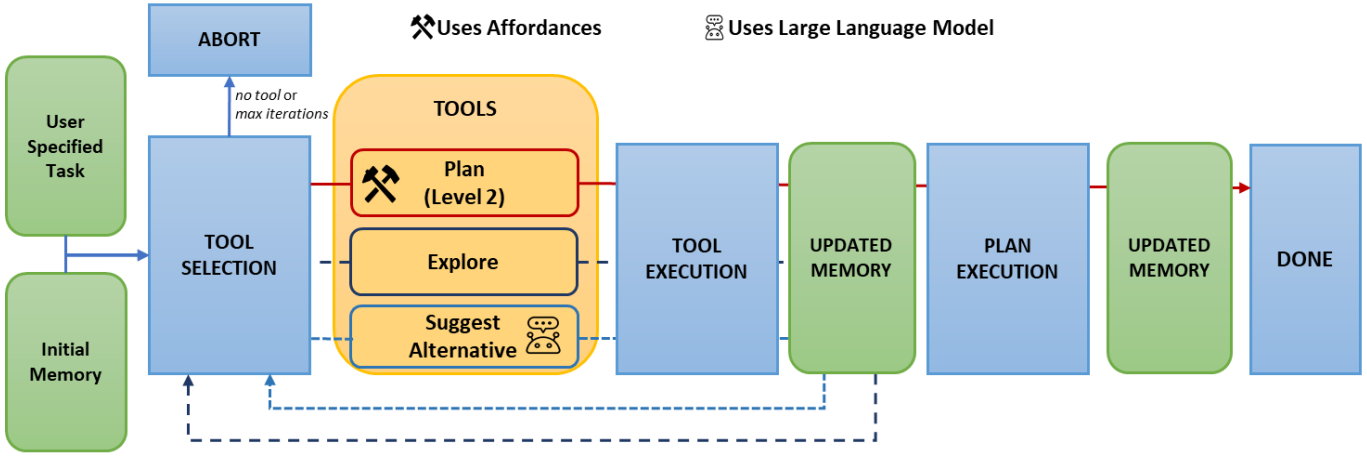
Karlsruher Institut für Technologie

AI, Data, Robotics Forum #ADRF24

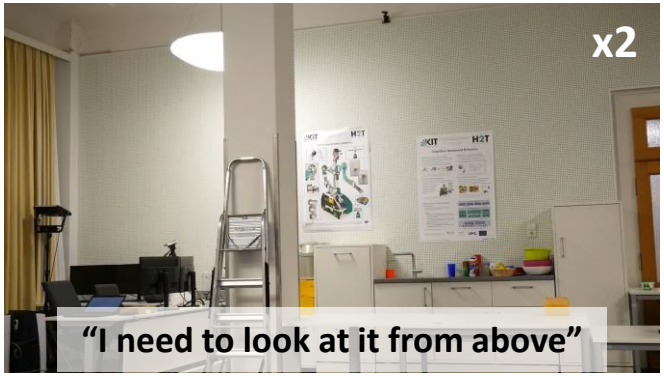
Hochperformante Humanoide Technologien

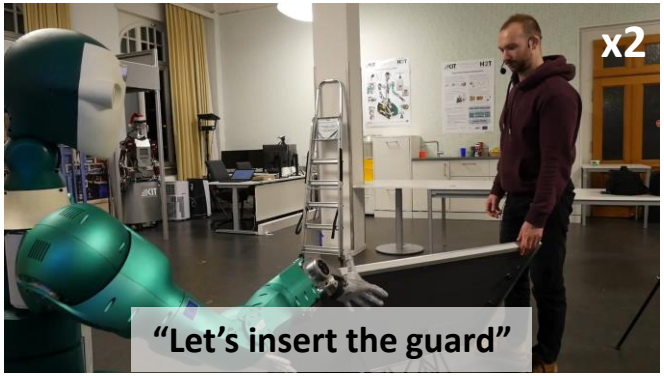
AutoGPT+P: Affordance-based Task Planning Using Large Language Models

Timo Birr, Christoph Pohl, Abdelrahman Younes and Tamim Asfour



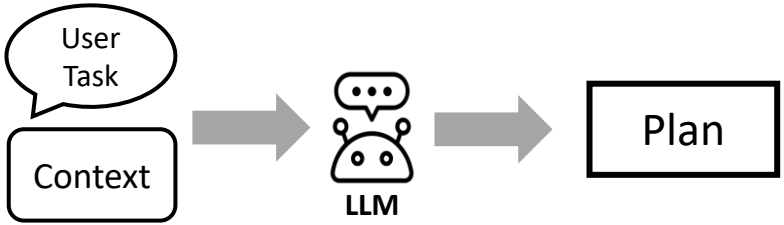
ARMAR-6: Recognizing the Need for Help





Large Language Models for Task Planning

LLM as Planner

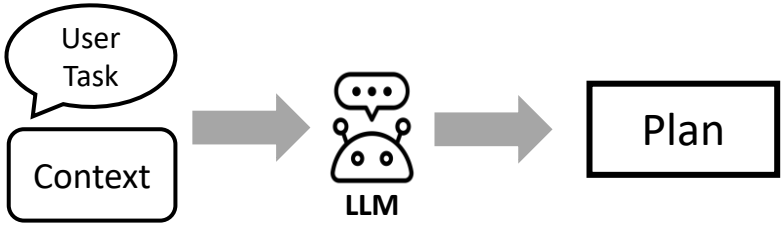


+ Dynamic handling of changing environment and reactions to errors
- Plans are not always optimal
- The LLM can cause the robot to perform unsafe actions

Incremental Learning from Natural Interaction

Large Language Models for Task Planning

LLM as Planner



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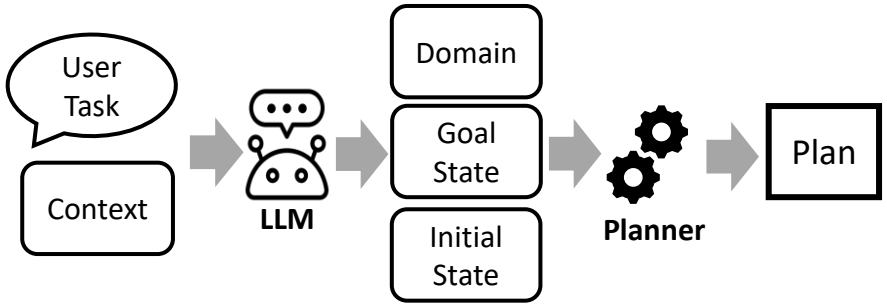
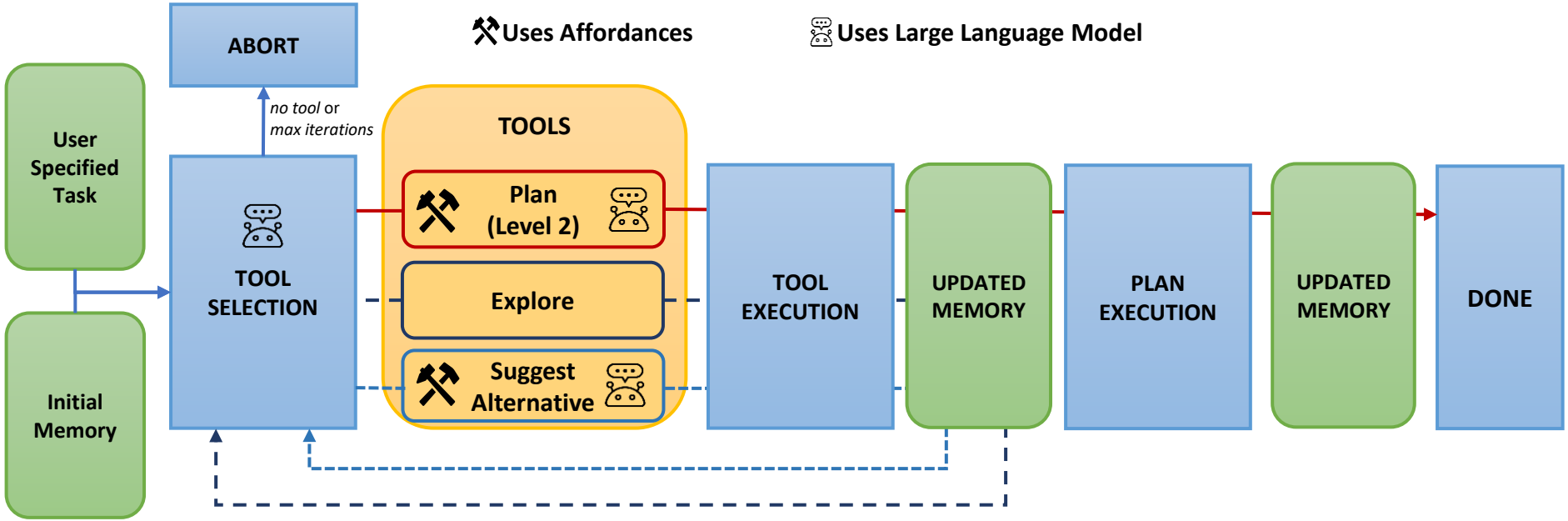
LLM with Planner



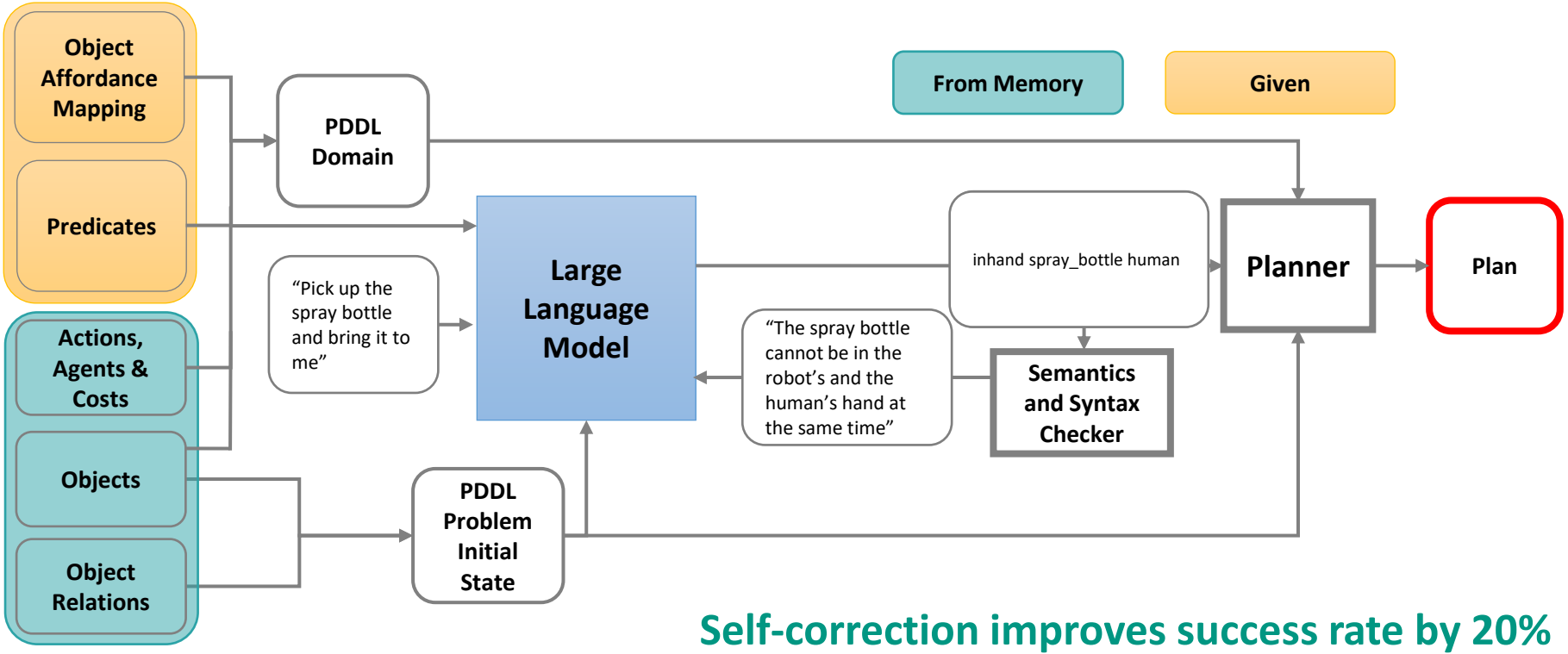
- Fails if robot has not detected all objects

+ Plans are always optimal
+ Definition and strict following of rules increases safety

AutoGPT+P: (Level 1) General Feedback Loop



AutoGPT+P: (Level 2) LLM+P with Self-Correction



Self-correction improves success rate by 20%

Takeaway Messages for Applying GenAI in I&M

1. For **robust** results make sure to have a **fault-tolerant** system in place that produces **human-readable** error messages

2. LLMs do make errors especially for difficult tasks, but are good at **self-correction**

3. Leveraging LLMs alongside rule-based system allows to combine the language processing capabilities of LLMs with the **reliability and explainability** of rule-based systems

Thanks for Your Attention!

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Link to the Paper

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