





UNIVERSITAT POLITÈCNICA **DE CATALUNYA** BARCELONATECH



PlanCollabNL: Leveraging Large Language Models for **Adaptive Plan Generation in Human-Robot Collaboration**

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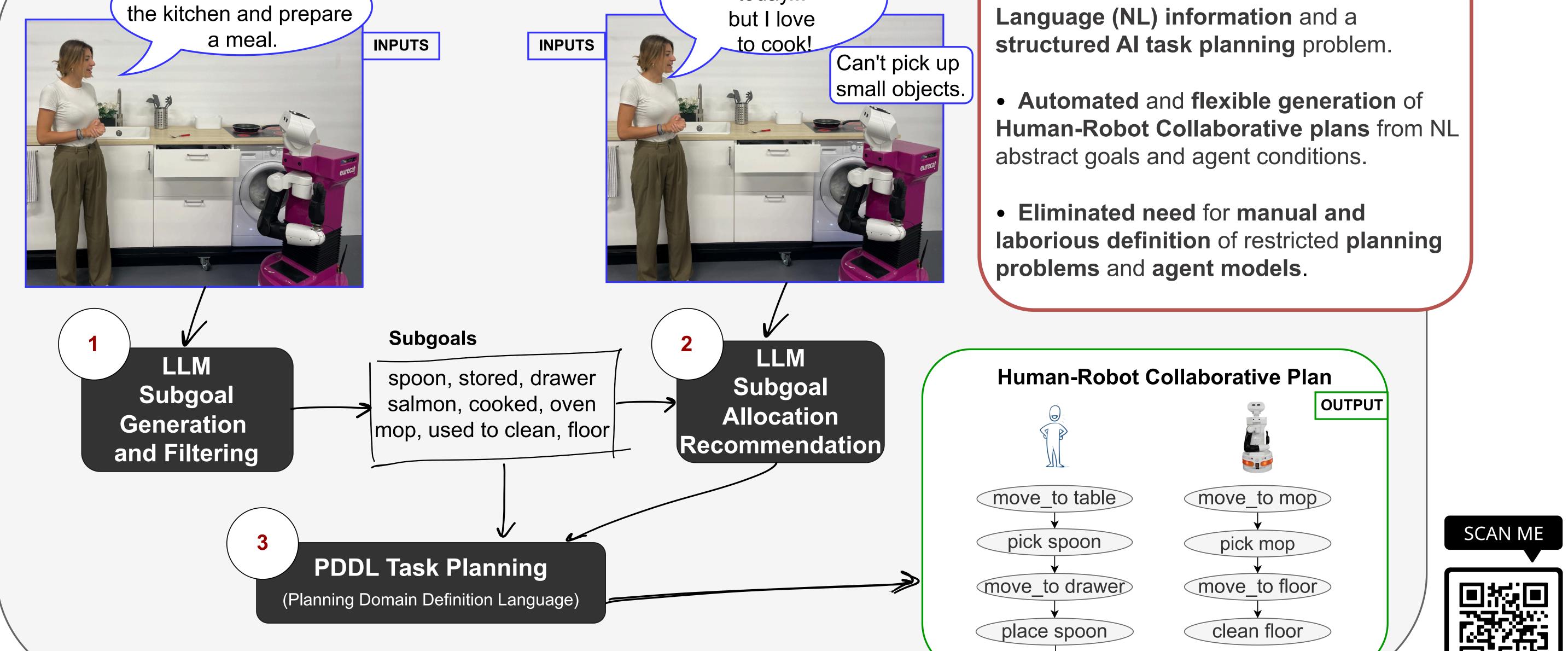
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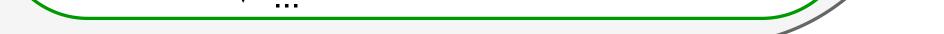
Human-Robot Collaborative Plan Generation from a Natural Language Goal and Agent Conditions

Hey robot, let's tidy up

have back pair todav..

LLMs as translators between Natural

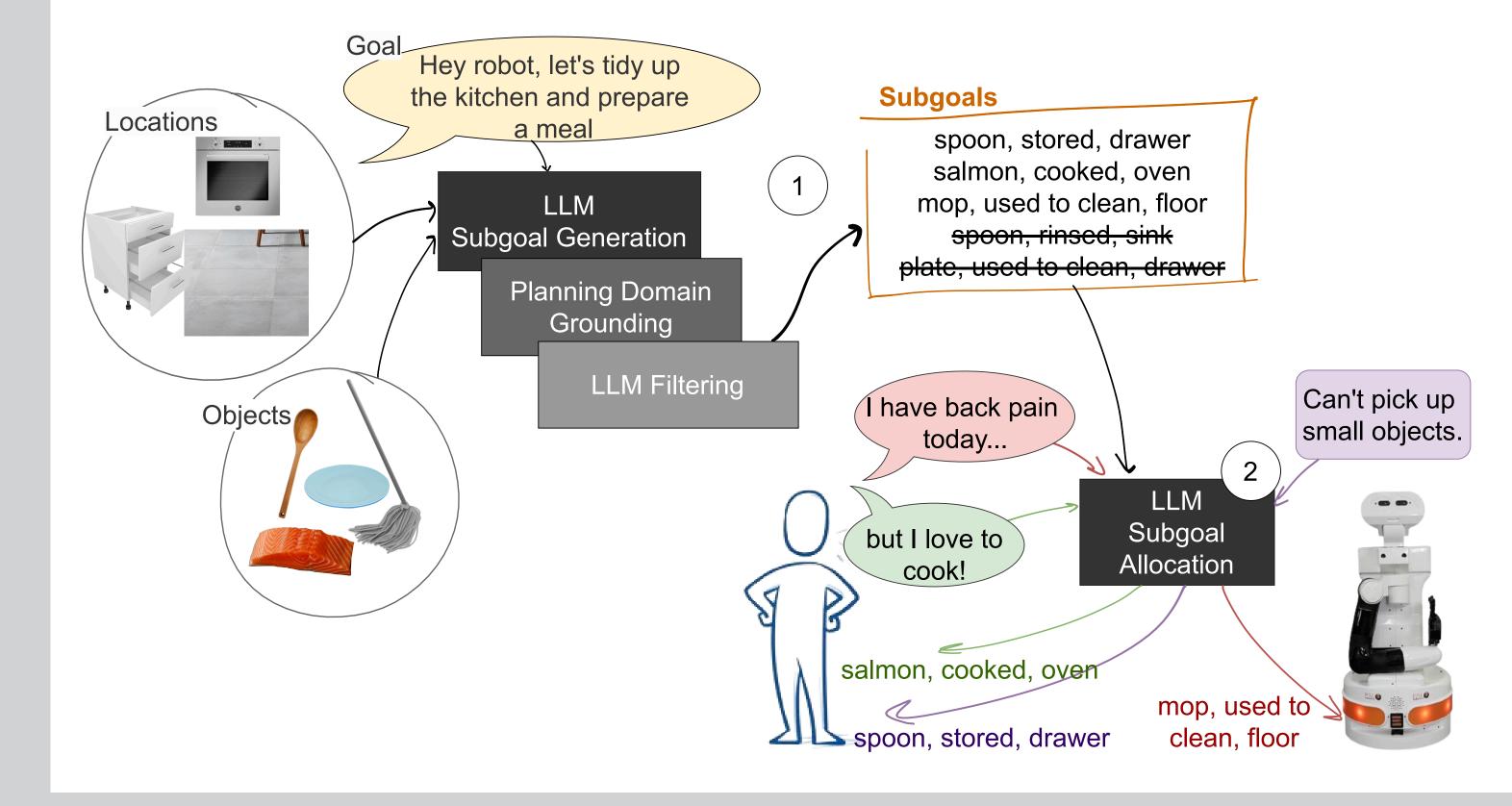






3

LLM-based 1) Subgoal Generation and 2) Allocation





PDDL problem **Planning Domain Definition Language** (:objects human robot - agent ; ... - obj ; from environment ; ... - loc ; from environment

(:init

(agent not busy robot)(agent not busy human)... (= (total-cost) 0)

; action costs from LLM recommendations based on agent states and preferences (stored cost robot spoon drawer 100); etc.

(:goal (and

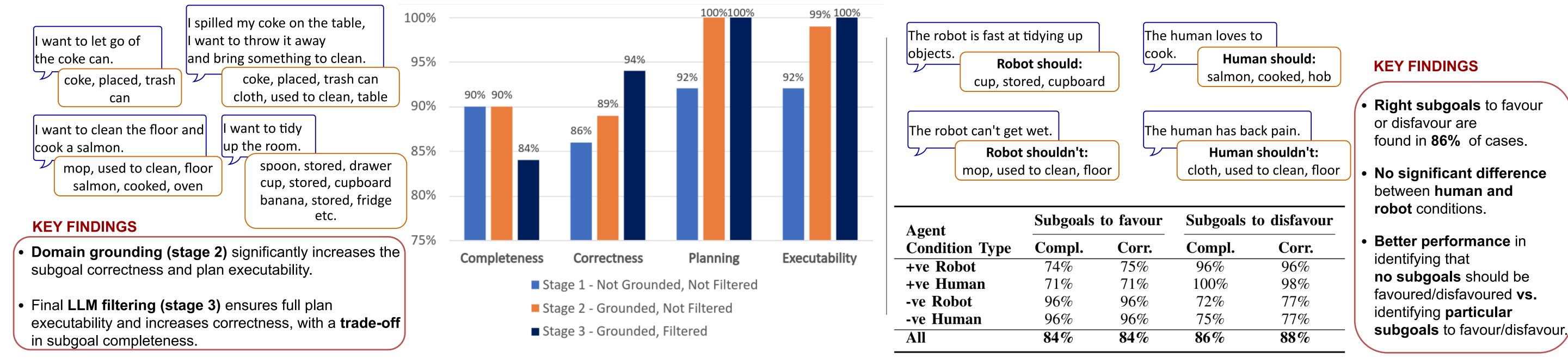
; goals from LLM based on environment (stored spoon drawer); etc.

Subgoal Allocation Recommendation

(:metric minimize (+ (* 1 (total-cost))(* 1 (total-time))))))



Subgoal and Plan Generation



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