Motion Planning for Physical Robots
Motion Planning for Physical Robots

- Robot Motion Planning

- 1980’s: a well understood mathematical problem
  - The problem is decidable
  - Algorithms exist
  - They are not efficient in practice
Motion Planning for Physical Robots

- Robot Motion Planning

- 1990’s: the triumph of empirism!
  - Make use of random search!
  - Benefit from computer power
  - Solutions depend on technology

- Success stories in:
  - PLM, Bio-informatics, … outside robotics!
Motion Planning for Physical Robots

- Origin of the workshop
Motion Planning for Physical Robots

- 50 years of Robotics, 30 years of Motion Planning

What robot among all of them is using motion planning algorithms?

50 years of Robotics, 30 years of Motion Planning.
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- 50 years of Robotics, 30 years of Motion Planning

Who else?

What remains to do?

- Algorithm improvements?
- Better link with « AI » (motion and symbols)?
- Better link with dynamics and control?
- Better link with sensor-based feedback?
- More pragmatism towards dedicated solutions?
- Benefit more from technology?
What remains to do?

Let Motion Planning go back to Physical Robots
Motion Planning for Physical Robots

• Workshop

• Hierarchical Task and Motion Planning (T. Lozano-Perez)

• Legs, Hands, and Wheels: Bridging the Gap Between High-level Planning and Low-level Control (J. Kuffner)

• Online Generation of Kinodynamic Trajectories (W. Brugard)

• Planning Sequences of Motion Primitives (F. Lamiraux)

• Real-Time Motion Planning and Handling Model Uncertainty (D. Manocha)

• Plan-based Movement Control for Everyday Manipulation (M. Beetz)

• Planning humanoid multi-contact dynamic motions using optimization techniques (A. Kheddar)

• Hierarchical Planning for Robot Manipulation (B. Marthi)

• Humanoid Grasping and Manipulation in the Real World (T. Asfour)

• Departing Kinematics: Reconciling Geometric Planners with Physical Manipulation (S. Srinivasa)
Motion Planning for Physical Robots
Panel

- Several marketed or open-source motion planning software exist.
- Is the generality targeted by motion planning algorithms a strength or a weakness?
- Only, a question of linking symbol and geometry?
- Benefit from technology: objects with tags, cloud computing....

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