MetaInsight

An LLM-Powered Research Assistant

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1st Large Language Models
in Physics Symposium

LIPS

Hamburg,
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Outline

- Problem

- Proposed solution

- Case study - Topological Photonics

- Challenges faced

- Future improvements

Challenges I faced as A PhD student

Information Overload

Sorting through a vast array of articles left me uncertain about which ones were most relevant or essential to read.

Grasping Main Findings

Difficulty in distilling key insights from scholarly articles due to complex terminology and methodologies.

Navigating Research Trends

Difficulty in discerning the most pertinent articles led to significant time investment in understanding current research trends, advancements, and key challenges within the field.

Idea Validation

I often struggled to validate the feasibility and originality of my research ideas without proper guidance or access to reliable sources for validation.

Main Features

1. Topic summarization

- Concise summaries of research topics.
- Distillation of key information from extensive literature.

2. Litrature retrieval

- Ability to retrieve relevant scholarly literature based on user queries and topics of interest.
- Comprehensive coverage of the latest research developments and findings.

3. Trend analysis

- Identification of emerging themes and methodologies.
- Insightful analysis of research trends within a chosen field.
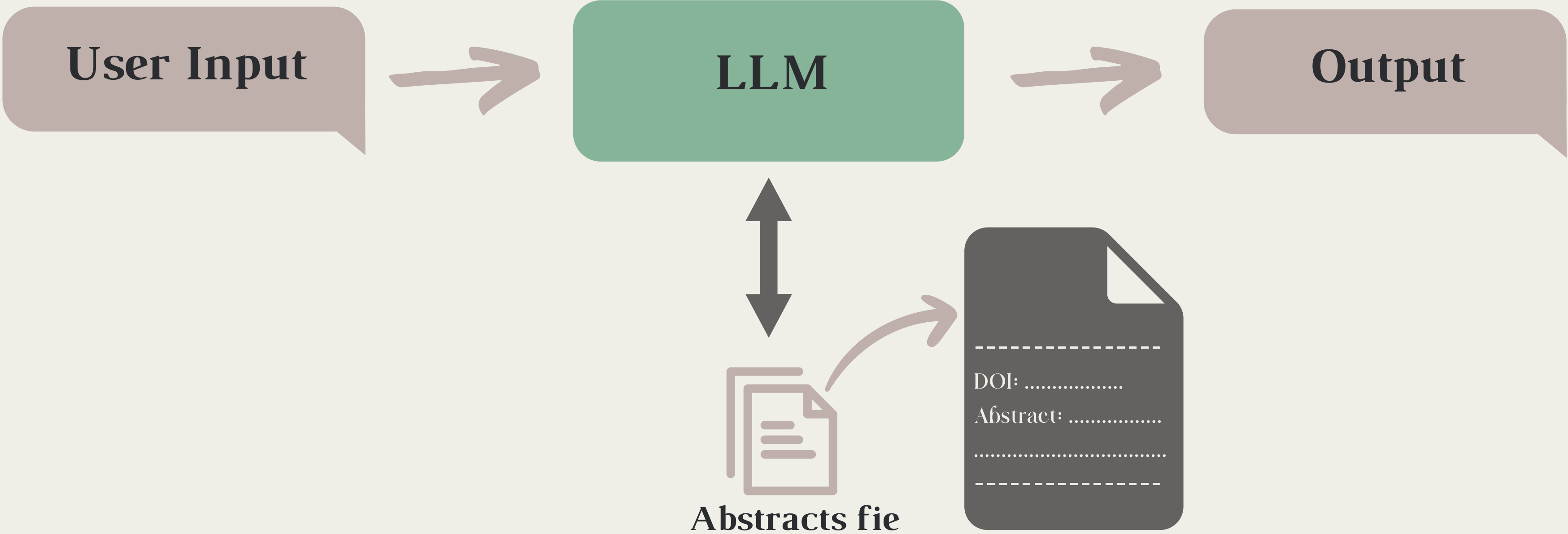
4. Research idea evaluator

- Rigorous evaluation of research ideas for originality and utility.
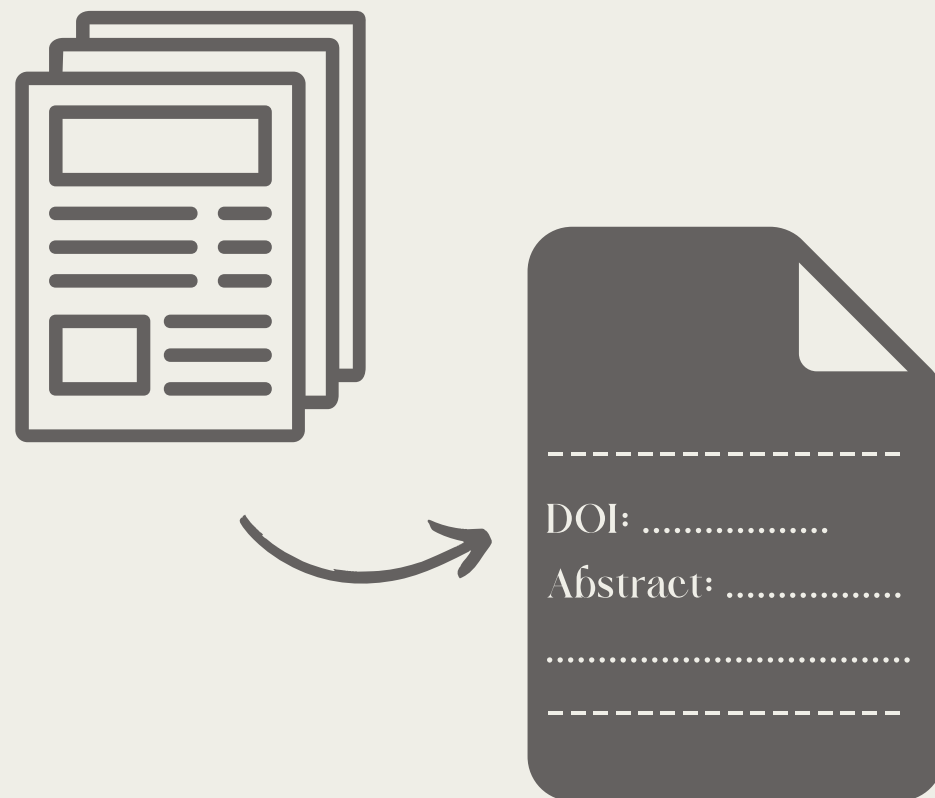- Assessment of difficulty level and resource requirements.
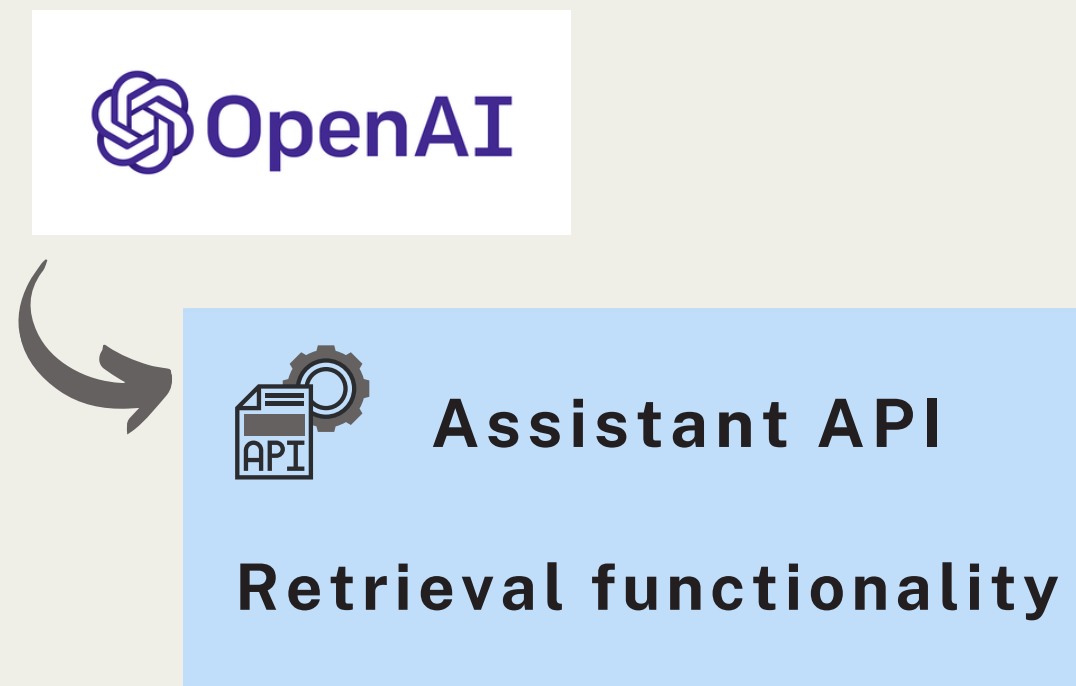
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General pipeline

User Input → LLM → Output

LLM ↕ Abstracts fie

DOI: ....
Abstract: ....
....
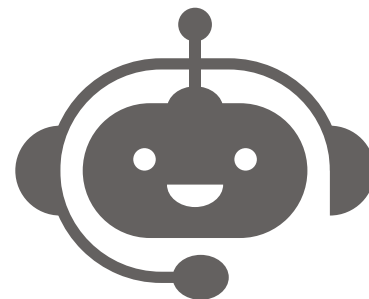
DEMO– Topological Photonics

1. Assembled all the search results related to the topic of "Topological Photonics"

2. Used the OpenAI assistant API with the retrieval functionality enabled

3. Built a simple Demo

DOI: ....
Abstract: ....

2347 Abstracts

OpenAI

Assistant API

Retrieval functionality

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Can you provide an overview of recent advancements in topological photonics?

Overview of Recent Advancements in Topological Photonics

The field of topological photonics has seen significant advancements and has emerged as a promising area of research with various potential applications. Here's a summary of the recent advancements based on the provided abstracts:

1. **Fundamental Science and Technological Applications**: Topological photonics seeks to control the behavior of light through the design of protected topological modes in photonic

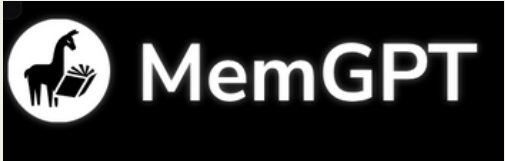How can I help you

https://meta-insight.streamlit.app/

Challenges & Improvements

Challenges

- Managing effectively the context window of the LLM
- The assistant isn't citing too many articles
- You can't engage in a long conversation before the history of conversations become too long

Future Improvements

- Integrate memGPT
- Use a small open source model (e.g., tinyllama, ...) instead of openai api
- Work on validating the pipeline used
- Include full articles, where possibe, instead of abstracts only.

Thank you!

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https://github.com/mohamed-elghafiani/meta-insight

https://meta-insight.streamlit.app/