Motion Planning for Mobile Manipulation: State-of-the-art Methods and Tools

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Motivation

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Agenda

- 08:45 - 09:00 - Welcome message, Overview of tutorial
- 09:00 - 09:20 - MoveIt! - (Sachin Chitta)
- 09:20 - 09:40 - The Open Motion Planning Library - OMPL (Mark Moll, Lydia Kavraki)
- 09:40 - 10:00 - Search-Based Planning Library - SBPL (Maxim Likhachev)

✓ 10:00 - 10:30 - Coffee Break

- 10:30 - 10:45 - Functional gradient optimization for manipulation (Siddhartha Srinivasa)
- 10:45 - 11:00 - Representing and planning with constraints for mobile manipulation (Dmitry Berenson)
- 11:00 - 11:15 - Real-time collision checking and motion planning in dynamic scenes (Dinesh Manocha)
- 11:15 - 12:30 - Hands on; live demo while attendees follow instructions

Agenda

- ✓ 12:30 - 14:00 - Lunch
- ❖ 14:00 - 14:15 - Motion planning with the Care-O-Bot and Rob@Work (Fraunhofer IPA)
- ❖ 14:15 - 14:30 - Upper-body motion planning on the REEM robot: Current state and future perspectives (PAL Robotics)
- ❖ 14:30 - 14:50 - 3D Sensing with Octomap (Armin Hornung)
- ❖ 14:50 - 15:10 - Workspace Analysis (Sachin Chitta), Benchmarking (Ryan Luna, Ioan Sucan)
- ❖ 15:10 - 15:20 - E-Graphs (Mike Phillips)
- ❖ 15:20 - 15:30 - Sparse Roadmaps (Kostas Bekris)
- ✓ 15:30 - 16:00 - Coffee Break
- ❖ 16:00 - 16:30 - Ongoing and Future Developments in MoveIt!

Agenda

- 16:30 onwards - Lightning Talks (5 minutes)
  - ✓ Showcase your work in motion planning for mobile manipulation
  - ✓ Currently 3 talks are scheduled so more slots are available
    - John Schulman and Pieter Abeel (Berkeley) - TrajOpt - Trajectory optimization software for motion planning
    - Norman Hendrich (Hamburg) - Domestic Robot/Jaco Arm
    - Armin Hornung (Freiburg) - Whole-Body Motion Planning for Manipulation of Articulated Objects
  - ✓ If interested, approach me during the first coffee break

Take-home message

- What are the latest techniques in motion planning for mobile manipulation?
  - ✓ where are the cutting edge ideas?
- What tools are available for you to use with your robots?
  - ✓ what are possible pitfalls to be aware of?
- Don’t worry about not being able to follow through with the hands-on
  - ✓ Just listen to how things are done
  - ✓ All documentation will be on the website