Head Monitoring
Persistent Collision Map
Multi Table App

Summer 2010 Projects

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Head Monitoring

- Laser limited, use stereo vision
- Integrated into move_arm
Head Monitoring

- Location: move_arm_head_monitor
- Usage:
  - pr2_arm_navigation_actions
  - head_monitor_x_arm.launch
  - move_x_arm_active.launch
Persistent Collision Map

- Currently amnesic
- Want to remember
- Other desired features
Persistent Collision Map

- OcTree structure
- Hierarchical, 8 children
- Octomap package
  - (Uni. Freiburg)
Persistent Collision Map

• Advantages:
  • More compact
  • Probabilistic update
  • Query resolution
  • Free & unknown space
  • Can degrade
  • Templated
Persistent Collision Map

- **Implementation:**
  - Replacement for `collision_map`
  - Volume difference per insertion
  - Increased query speed

- **Location:**
  - `octomap2`
  - `collision_octomap`
Multi Table App

- Mobile manipulation
- Build world with Octomap
- Identify tables, objects
- Get manipulation points
- Navigation & grasping
- Head monitoring
Multi Table App

- Multi table detector service
- Table detection:
  - Point clouds from collision_octomap
  - Filter z direction
  - Cluster points
  - Fit plane
  - Project inliers
Multi Table App

• Manipulation pose generation:
  • Expand table perimeter
  • Check for reachability

• Object detection:
  • Cluster volume over table
  • Find distance to perimeter poses

• Pose ranking
Multi Table App
Multi Table App

- Implemented in SMACH
  - Table and pose selection
  - Navigation
  - Grasping via wrapping PickAndPlaceManager
Multi Table App
Future Work

- **Octomap:**
  - Make it faster
  - Operations directly on octree?
  - Solve clearing problem

- **App:**
  - Improve table/object detector
  - Use both arms
  - Make it faster
Package Locations

- `move_arm_head_monitor` in `arm_navigation`
- `collision_octomap` in `collision_environment` (soon)
- `multi_table_detector` and `multi_table_app` location (and name) t.b.d.
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