
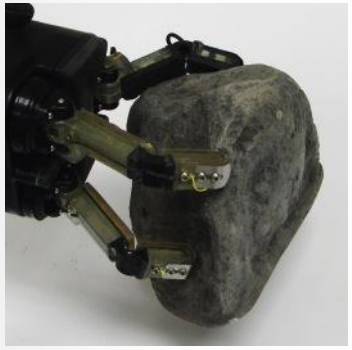


Robot Planning in the Real World:
Research Challenges and Opportunities

Wes Huang

October 28-29, 2013

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Robots That Make A Difference


CLEAN


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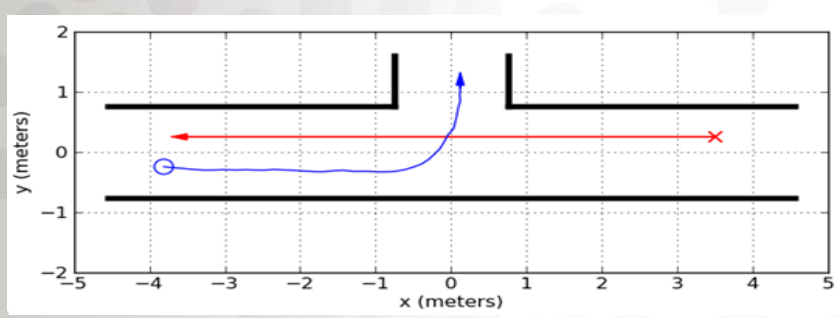
Remote Presence Robots

RP-VITA

Ava 500

Application domains to motivate planning

- Socially-aware navigation
- Extending independent living



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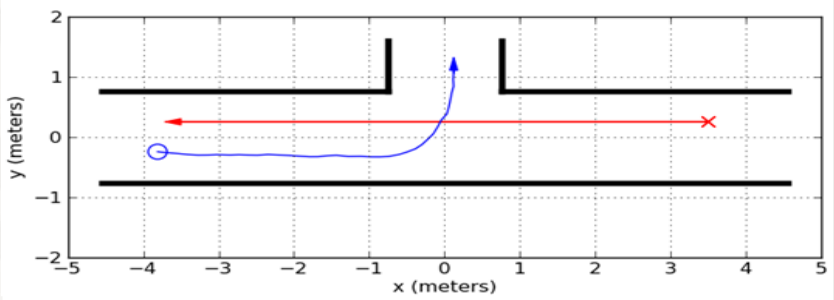
Socially-aware navigation

- Robots increasingly operate in busy human environments
- Navigation is a social interaction:
  - e.g., nonverbal cues: gaze, proxemics, etc.
- No robot today has adult-level social navigation skills
- Planning problems:
  - How should a robot actively use nonverbal cues to navigate?
  - When should a robot ask people to move versus find another route?



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Extending independent living (EIL)

- iRobot's CEO has stated a long-term goal to extend independent living through our robots
- How do you help a senior live independently?
  - or, delay the transition to a long-term care facility?
- Activities of Daily Living:
  - Eating, bathing, toileting, dressing, transferring/walking
- Instrumental activities of daily living:
  - Housekeeping, shopping, meal preparation, finances, transportation, telephone/communication
- Faculties decline with age:
  - flexibility, balance, vision, hearing, mental acuity

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Planning challenges for EIL

- How does a robot help a person get dressed?
  - Close interaction on cooperative tasks with humans
- How can a robot prepare, serve, and clean up after a meal?
  - Ill-defined or not easily modeled objects and processes
- How does a robot offer assistance before it is requested?
  - Inferring the goal, plan, and status from observation
  - Determining what the robot should do (if anything) to help

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