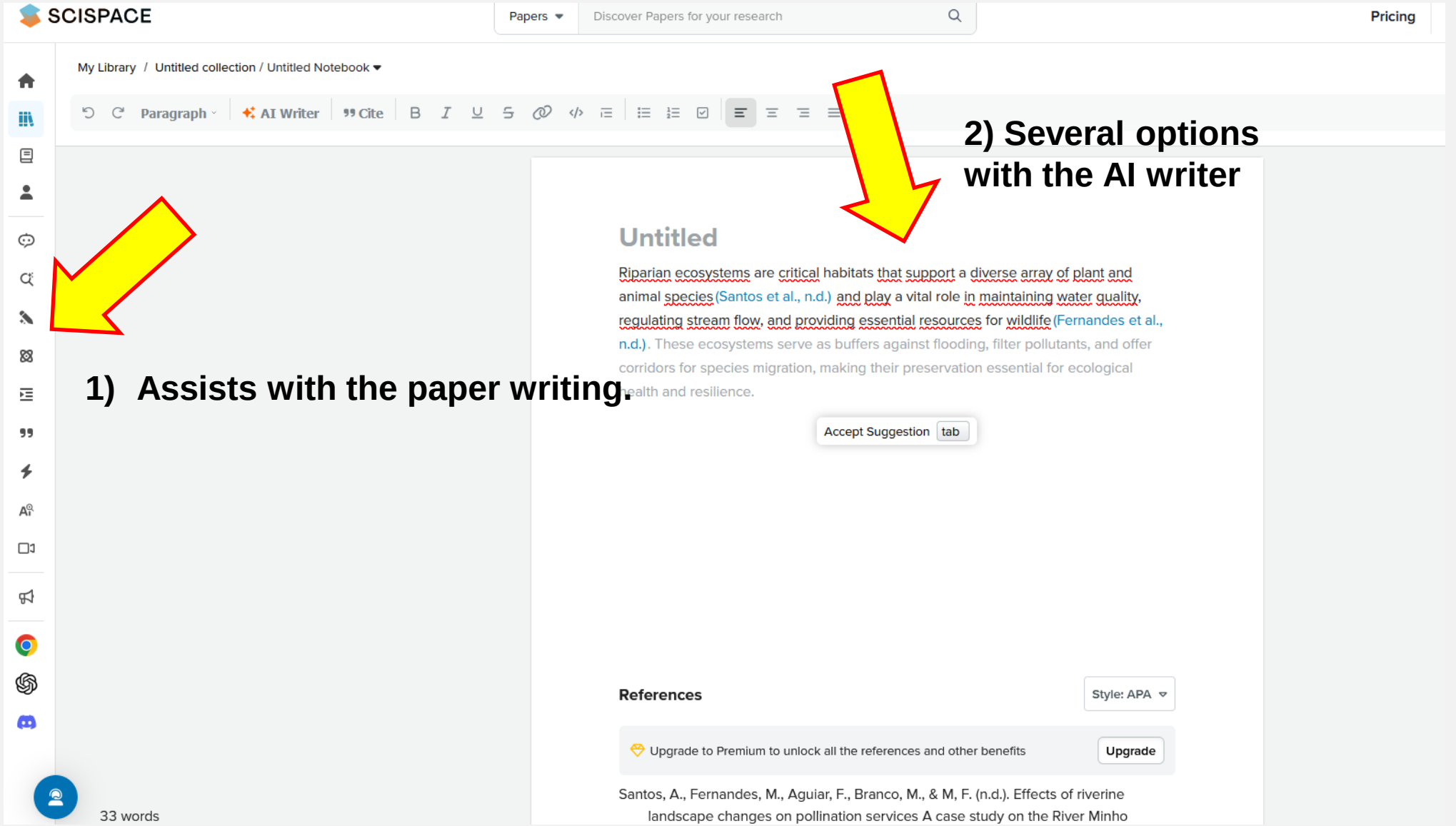
1) **Generates the in-text citation and the respective bibliographic reference based on a title or a URL**



SCISPACE 5) Writing assistant

ISA



SCISPACE 4) AI detector

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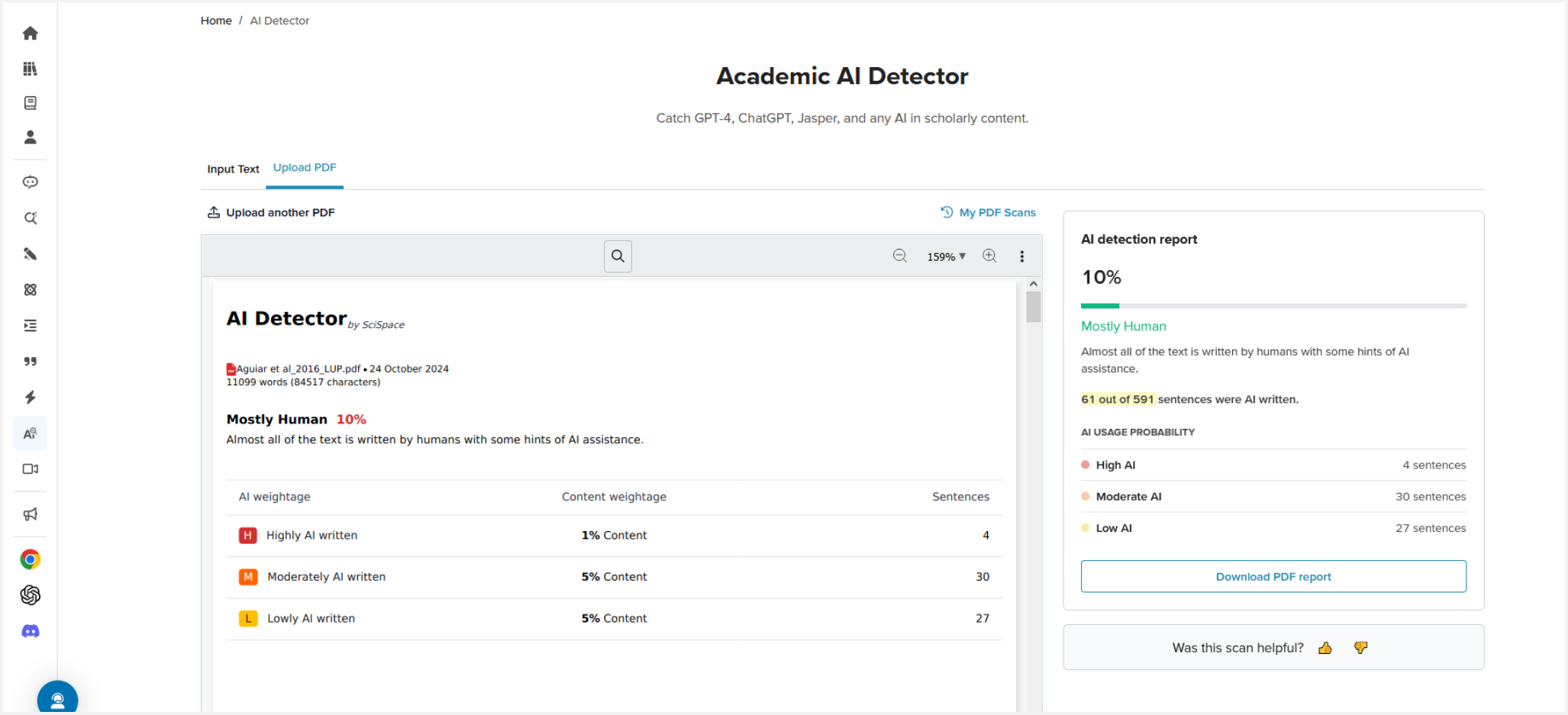

Other AI tools

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IAED centrada no professor

Correção, feedback e deteção de plágio

Turnitin - Ferramenta de deteção de plágio com IA que também fornece feedback sobre a escrita dos alunos.

Socrative - Plataforma melhorada com IA para criar questionários e fornecer feedback instantâneo aos alunos.

Gradescope - Plataforma de correção assistida por IA que simplifica o processo de avaliação de trabalhos e exames

iThenticate - Plataforma de deteção de plágio.

Ouriginal - Plataforma de deteção de plágio.

Plagiarism Checker X - Plataforma de deteção de plágio.

Grammarly - Plataforma de deteção de plágio, entre muitas outras funcionalidades.

Outras ferramentas de AI....

ISA

IAED centrada no aluno

Redação automática de textos

Hemingway - Ferramenta concebida para ajudar os utilizadores a melhorar a qualidade da sua escrita (especialmente no que diz respeitoao vocabulário e estrutura frásica).

ProWritingAid - Uma ferramenta concebida para ajudar os utilizadores a melhorar a qualidade da sua escrita (especialmente quanto à gramática e ao estilo).

Chat GPT 4 - Processador de linguagem natural baseado em LLM (Large Langua Model)

Grammarly - Assistente de escrita com IA que oferece sugestões de gramática, estilo e tom.

Cramly - Ferramenta de escrita automatica

EssayGenious - Ferramenta de escrita automatica

Zotero: Ferramenta de pesquisa melhorada com IA que ajuda os alunos a gerir e citar fontes nos seus trabalhos.

Scrivener: Software de escrita impulsionado por IA que auxilia na organização e estruturação de textos longos.

Outras ferramentas de AI....

ISA

IA Generativa

Gemini - Processador de Linguagem Natural da Google.

ChatGPT - Processador de Linguagem Natural da OpenAI

Hugging Face - Processador de Linguagem Natural da HuggingFace

Copilot - Processador de Linguagem Natural da Microsoft

IA Generativa para imagens:

DALL-E 2 - Plataforma generativa de imagens da OpenAI

Stablility AI - Plataforma generativa de imagens

Midjourney - Plataforma generativa de imagens

IA generativa para video:

Runway - Plataforma generativa de vídeo

Elai - Plataforma generativa de vídeo

IA generativa para música:

Aviva - Plataforma generativa de música

Soundraw - Plataforma generativa de música

MOOC – "A Inteligência Artificial vai transformar a Escola" - DGE – IAESC – Módulo de ferramentas digitais
https://www.nau.edu.pt/pt/curso/a-inteligencia-artificial-vai-transformar-a-escola/

Mais informações em:

infobisa@isa.ulisboa.pt

https://www.isa.ulisboa.pt/bisa/apresentacao