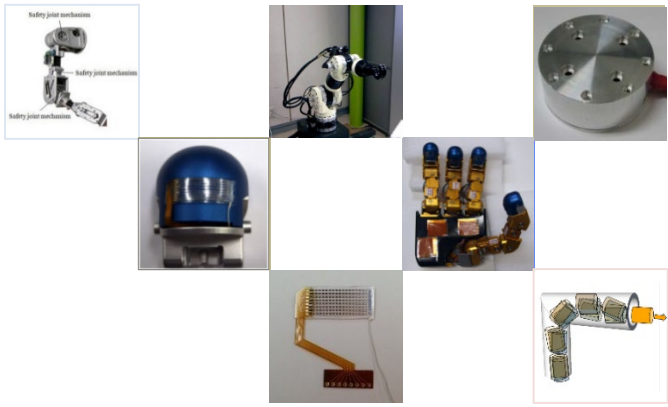
Robotics Engineering Research Center



Implementation of Obscured Object Grasping Using A PDDL Based Task-Motion Planner

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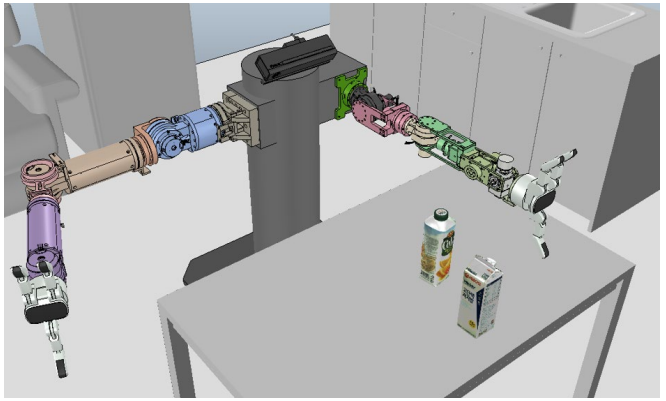
Objectives

- **Integrated Task-Motion planner system**
  - Recognition, Knowledge and Task manager modules
- **Automated planning with Knowledge inference and Action library**
- **Modularize the system with the ROS**
- **Implementation in Simulation environment**

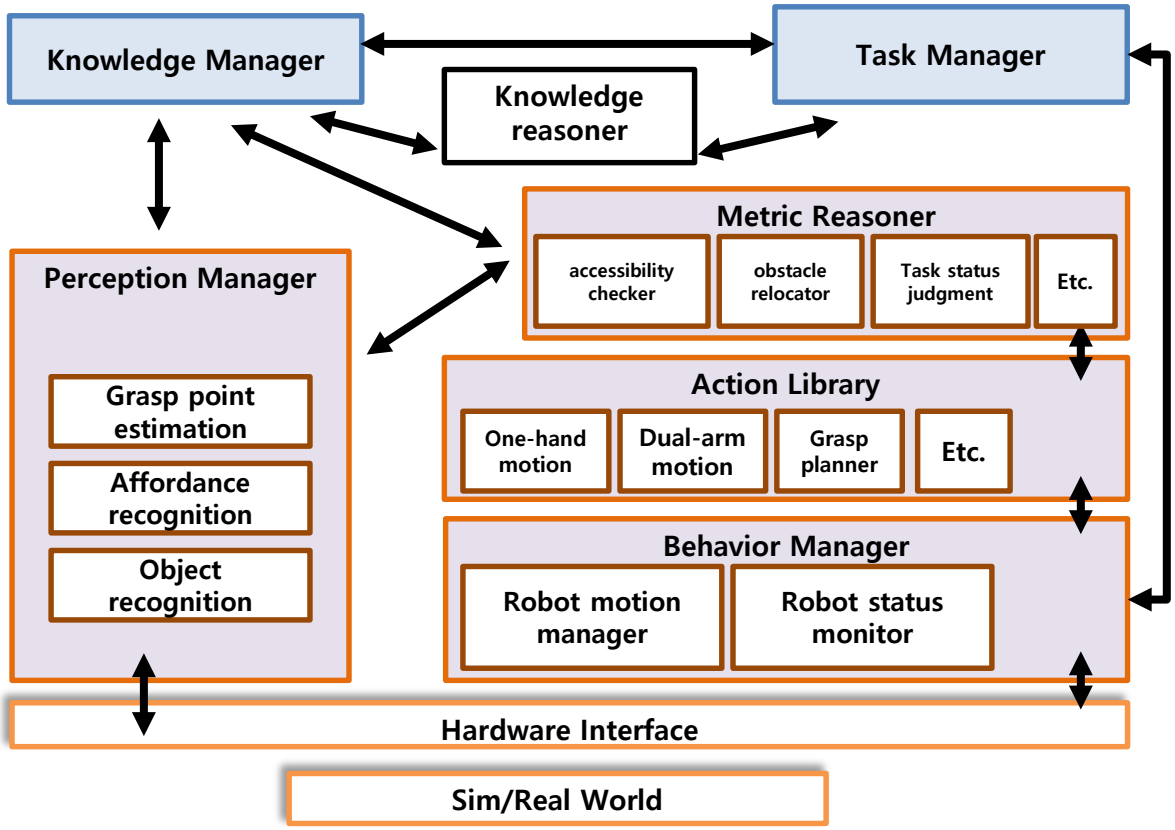


Demo scenario : grasp a blocked milk

System Overview

- **Integrated Task-Motion planner System**

  - Perception Manager
  - Knowledge Manager
  - Task Manager
  - Behavior Manager
  - Action library
  - Metric Reasoner

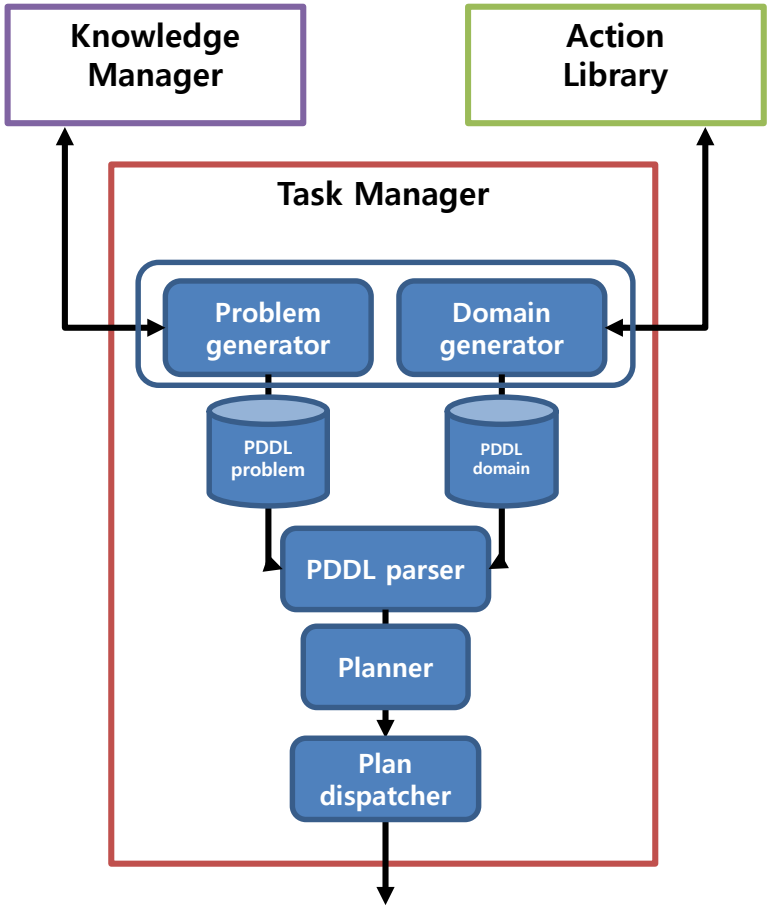


System Architecture

Planning System

- **PDDL based Task Planning**
  - Domain
    - ✓ Determine what actions are available
  - Problem
    - ✓ Describe the initial and goal state

- **Automated PDDL model generation**
  - Generate *Domain* and *Problem* files from Knowledge Manager and Action Library
    - ✓ Estimate the initial and goal with Ontology based knowledge inference
    - Get the action list from the Action Library that is applicable to the current robot platform

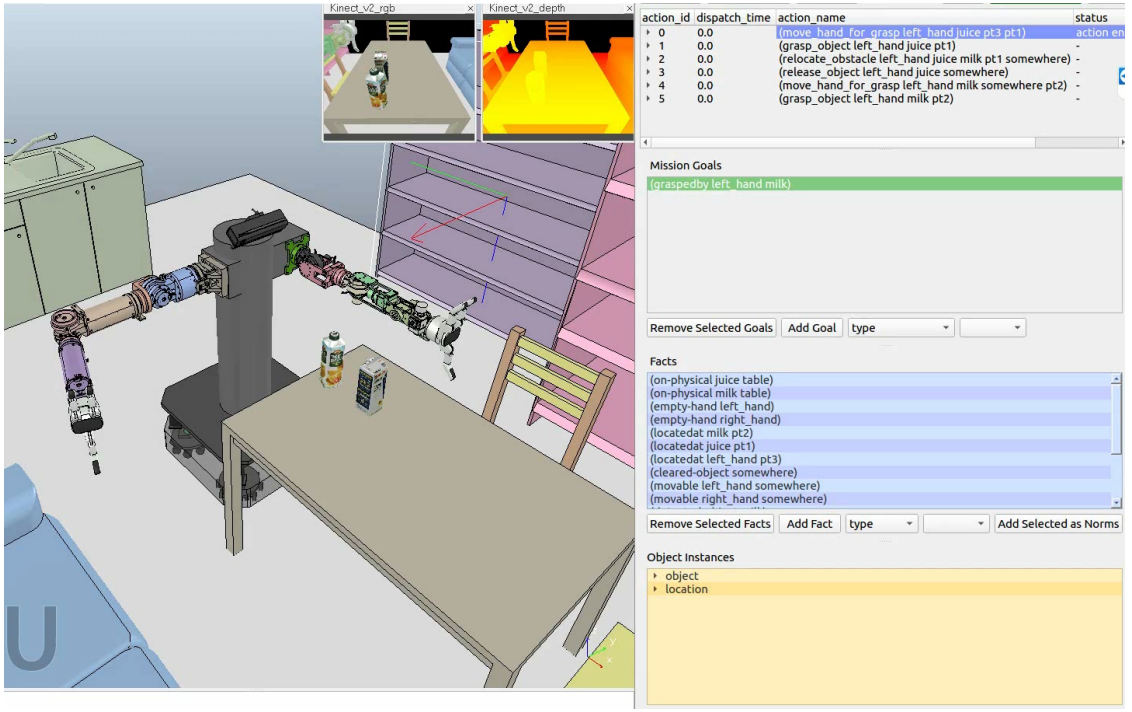


Task manager architecture

Results

- **V-REP simulation**

  - Goal state :
    - ‘grasp milk’
  - Task planning system
    - ROSPlan, Probe planner
  - Motion planning system
    - GraspIt, MoveIt



Grasping demo result

Thank you