

Query Understanding in LLM-based Conversational Information Seeking

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Management University

July 13, 2025

About Presenters



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@UvA



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@SMU

Participation and Q & A

- All tutorial slides are available at <https://sigiruser tutorial.github.io/>
- Throughout the tutorial, we will provide Q & A on sli.do



Tutorial Slides



Live Q & A



Tutorial this morning (in the same room)

Title: Conversational Search: From Fundamentals to Frontiers in the LLM Era

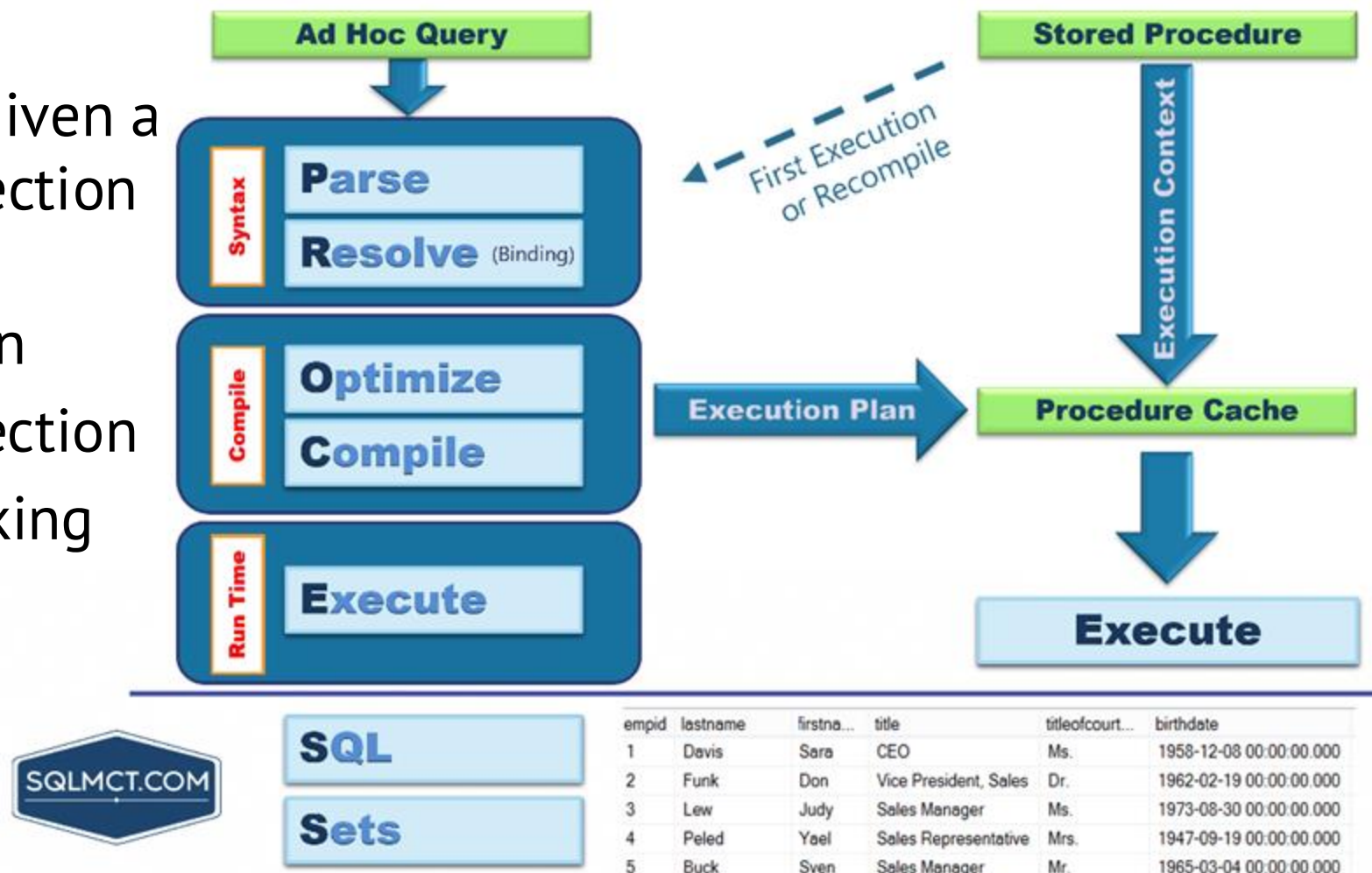
- **Revisited key aspects of conversational search:**
 - What it is, common paradigms, and mixed-initiative interactions.
- **Explored emerging topics in the LLM era:**
 - Reasoning , reflection, tool use beyond retrieval, and broader applicability (e.g., multi-lingual, multi-modal, and domain-specific scenarios like finance and law).
- **Highlighted promising future directions, including:**
 - Combining search with LLM-based generation, personalisation, automatic evaluation, and agentic search.

Let's start from a search scenario ...

Ad-hoc search:

Retrieving documents given a query from a large collection of documents

- ❖ Single turn interaction
- ❖ Static document collection
- ❖ Relevance-based ranking



Conversational Information Seeking (CIS)

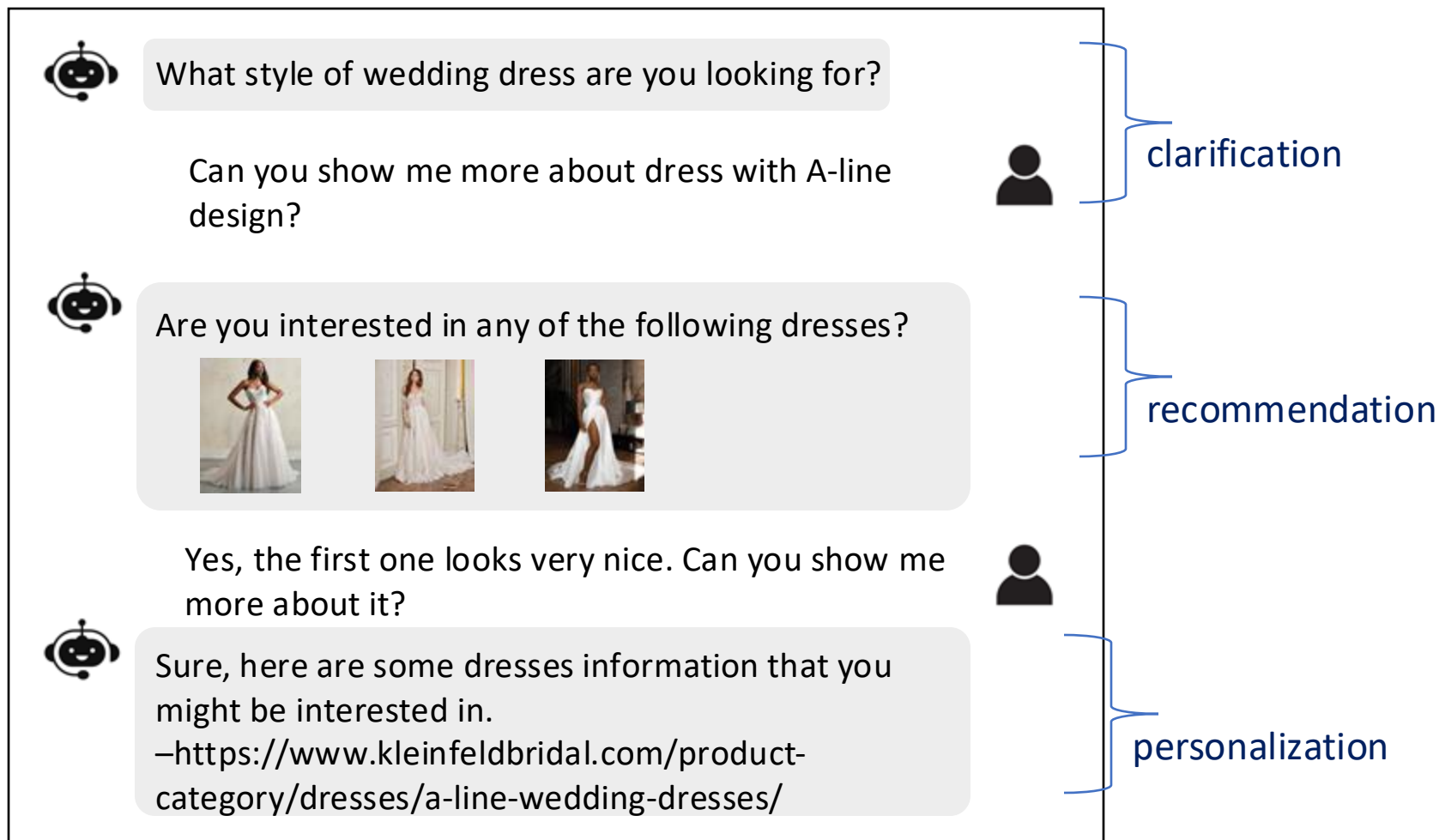


Query: Wedding Dress














Facet (User intention): Find information about wedding dress that fits me best.

Conversational Information Seeking (CIS) refers to the process of **interactively** seeking information through **natural, dialogue-based** interactions.



Query Understanding in CIS

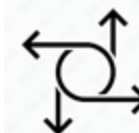
 Information Need (Facet) I'm looking for the Discovery Channel's dinosaur site, which has pictures of dinosaurs and games.	 Information Need (Facet) I'm looking for a list of all (or many of) the different kinds of dinosaurs, with pictures.
 Are you looking for dinosaur books?  No, just the discovery channel website.	 Are you looking for dinosaur books?  Yes, if they contain pictures of all the different kinds of dinosaurs.
 Are you looking for meat-eating or plant-eating dinosaurs?  I'm not sure. <div>✕ No answer</div>	 Which dinosaurs are you interested in?  I'm interested in any and all dinosaurs.
 Would you like to see pictures or videos of dinosaurs?  I'd like to see pictures of dinosaurs on the discovery channels website.	 Do you want a list of dinosaurs names?  Yes, I would also like the list to include pictures of the dinosaurs.

Single-turn
Interaction

Multi-turn
Interaction



Personalized



Dynamic



Context-aware

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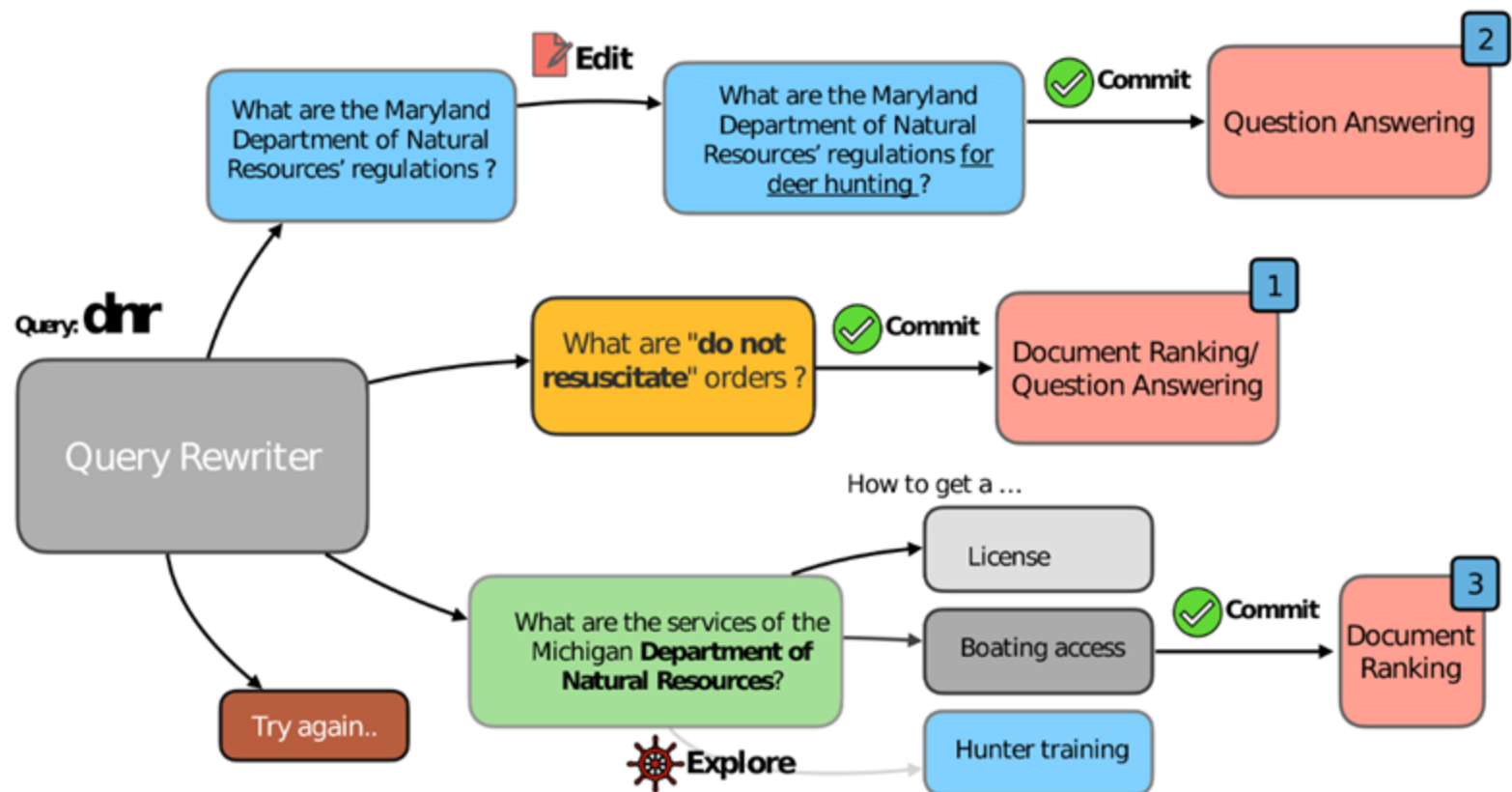
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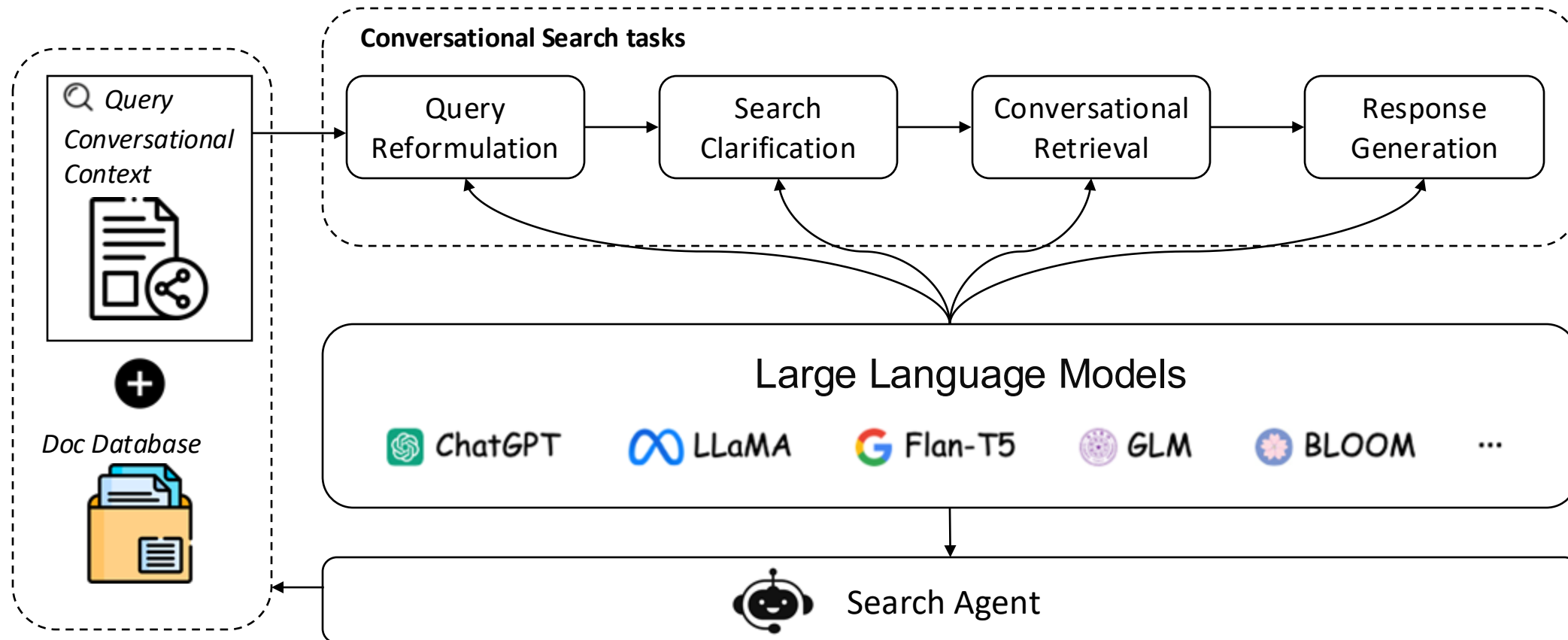
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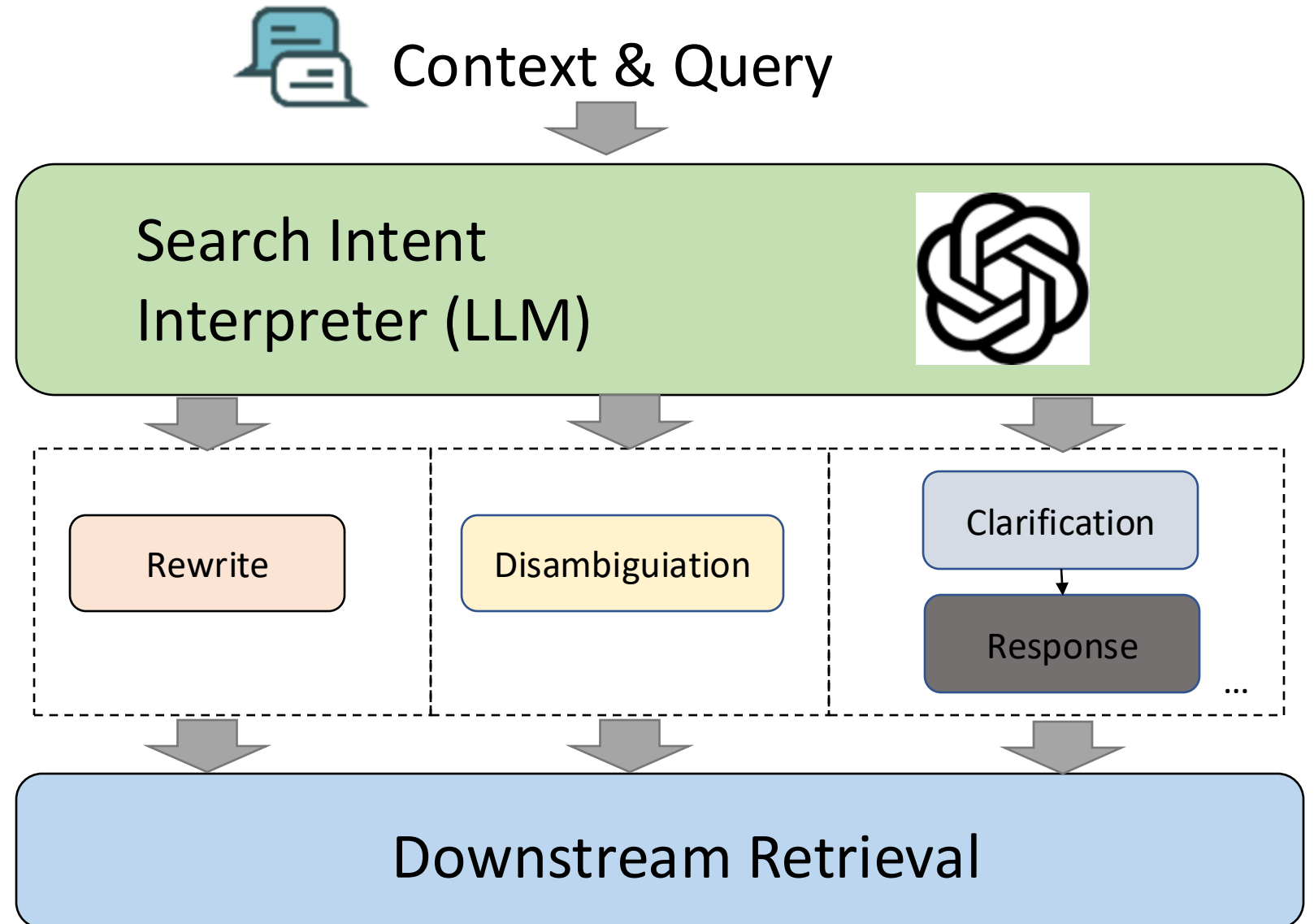
Query Understanding in LLM-based CIS



Query understanding in LLM-based CIS

Common Techniques:

- ❖ **Prompt Engineering**
- ❖ **Retrieval-augmented generation (RAG)**
- ❖ **Dialogue State Tracking**
- ❖ **User Simulation**
- ❖ ...





Goals of this tutorial

- We will cover a number of key developments on query understanding in LLM-based conversational information seeking
 - ★ **Problem Definition**
 - ★ **Technical advancements**
 - ★ **Evaluation**
 - ★ **Applications**
- In addition, this tutorial highlights several open challenges that remain unresolved in current query understanding methods for conversational information seeking



Tutorial Outline

Our tutorial was held from 14:00-17:30 on July 13 (all the times are based on CET = Central European time).

Time	Section	Slides
14:00—14:15	Section 1: Introduction and Background	[Slides]
14:15—14:50	Section 2: LLM-based Query Enhancement	[Slides]
14:50—15:15	Section 3: LLM-based Proactive Query Management	[Slides]
15:15—15:20	Q & A Session I	[Slides]
15:30—16:00	Coffee Break	[Slides]
16:00—16:30	Section 4: LLM-based Conversational Interaction	[Slides]
16:30—17:10	Section 5: Conversational Query Understanding Evaluation	[Slides]
17:10—17:25	Section 6: Summary and Outlook	[Slides]
17:25—17:30	Q & A Session II	