

## Capabilities and limitations of AI-assisted tools in literature review

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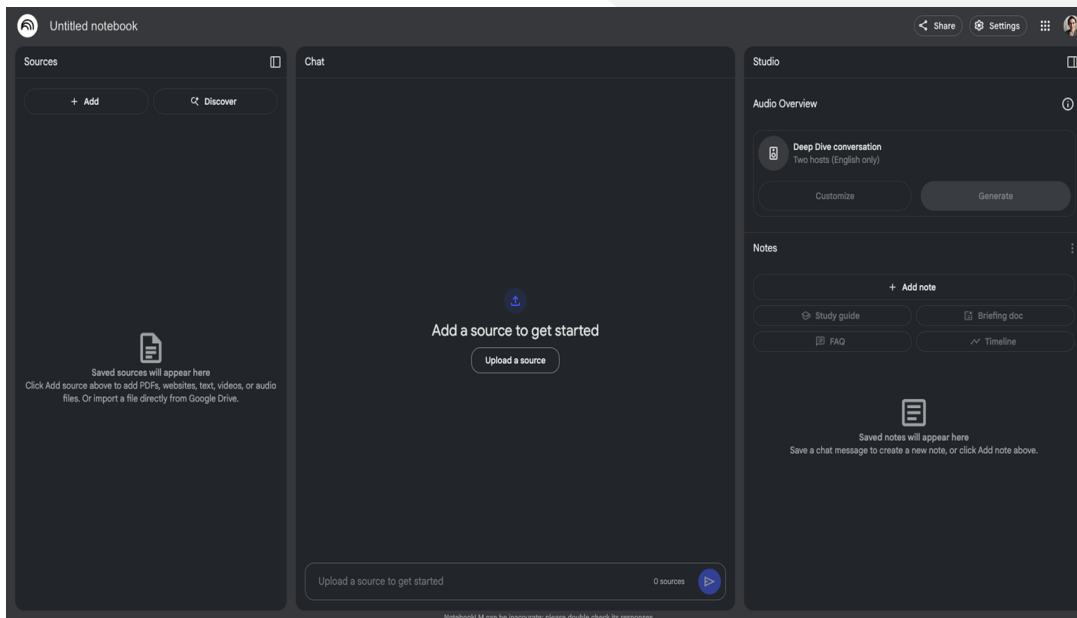
# Outline

1. State of the art of AI assistants and tools in academic research
  - a. Notebook LM
  - b. Anara
  - c. Deep Research OpenAI
  - d. SciteAI
  - e. STORM
  - f. Perplexity.AI
2. Pro and Con overall of AI assisted tools
3. Pro and Cons with our Tool

# AI Research tools - What can they do?

- Accelerating Research
- Automating tasks
- Uncovering hidden insights in large datasets
- Finding gaps in research

# Notebook LM



An AI-powered note-taking tool by Google that allows users to upload documents and receive summaries, explanations, and answers based on the content. It supports various formats, including PDFs and Google Docs, and can generate audio overviews

# Anara

Designed for researchers to analyze and cross-reference multiple documents simultaneously. It supports various formats and offers collaborative features, making it suitable for team-based research projects.

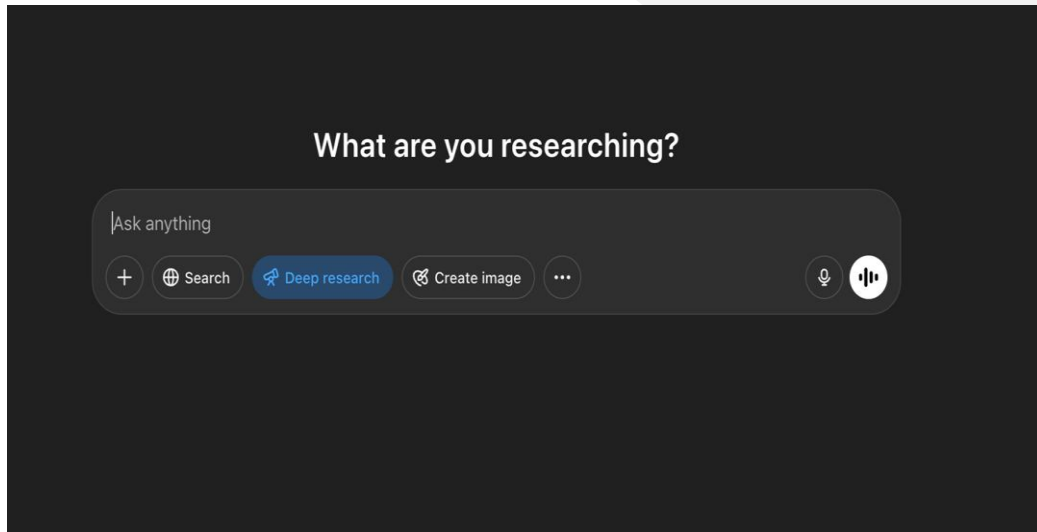
The screenshot displays the Anara interface. On the left, a document titled "[2401.00002] Prompt emission of relativistic protons up to GeV energies from M6.4-class solar flare..." is open. The document content includes the title, authors (C.E. NARDI, M.S. DE OLIVEIRA, and A.A. NEPISHCHENKO), affiliations, an abstract, and an introduction. The abstract discusses the prompt emission of a long-duration life-time solar flare on July 17, 2023, and the acceleration of electrons and protons. The introduction mentions the observation of solar energetic particles since 1959 and the existence of a prompt and gradual emission of solar energetic particles.

On the right, a chat window is active, showing a conversation about the document's findings. The chat messages include:

- How do the findings challenge existing models of solar energetic particle behavior?
- What are the broader impacts of this research on space weather prediction and safety?
- Explain this research paper to me in simple terms. What did the researchers find? Why does it matter?

The chat window also shows a list of documents and a word count of 120 words.

# Deep Research OpenAI



An advanced tool that autonomously conducts multi-step research using web data, generating comprehensive reports with citations. It's integrated into ChatGPT and is particularly useful for in-depth research tasks.

# SciteAI

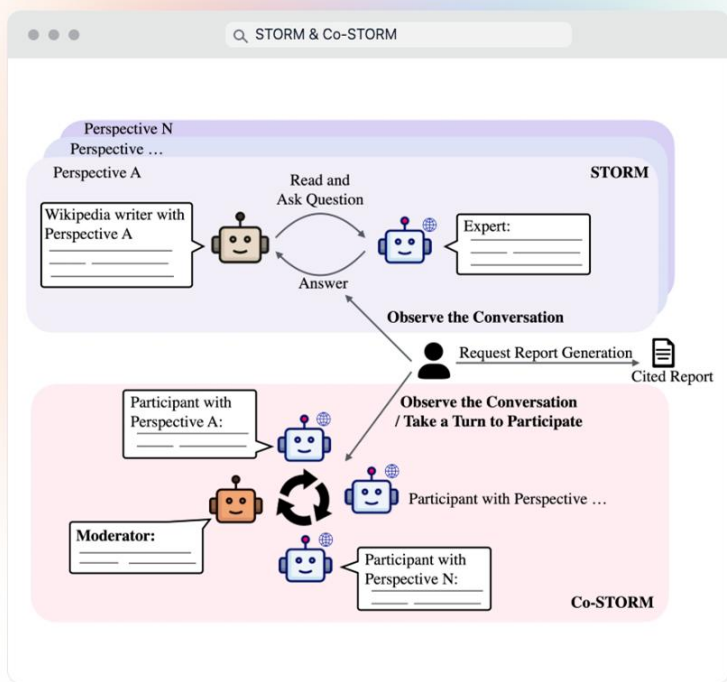
Focuses on citation analysis, helping researchers understand how scientific papers are cited—whether supporting, contrasting, or merely mentioning. It provides contextual insights into citations and integrates with reference managers

Harness the power of AI for your research workflows. Assistant lets you ask questions and gives you an answer with insight and control into its thought process.

The screenshot displays the SciteAI interface with several key components:

- Your prompt:** A text input field containing the question: "How does the structure of a protein affect its function?".
- Assistant's response:** A detailed text block providing an answer to the prompt, including references to scientific papers and a summary of protein structure-function relationships.
- Your follow-ups:** A section below the main response with a text input field for asking related questions, such as "What is a tertiary protein?".
- Table of contents to know where you are:** A sidebar on the left showing a list of search results and their relevance scores.
- View and edit search strategy and reference selection process:** A sidebar on the right showing a list of references used to support the assistant's response, with options to view full-text or open access articles.
- Reference list used to support the claims in this response, with relevant snippets from full-text / abstracts for your review:** A section at the bottom right showing a list of references with snippets of text from the full-text or abstracts that support the claims in the assistant's response.

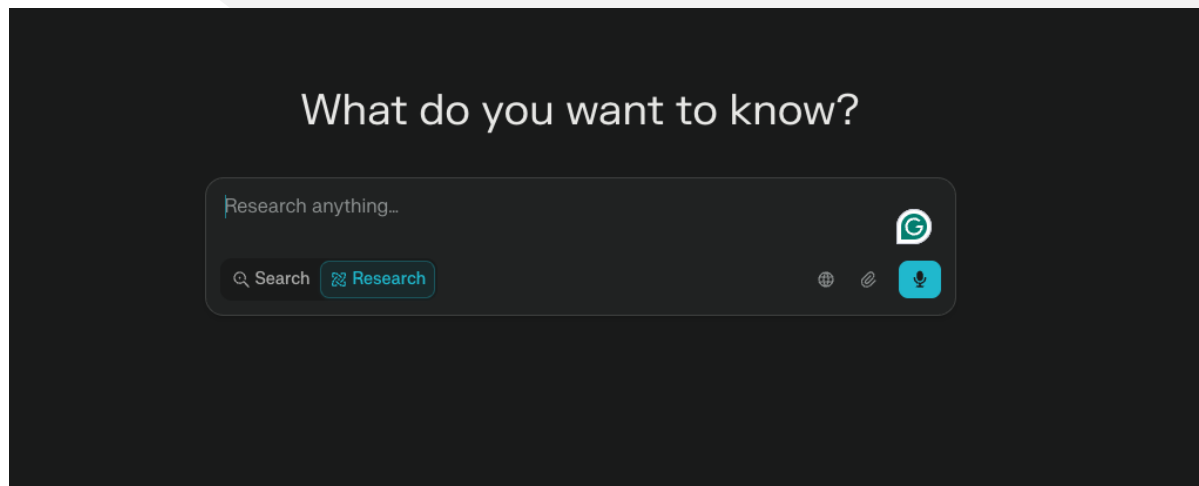
# Storm AI



An open-source tool that automates the creation of structured, cited articles resembling Wikipedia entries. It employs a multi-agent system to simulate expert collaboration, enhancing the depth and quality of generated content.

# Perplexity.AI

A conversational AI search engine that provides real-time answers with source citations. It supports various content formats and offers features like focus modes and integration with mobile and browser platforms



Functionality	Notebook LM	Anara	SciteAI	Deep Research OpenAI	StormAI	Perplexity.AI	ETF AI Assistant
Document Upload & Analysis	✓	✓		✓	✓	✓	✓
Web-Based Information Retrieval		✓	✓	✓	✓	✓	✓
Citation Contextualization		✓	✓	✓	✓	✓	✓
Summarization of Content	✓	✓	✓	✓	✓	✓	✓
Question Answering (QA)	✓	✓	✓	✓	✓	✓	✓
Multi-Format Support (PDF, Audio, etc.)	✓	✓		✓	✓	✓	
Collaborative Features		✓			✓	✓	✓
Customizable Output Formats	✓	✓		✓	✓	✓	
Real-Time Data Access		✓	✓	✓	✓	✓	✓

# Pros and Cons of AI Research tools

## Pros

- Efficiency and Time-Saving
- Enhanced Accessibility
- Support for Multilingual Research
- Continuous Availability

## Cons

- Potential for Inaccurate or Fabricated Information
- Lack of Critical Thinking and Contextual Understanding
- Risk of Overreliance
- Ethical and Privacy Concerns
- Cost and Accessibility Barriers

# AI Tool Limitations: data creativity

**Data creativity** refers to the ability to find, interpret, and synthesize non-obvious insights from raw or complex datasets. It involves navigating ambiguous or incomplete data, understanding the context behind the numbers, and making informed judgments—often requiring domain knowledge or methodological flexibility.

"What was the unemployment rate in France in 2023?"

- **Type:** Factual retrieval
- **Answer:** Can usually be answered directly from a known source (e.g. OECD or Eurostat).

"How has youth unemployment in France compared to overall unemployment over the past decade, and what might explain the differences?"

- **Type:** Interpretive and analytical
- **Requires:**
  - Retrieving multiple data series (youth vs total unemployment)
  - Analyzing trends over time
  - Applying contextual knowledge (e.g., education policy, economic shifts, labor market reforms)
  - Possibly integrating multiple sources or building a narrative

# AI Tool Limitations: Tyranny of Majority

In this context, "**tyranny of the majority**" refers to an AI's tendency to prioritize the most frequently mentioned or easily accessible information, rather than the most accurate, authoritative, or innovative ideas. This happens because the model is trained on massive datasets where popular views are overrepresented, leading to a bias in its responses.

## Conventional (majority) view:

*"Income inequality in America has dramatically increased since the 1960s."*

– This is what the AI tends to repeat, because it's widely published.

## Expert (minority) view:

*"Some economists argue that inequality has remained relatively stable or grown only modestly."*

– Less visible in training data, despite being well-supported in some academic research.

# AI Tool Limitations: Intellectual shortcuts

This refers to the tendency for users to bypass deeper analysis or reflection when AI can instantly provide information. Over time, this can weaken critical thinking and creative problem-solving skills.

## **Without AI (deep engagement):**

A researcher reads multiple conflicting reports about climate change policies, notices a gap in regional data, and develops a novel framework to compare policy effectiveness.

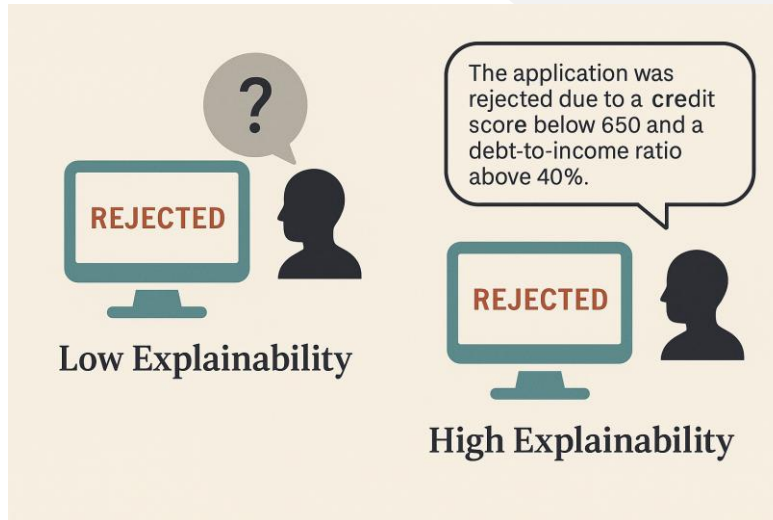
## **With AI (shortcut):**

The researcher asks an AI for a summary and accepts the synthesized answer without digging deeper—missing the contradictions and the opportunity for original insight.

# Major Factor: Explainability

Explainability refers to the degree to which a user can understand and interpret the model's decision making process, and the reasons behind its generated outputs.

Explainability helps users, developers, and stakeholders understand how the model works : why it makes certain predictions or generates specific text.



# Pros and Cons of ETF AI Assistant

## Pros

- Structured, easy to use
- Combination of web-based research and own data
- Clear summarization and traceability
- Efficient and time-saving
- Real and traceable data sources

## Cons

- Lack of control over output
- Output variability
- Lack of critical thinking and contextual understanding

Q\A

Thank you!