



# Workspace Analysis

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#### Applications: Kinematic Workspace Analysis

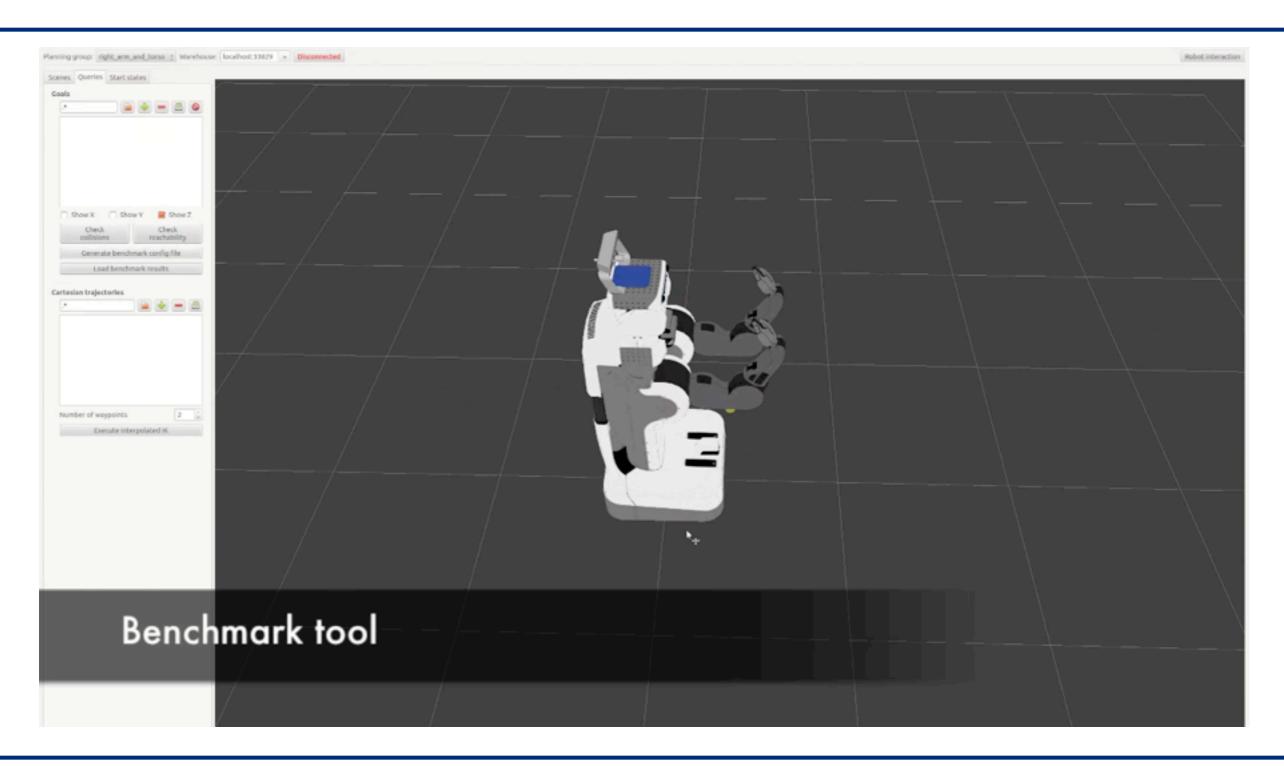
- Robot Design Evaluation
- Robot Workspace Placement



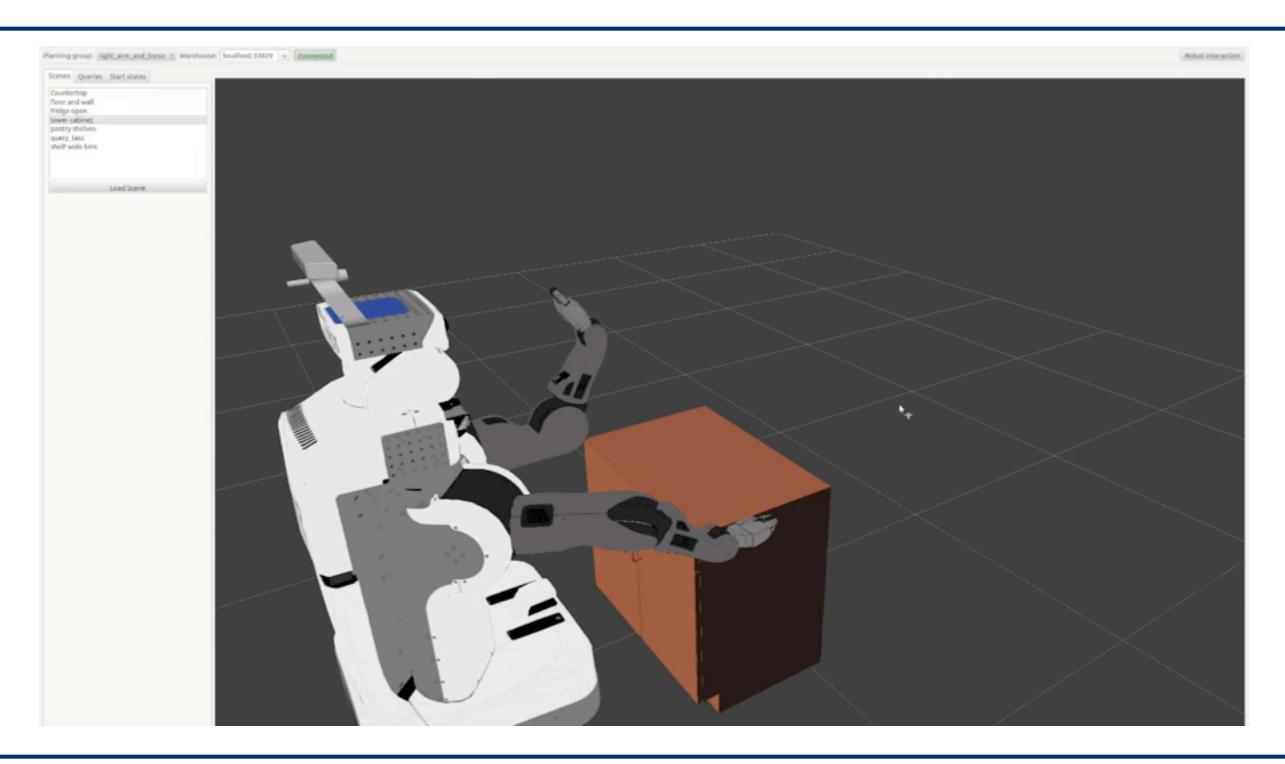
#### Applications: Kinematic Workspace Analysis

- Robot Design Evaluation
  - √ reachability analysis
    - \* e.g. home service robots
      - reach shelves, drawers, etc.
      - reach the floor
      - use all joints?, use a subset of joints?
  - √ Cartesian trajectories
    - e.g. open a fridge door



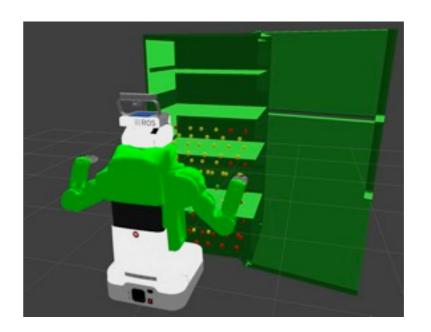




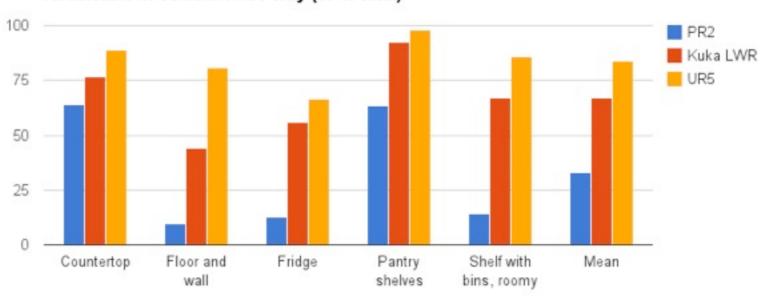








#### Reachable in collision-free way (% of total)





- Robot Workspace Placement
  - ✓ e.g. an industrial robot needs to be setup in a workspace
  - ✓ not clear where it should go in the workspace
  - √ reachability analysis can help



### Kinematic Metrics

- E.g. manipulability
  - ✓ measure of how well the robot can move in different directions
- E.g. payload
  - ✓ how much the robot can pick up in different configurations



## Metrics

