Centro E. Piaggio
bioengineering and robotics research center

PACMAN
Probabilistic and Compositional Representations for Object Manipulation

WP 4
Grasping under uncertainty:
The Soft-Hand point of view

Hamal Marino, Carlos J. Rosales, Edoardo Farnioli,
Manuel Bonilla, Marco Gabiccini (with Mirko Ferrati,
Alessandro Settimi, Daniela Resasco)

High-Level Planning for Object Passing

Obj. recognition + Pose estimation

Hamal Marino, Mirko Ferrati, Alessandro Settimi, Carlos Rosales, and Marco Gabiccini,
High-level Planning for Dual Arm Object Passing Tasks, Submitted to IROS 2015

Workspaces and Reachability

Target: I can reach it only with my LEFT hand!

Source: I can reach it only with my RIGHT hand!

Quantized possible grasps…

Left Hand

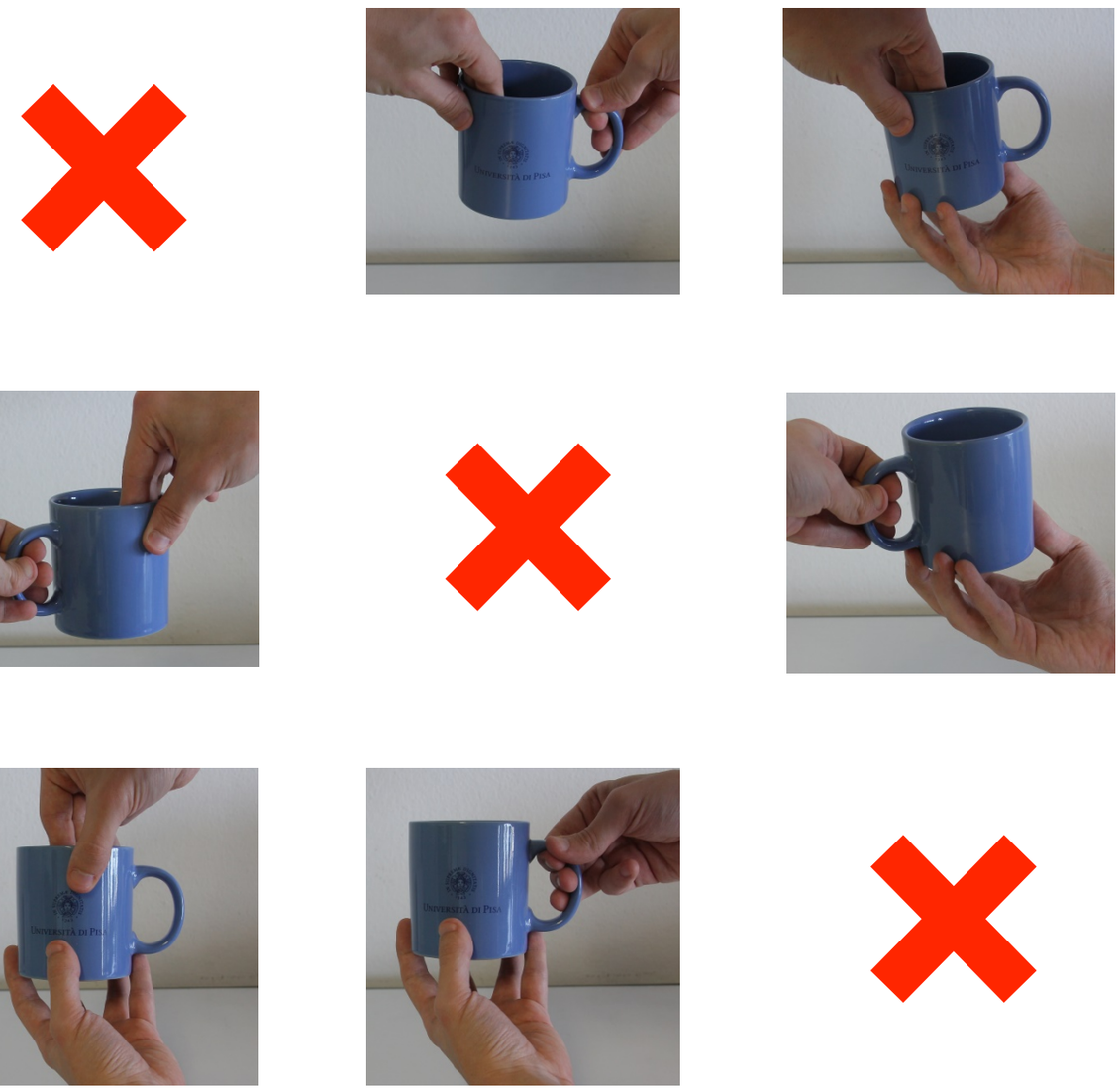
Right Hand

… and “table grasps”!

PACMAN

Mobility

…and associated feasible exchange!



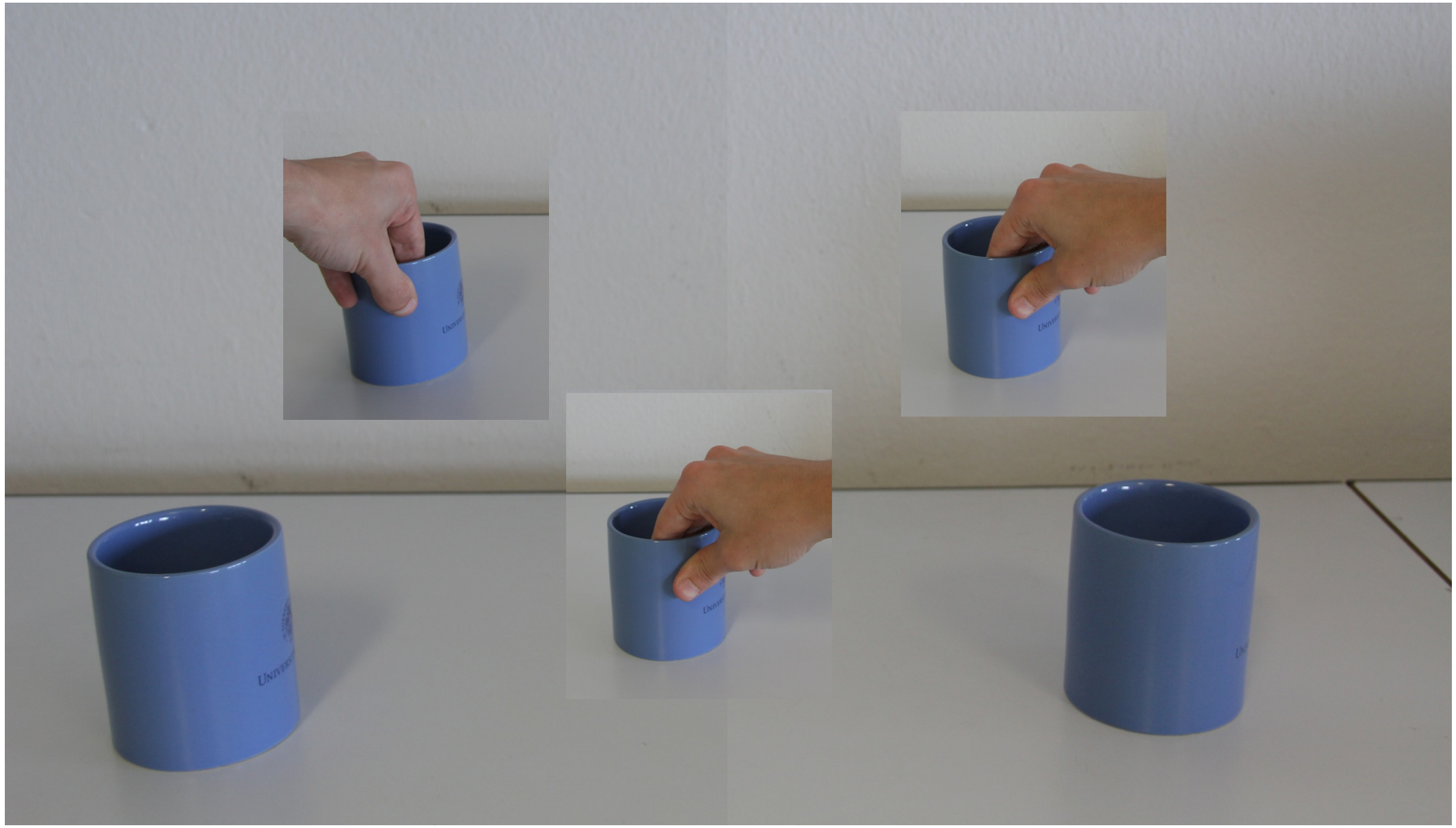
A possible sequence of actions…

Semantic planning + backtracking → Motion planning + execution

…but execution may differ!

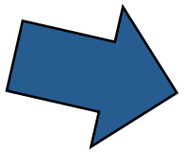
Object Tracking

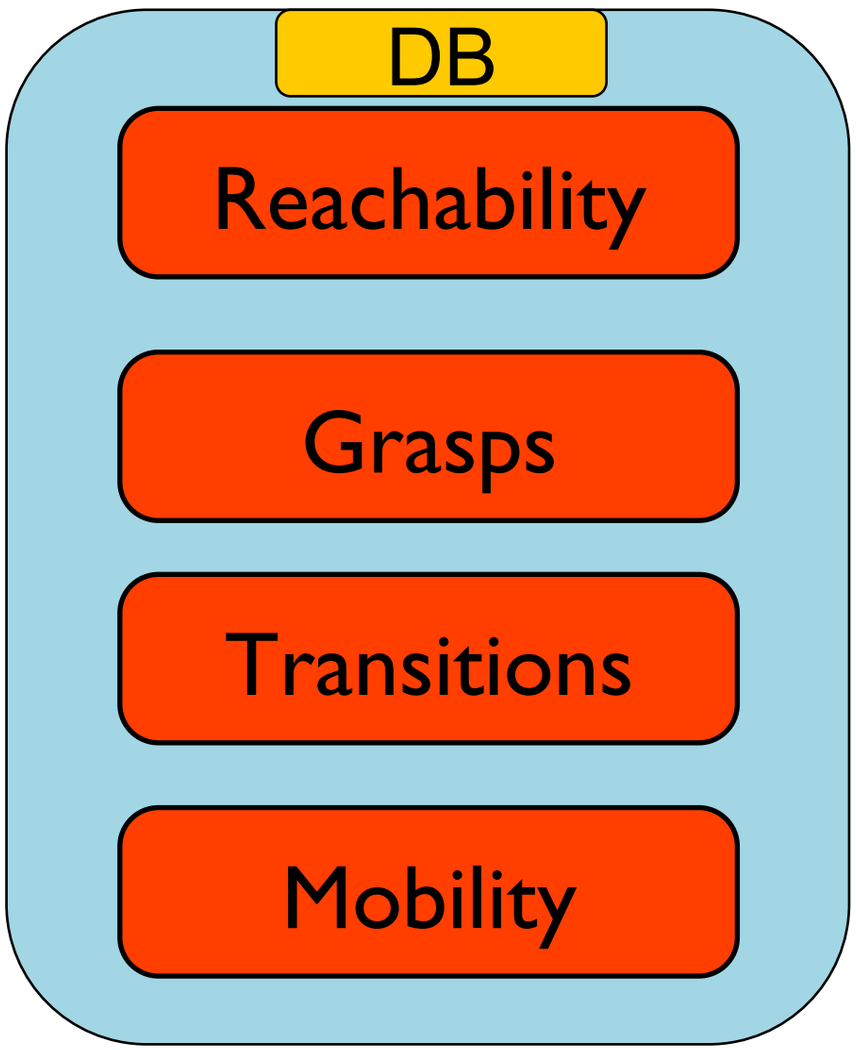
A different target

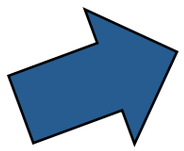


Action scheme

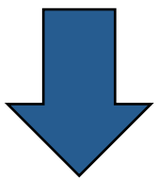
Obj. recognition +
Pose estimation







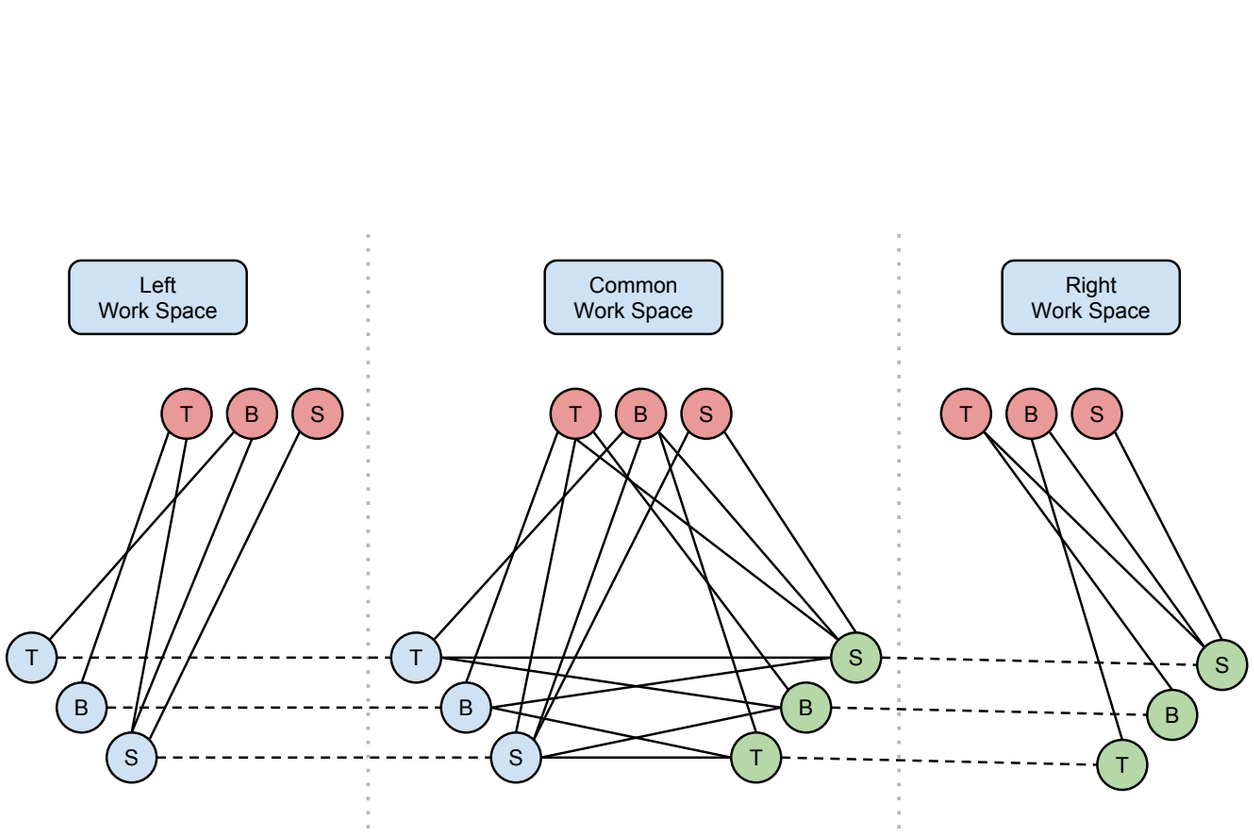
Semantic planning
+ backtracking

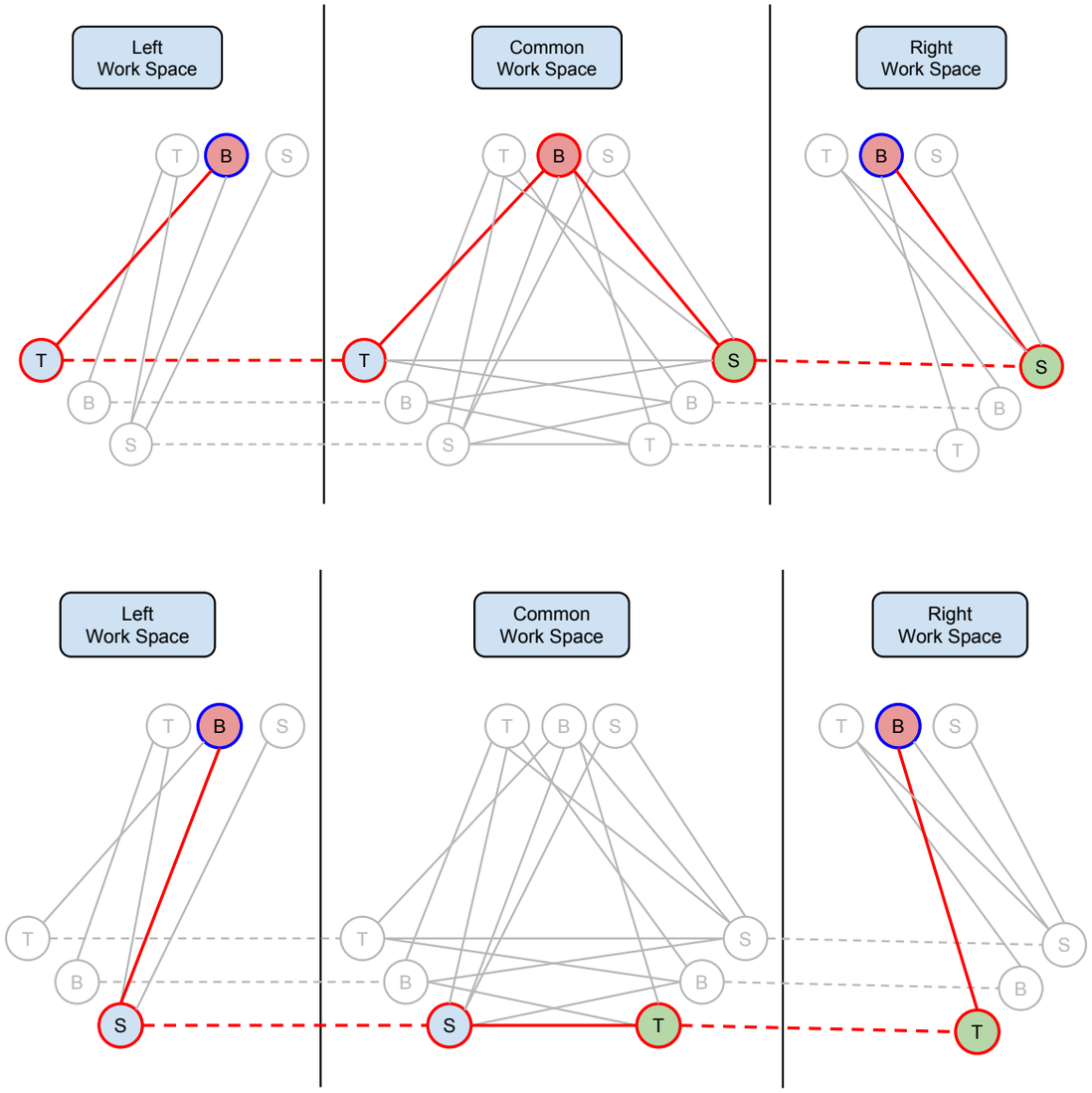


Motion planning +
execution

Obj. tracking +
Reactive strategies

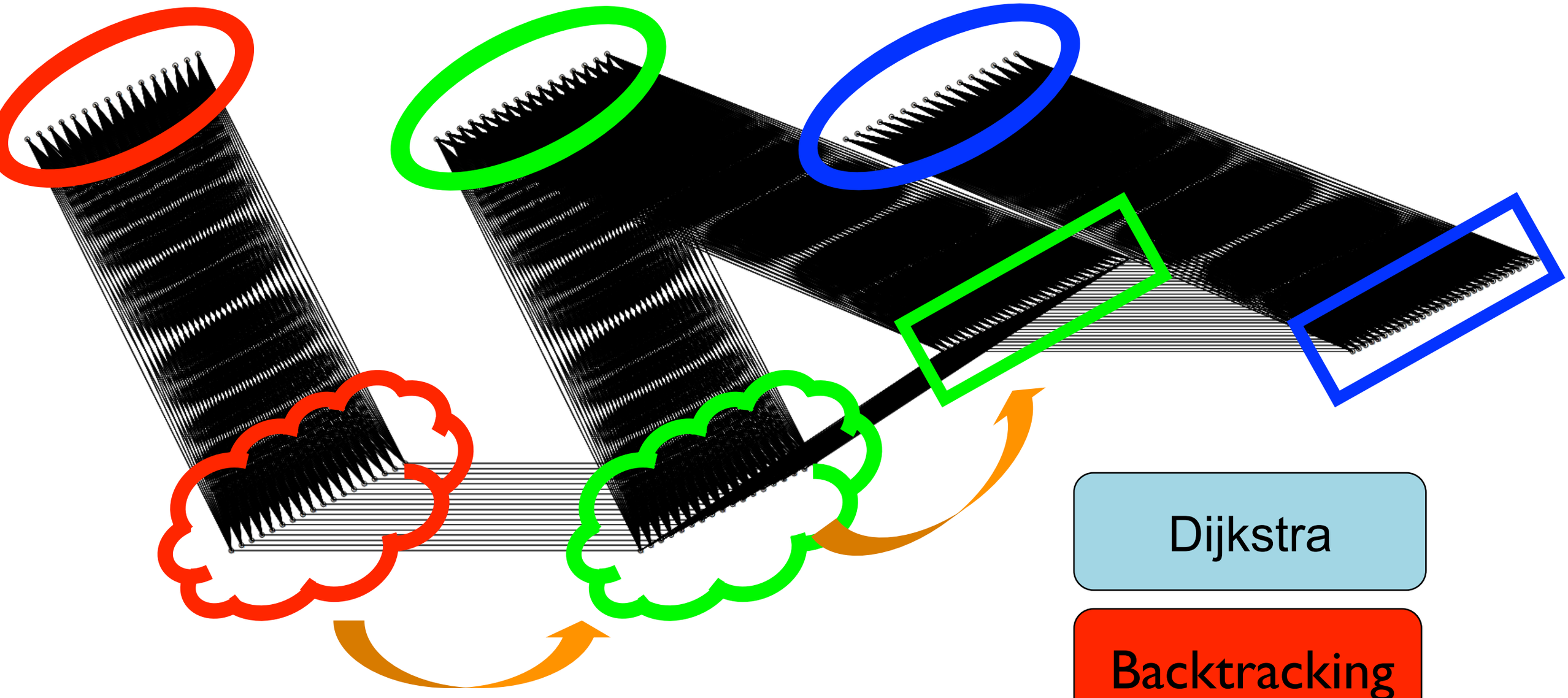
Semantic Planning





Semantic Planning

PACMAN



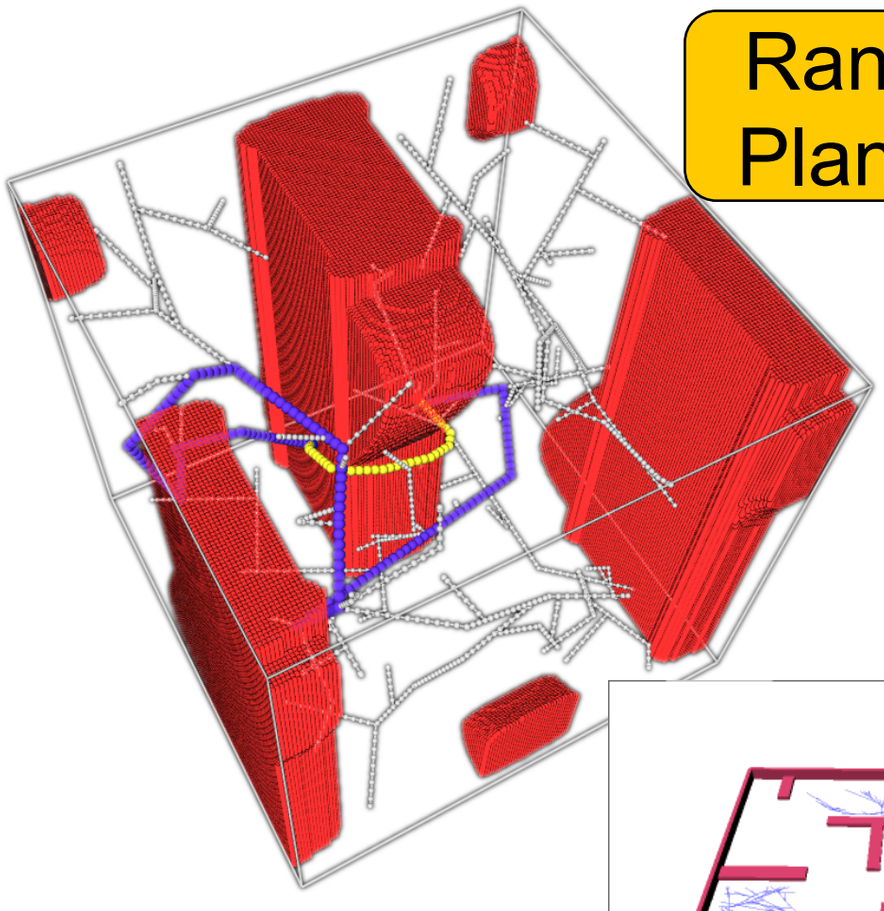
Dijkstra

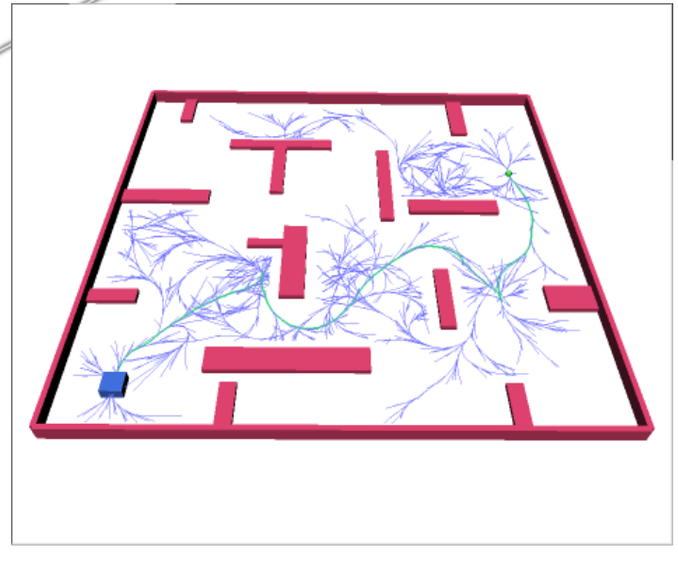
Backtracking

Motion planning and execution

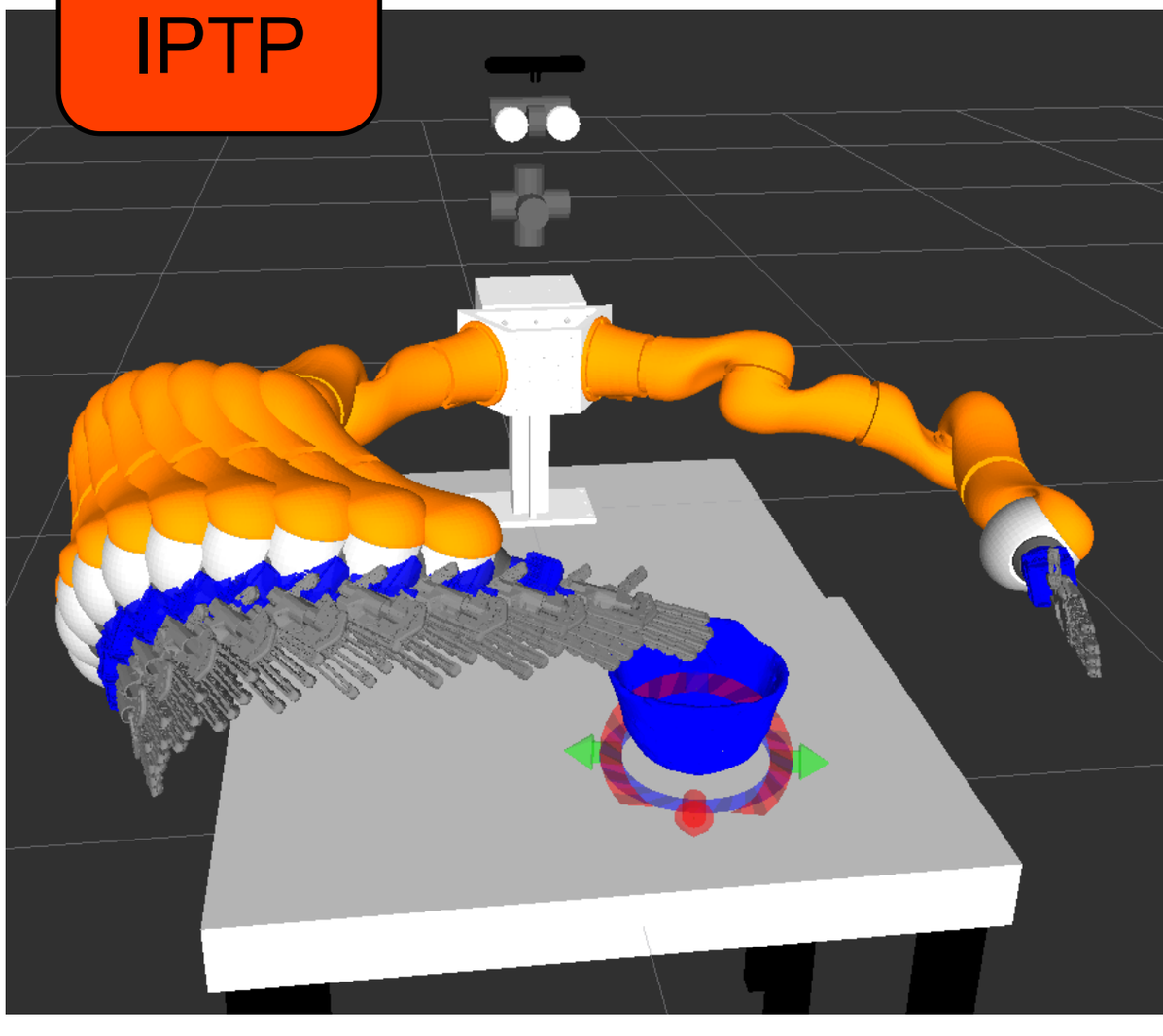
PACMAN

Random Planners





IPTP



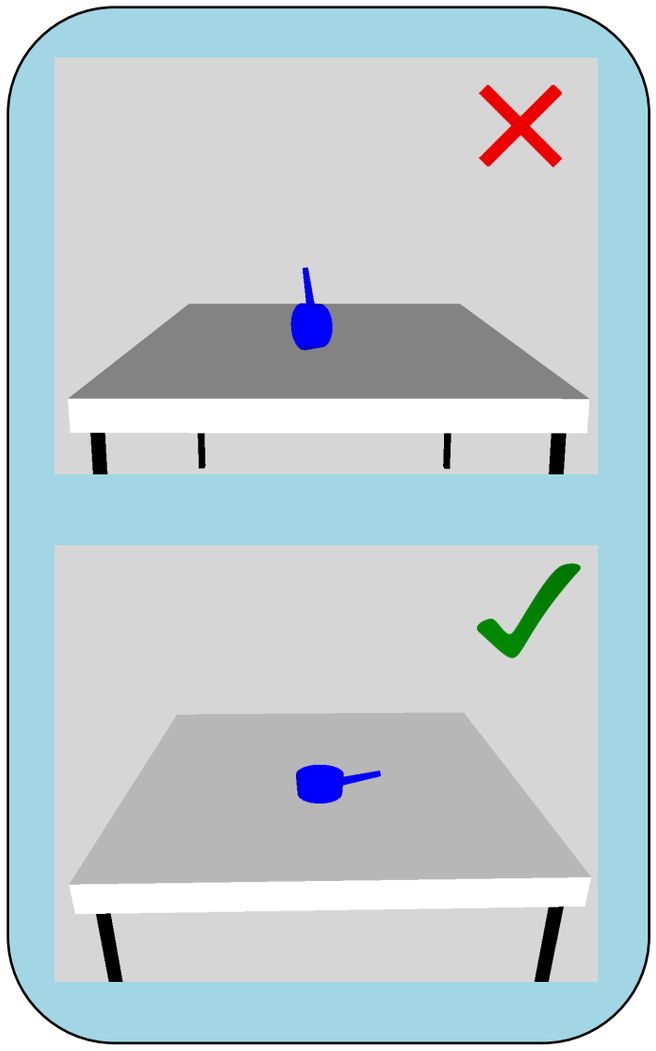
A full run

WP 5 - Task 5.3 DEMO

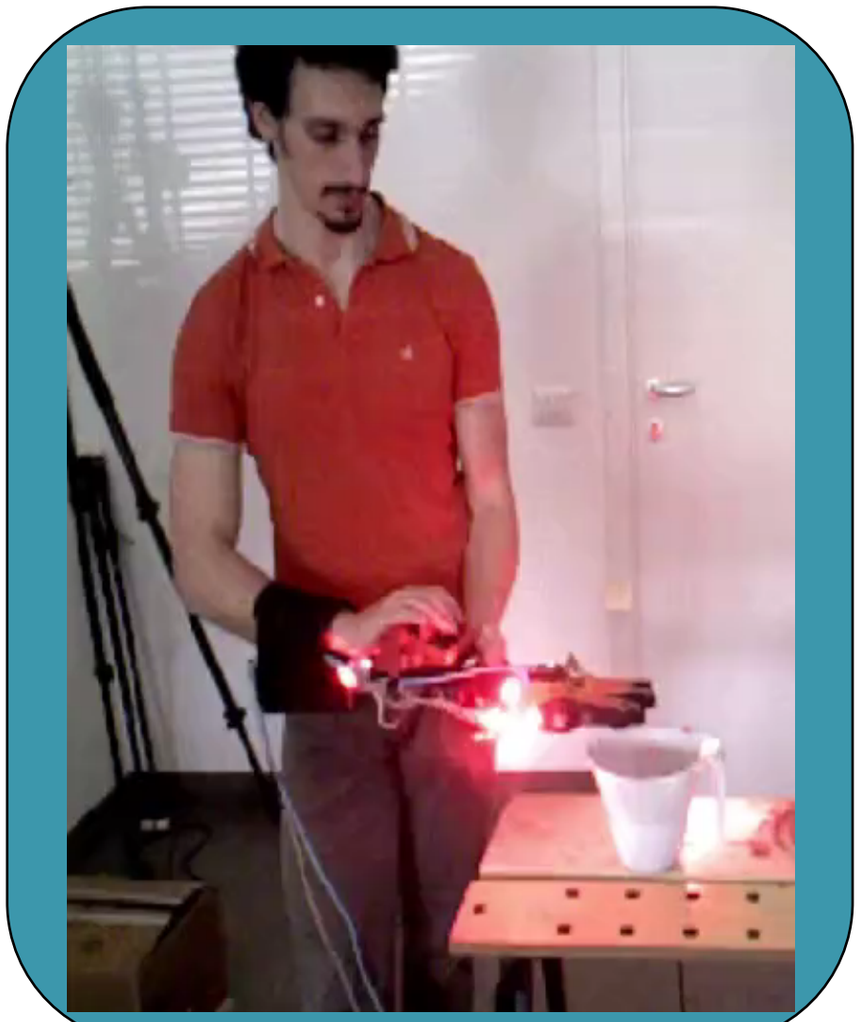
Moving objects from
one location to another
by bimanual object passing
(if needed)

How to build the DB?

Table grasps



Hand grasps

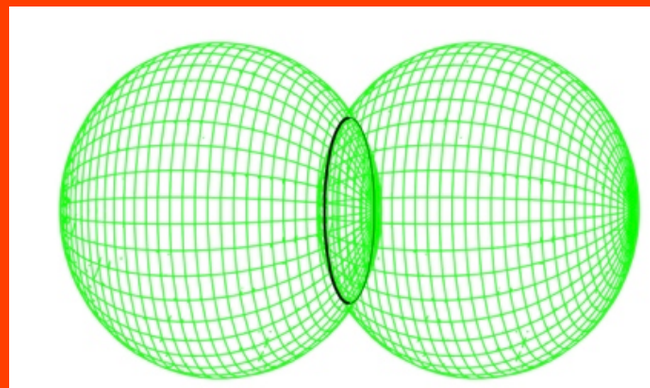


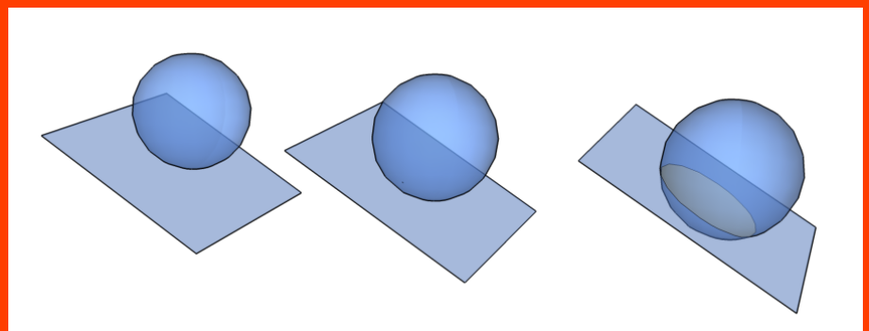
How to build the DB?

“Generalization”

Transitions

To be improved!





Future Work

Integrate different grasp generation methods

Improve the automatic transitions generation

Consider different costs and different types of transitions