

Technical University of Kaiserslautern  
Department of Computer Science



SeminAIR Paper:

# Is manual literature research becoming obsolete in the rise of LLM revolution

## Author

Dennis Schneider  
(schnei\_d@rhrk.uni-kl.de)  
David Kariem Habusch  
(habush@rhrk.uni-kl.de)

## Supervisors

Prof. Dr. Paul Lukowicz  
Zhou Bo

July 14, 2023

## Abstract

# Contents

<b>1</b>	<b>Introduction</b>	<b>2</b>
<b>2</b>	<b>ChatGPT</b>	<b>2</b>
2.1	Ohne Plugin . . . . .	2
2.1.1	How to start . . . . .	2
2.1.2	Capabilities . . . . .	2
2.1.3	Limitations . . . . .	3
2.2	Plugin 1: VoxScript . . . . .	4
2.2.1	How to start . . . . .	4
2.2.2	Capabilities . . . . .	4
2.2.3	Limitations . . . . .	5
2.3	Plugin 2: Wolfram Alpha . . . . .	6
2.3.1	How to start . . . . .	6
2.3.2	Capabilities . . . . .	6
2.3.3	Limitations . . . . .	7
<b>3</b>	<b>Bing Chat</b>	<b>8</b>
3.1	How to start . . . . .	8
3.2	Capabilities . . . . .	8
3.3	Limitations . . . . .	8
<b>4</b>	<b>Copy.ai</b>	<b>9</b>
4.1	How to start . . . . .	9
4.2	Capabilities . . . . .	9
4.3	Limitations . . . . .	10
<b>5</b>	<b>Research Rabbit</b>	<b>10</b>
5.1	How to start . . . . .	10
5.2	Capabilities . . . . .	10
5.3	Limitations . . . . .	10
<b>6</b>	<b>Connected Papers</b>	<b>10</b>
6.1	How to start . . . . .	10
6.2	Capabilities . . . . .	11
6.3	Limitations . . . . .	11
<b>7</b>	<b>Comparison</b>	<b>12</b>
<b>8</b>	<b>Conclusion and Future Work</b>	<b>12</b>

# 1 Introduction

## 2 ChatGPT

To put it in the words of ChatGPT:

I am ChatGPT, an artificial intelligence language model developed by OpenAI. I'm designed to understand and generate human-like text based on the input I receive. My architecture is based on GPT-4, which equips me with an extensive capacity to predict and construct responses. I can assist in a variety of tasks such as answering questions, creating content, tutoring, translating languages, and more.

### 2.1 Ohne Plugin

#### 2.1.1 How to start

Since ChatGPT is a web-based application, installation is neither necessary nor possible. Different models can be used via the link <https://chat.openai.com/>. At the moment there are gpt3.5 and gpt4 available. We will look at gpt4 in particular, as it is the more capable and advanced application.

#### 2.1.2 Capabilities

- **Literature Review Assistance:** By inputting queries related to the research topic, the researcher can gather summaries, comparisons, and analysis of different papers in the field. However, ChatGPT's knowledge is up-to-date only until its last training cut-off in September 2021. Hence, for the most recent papers, direct consultation of databases and journals is necessary.
- **Framing Research Questions:** ChatGPT can assist in reformulating and refining research questions based on the researcher's initial area of interest. This can provide different perspectives on the research scope.
- **Hypothesis Formulation Assistance:** The researcher can use ChatGPT to understand the general consensus in the scientific community about a particular topic, or explore the pros and cons of different theoretical models, thus assisting in the generation and refining of hypotheses.
- **Grammar and Spelling Preparation:** With its proficiency in text generation, ChatGPT can be employed for drafting parts of the manuscript, brainstorming ideas, and even checking grammar and syntax.

- **Syntax Preparation:** When producing summaries, ChatGPT can assist with formatting. It supports popular and commonly used formats such as latex. It is especially useful for establishing a basic format, which can then be fine-tuned to the user's liking.
- **Multi Lingual:** The build in translation layer makes it possible to formulate your input and the output in different languages.

### 2.1.3 Limitations

- **Recency of Information:** ChatGPT's knowledge is up-to-date until its last training cut-off in September 2021. Therefore, it can't provide information on research or findings published after this date, without using additional tools or plugins.
- **Accuracy of Information:** While ChatGPT strives to provide accurate information based on its training data, there is always a chance of errors or omissions. ChatGPT should be used in conjunction with direct consultation of scientific literature, even if the results look at the first glance supposedly correct. This point is the most important to pay attention to when working with ChatGPT, as it is not possible to tell from ChatGPT's answer alone whether it is a "hallucinated" answer or a correct answer.
- **Depth of Understanding:** ChatGPT generates responses based on patterns in its training data, not on a deep understanding of the content. Thus, its responses should be seen as a starting point for further investigation rather than definitive answers.
- **Critical Evaluation:** ChatGPT can provide summaries and comparisons of literature, but can't critically evaluate the quality of research studies like a human researcher can. This includes assessing the validity of the research methods used, potential biases in the study, and the significance of the findings.
- **Personalization:** ChatGPT doesn't have the ability to understand the specific context of a researcher's study beyond the provided input. The utility of its responses can sometimes be limited by a lack of contextual understanding.
- **Query Formulation Dependencies:** It's quintessential to formulate the right query in order to obtain the best possible results. Similar queries can result in vastly different outputs.
- **Content restricted Answers:** Considering the stringent measures for youth protection and against discrimination embedded within ChatGPT, which commonly react to violations with pre-established statements, a user's literature

search on sensitive subjects may face potential restrictions. In such cases, chatgpt usually replies with pre-generated answers.

## 2.2 Plugin 1: VoxScript

### 2.2.1 How to start

OpenAi differentiates ChatGPT between a free and a paid version. Plugins are only available in the latter version. Enabling plugins can be as simple as :

1. Open your ChatGPT settings and navigate to the plugins section.
2. Find VoxScript in the list of available plugins and click the "Enable" button.

### 2.2.2 Capabilities

- **Web Search:** VoxScript can perform a broad search across the internet, helping you find relevant articles, papers, and resources related to your research topic. It can pull from a variety of sources, giving you a wide range of information to explore.
- **Website Content Retrieval:** VoxScript can access and retrieve the content of specific websites. This is particularly useful if you know of certain websites or online databases that have relevant information for your research. It can pull the most recent information, ensuring you have the most up-to-date data.
- **Text Content Retrieval:** If there are specific documents or articles online that you want to review, VoxScript can retrieve and summarize this text. This can save you time by providing a summary of the content, allowing you to decide if you want to delve deeper into the full document.
- **Video Content Analysis:** If your research involves video content, VoxScript can search for and retrieve data about specific videos. This can be useful for finding relevant video content and understanding what the video is about without having to watch the entire thing.
- **Feedback and Support:** VoxScript has built-in mechanisms for feedback and support. If you're having trouble or need assistance, you can reach out directly through the plugin. This ensures that you have the support you need to effectively use the tool for your research.
- **Guidance and Learning:** VoxScript also provides help and guidance on how to use the tool effectively. This can be particularly useful if you're new to the tool or if you're not sure how to best leverage it for your research.

### 2.2.3 Limitations

- **Limited to Online Content:** VoxScript can only access information that is available online. It cannot access offline resources or databases that require special access permissions.
- **Dependent on Search Terms:** The effectiveness of VoxScript largely depends on the search terms used. If the search terms are too broad or too vague, the results may not be relevant. Conversely, if the search terms are too specific, they may not yield enough results.
- **Language Limitations:** While VoxScript can handle multiple languages, the accuracy and effectiveness of its functions may vary depending on the language. Some languages may not be supported or may have limited functionality.
- **No Interpretation or Analysis:** VoxScript can retrieve and summarize information, but it does not interpret or analyze this information. The user still needs to review the information and draw their own conclusions.
- **Limited to Text and Video Content:** VoxScript can retrieve text and video content, but it cannot handle other types of content such as images, audio, or interactive media.
- **Limited by Website Structure:** The ability of VoxScript to retrieve website content depends on the structure of the website. Some websites may have structures that make it difficult for VoxScript to retrieve the relevant information.
- **Privacy and Legal Considerations:** VoxScript must respect privacy laws and copyright restrictions. It cannot access private information or content that is protected by copyright without the necessary permissions.
- **Dependent on Internet Connection:** Since VoxScript operates online, it requires a stable internet connection to function. If the internet connection is unstable or slow, this could impact the performance of VoxScript.
- **Limited by Knowledge Cutoff:** VoxScript's knowledge is cut off at a certain date (as of my training, the cutoff was September 2021). For information beyond this date, it relies on real-time data retrieval which may not always be accurate or complete.

## 2.3 Plugin 2: Wolfram Alpha

Wolfram Alpha is a computational knowledge engine created by Wolfram Research. It's designed to answer factual queries directly by computing the answer from structured data, rather than providing a list of documents or web pages that might contain the answer as a search engine might.

Wolfram Alpha uses a vast amount of curated data, algorithms, and is built on top of the symbolic mathematical computation program Mathematica, which allows it to provide responses based on factual data, perform calculations, generate visualizations, and more. It's capable of responding to a wide variety of topics, including mathematics, science, geography, history, and many others.

### 2.3.1 How to start

See 2.2.1

### 2.3.2 Capabilities

- **Querying Scientific Data:** The plugin allows users to query a wide range of scientific data and calculations from various domains like chemistry, physics, mathematics, and more. This can be helpful in finding specific scientific facts or conducting calculations related to the literature research.
- **Definitions and Concepts:** With the plugin, users can obtain definitions and explanations for scientific terms, concepts, and theories. This feature assists in understanding complex scientific concepts encountered during literature research.
- **Computational Knowledge:** The Wolfram Alpha plugin provides access to Wolfram's vast computational knowledge database. Users can leverage this feature to perform computations, analyze data, and generate visualizations, aiding in understanding and interpreting research findings.
- **Cross-Domain Connections:** The plugin enables users to explore connections and relationships between different scientific fields. It allows for cross-domain searches and offers insights into how different areas of research relate to each other.
- **Fact-checking:** Wolfram Alpha has an extensive database of information across many different fields. You can use it to verify facts or find additional information on a particular topic.



- **Calculations and Data Analysis:** If your research involves mathematical calculations or data analysis, Wolfram Alpha can perform these tasks efficiently. It can also create charts and graphs to visualize data.
- **Historical Data:** Wolfram Alpha has access to a wide range of historical data, which can be useful in researching historical topics.
- **Scientific Information:** Wolfram Alpha is particularly strong in the areas of mathematics and the sciences. If your research requires scientific information, Wolfram Alpha can be a valuable resource.

### 2.3.3 Limitations

- **Restricted Data Coverage:** The Wolfram Knowledge base is curated by experts on the basis of primary sources. In this way, the factual correctness of the data can be ensured. But this also limits the up-to-dateness and the total volume of the curated data.
- **Knowledge Blackbox:** All plugins of ChatGPT work by giving a response to a certain input query, which ChatGPT formulates itself. In the case of an execution of a mathematical computation or an algorithm, ChatGPT thus doesn't see what happens inside the black box of Wolfram Alpha and can therefore not draw its own conclusions or even improve its understanding.
- **Query Inconsistency:** When constructing a query for the Wolfram Alpha Plugin, a degree of randomness is inherently involved. This can occasionally lead to variations in the queries, subsequently resulting in slightly different outcomes.
- **Limited Literature Search:** The plugin's main strength lies in its ability to process queries and provide specific computational information, but it may not offer comprehensive literature search capabilities[5] Therefore, users may need additional tools or databases to conduct more extensive literature reviews and searches specifically tailored for their research purposes.

## 3 Bing Chat

Contrary to ChatGPT, we cannot directly use the response from Bing Chat here, as it already contains an error. Bing Chat indicated that the crawler uses the Microsoft Academic Graph, which Microsoft has already discontinued. On Microsoft's website, it states: "Bing searches the entire web for relevant content and then synthesizes the results into a useful response. It also provides the respective sources, and you are presented with links to the relevant web content." [bin, 2023]

### 3.1 How to start

Just as with ChatGPT, there is no need, nor requirement, to install "Bing Chat". The chatbot can be found on [www.bing.com](http://www.bing.com), specifically under the "Chat" tab.

### 3.2 Capabilities

Since Bing Chat also uses GPT-4 as its LLM, several advantages and disadvantages are quite similar. However, the two models perform with varying proficiency in the individual subdomains. Hence, we can mention aspects such as assistance in literature review, framing research questions, help in formulating hypotheses, multi lingual and preparation in grammar and spelling.

- **Partial access to Scientific Publications:** Through Bing's search engine, Bing Chat can access various resources on the Internet. Therefore, it is partially up-to-date, even though the LLM was trained with an older knowledge cut-off. However, one must always pay attention to the quality of the source, which is feasible due to Bing Chat's direct indication of the source.
- **Image Generation:** A desirable feature of Bing Chat is its ability to utilize DALL-E for image generation. This makes it relatively simple to generate AI-created images with the assistance of text.

### 3.3 Limitations

Once again, the limitations are very similar to those of ChatGPT. Thus, for Bing Chat, one can list the following points: Recency of Information, Accuracy of Information, Depth of Understanding, Critical Evaluation, Personalization, and Dependency on Query Formulation.

- **Recency of Information:** Even though the search engine significantly updates the timeliness compared to ChatGPT, the LLM, i.e., GPT-4, has also been trained with a knowledge cut-off. However, we were unable to find more specific details about this.
- **Restricted input size:** The maximum input size of a question to Bing Chat is restricted to a maximum amount of 2000 symbols.
- **Formatierungen wie Latex?:**

## 4 Copy.ai

To say it in the words of Copy.ai:

I am built using transformer models, specifically the GPT (Generative Pre-trained Transformer) architecture. This architecture allows me to understand and generate text based on the patterns and context in the training data. I have been trained on a diverse range of text sources to provide accurate and informative responses.

### 4.1 How to start

Utilizing this tool is as straightforward as the previously considered models. Simply navigate to the copy.ai website and complete the registration process. Once registered, you can operate the tool in the same manner as any other AI-based chatbot.

### 4.2 Capabilities

Like ChatGPT and Bing Chat, Copi.ai is a Transformer-based chatbot. For this reason, capabilities such as assistance in literature review, framing research questions, help in formulating hypotheses and preparation in grammar and spelling should also be mentioned here.

- **Specification of references:** Just like Bing Chat, Copi.ai also gives the references directly. This is because Copi.ai uses web search for some queries.
- **Web search:** Searches for parts of the user's query using a search engine on the internet, just like Bing Chat.

## 4.3 Limitations

The following points can be taken from before: Recency of Information, Accuracy of Information, Depth of Understanding, Critical Evaluation, Personalisation, and Dependency on Query Formulation.

- **Very limited free version:** The free version does not allow any more requests after only a few. Thus, a first test is not possible without directly paying 49\$ (as of 10.07.23).
- **Formatierungen wie Latex?:**

## 5 Research Rabbit

### 5.1 How to start

### 5.2 Capabilities

- **Find Connections:** For a given paper, it is very easy to find papers with similar content or the same authors. It is also possible to find the papers that are referenced and those that have referenced the paper.

### 5.3 Limitations

- **Starting Point:** Although it is possible to search for papers with Research Rabbit, the choice of the starting paper lies with the user.
- **Actuality:** Recently published papers might have only few connections with respect to the content, authors, citations and references.

## 6 Connected Papers

Connected Papers is a visual tool that offers several capabilities for literature research.

### 6.1 How to start

Go to [www.connectedpapers.com](http://www.connectedpapers.com) and start by searching for a "start paper" or specify one already found.

## 6.2 Capabilities

**Visual Overview:** Connected Papers allows users to get a visual overview of a new academic field. By entering a paper's title, the tool generates a graph that visualizes similar papers in the field. Each node in the graph represents a related paper, with the size indicating the number of citations received and the saturation representing the publication year. This feature helps researchers explore and navigate the existing literature in a specific field.

**Prior Works and Derivative Works:** Connected Papers can provide lists of "Prior Works" that heavily influenced a paper and "Derivative Works" that were strongly influenced by it. This feature allows researchers to follow the evolution of ideas and discoveries over time.

**Different Sorting possibilities:** The tool can sort related papers based on their title, authors, year, citations, references or similarity to origin. This allows users to easily find important, seminal works in a particular field or subject matter.

**Direct Access to PDFs:** When available, Connected Papers provides direct links to the full-text PDFs of the articles, making it easy to access the source material.

**Bookmark Papers:** Users can bookmark papers to review or read at a later time, creating a personal library of resources.

**Advanced Search:** The search function in Connected Papers allows researchers to find papers based on specific parameters such as author, title, or year of publication.

**Exploration Tool:** Researchers can use this feature to discover new papers and fields that they might not have come across in traditional literature reviews.

## 6.3 Limitations

**Coverage:** Connected Papers might not have complete coverage of all articles in every field of research. Some papers might not be available in the graph or database, especially if they are from less common sources or journals.

**Non-English Research:** The platform's functionality might be less effective or accurate when dealing with papers that are not in English or are from non-English sources.

**New Research:** Because the tool depends on citation networks, very recent papers that have not yet had time to gather citations may not appear in the graphical overview.

**Access to Full Text:** While Connected Papers provides links to full-text papers where available, it does not control whether the full text is freely accessible or behind a paywall. Users may still need subscriptions or institutional access for some articles.

**Graph Interpretation:** The graph-based representation requires users to have a basic understanding of how to interpret these visualizations. It might take some time for new users to get used to this way of representing relationships between papers.

**Seminal Works Identification:** The algorithm used by Connected Papers identifies seminal works based on shared citations. However, important papers that don't have a high number of shared citations may be overlooked.

## 7 Comparison

Here we didn't start yet. Welche Modelle kann man ggf. zusammen verwend?

## 8 Conclusion and Future Work

### References

[bin, 2023] (2023). [Online; accessed July 03, 2023] <https://www.microsoft.com/de-de/bing?form=MA13FJ>.