

The RoboCup 2013 Drop-In Player Challenges: Experiments in Ad Hoc Teamwork

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Example Ad Hoc Teamwork Scenario: Earthquake Response & Rescue



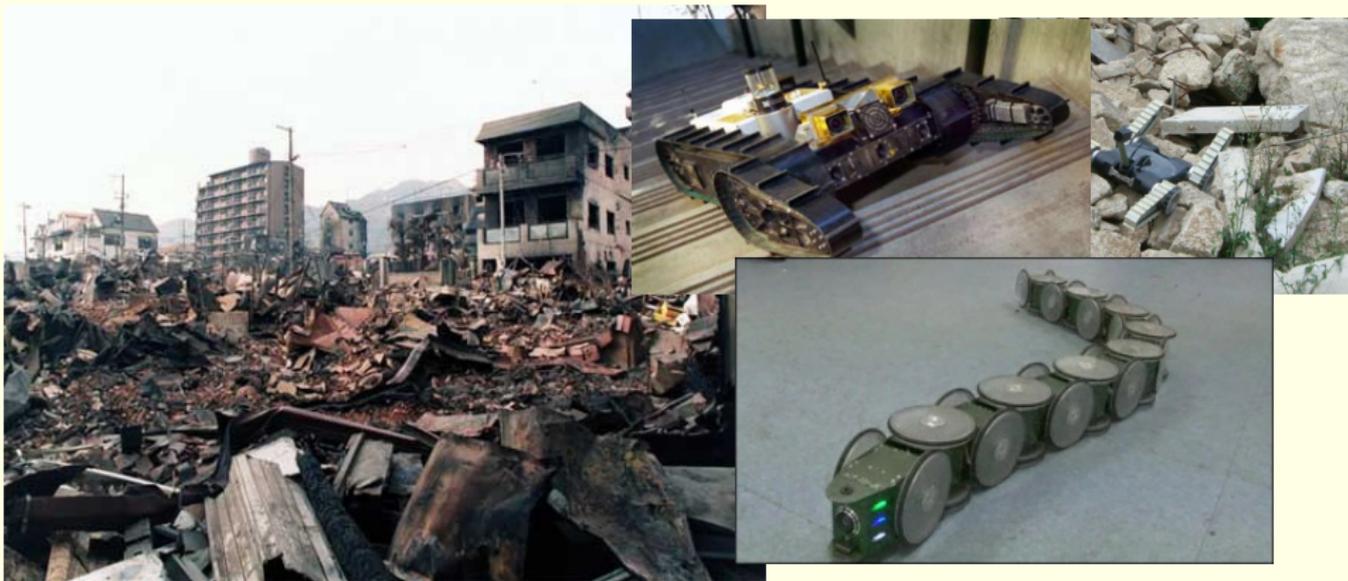
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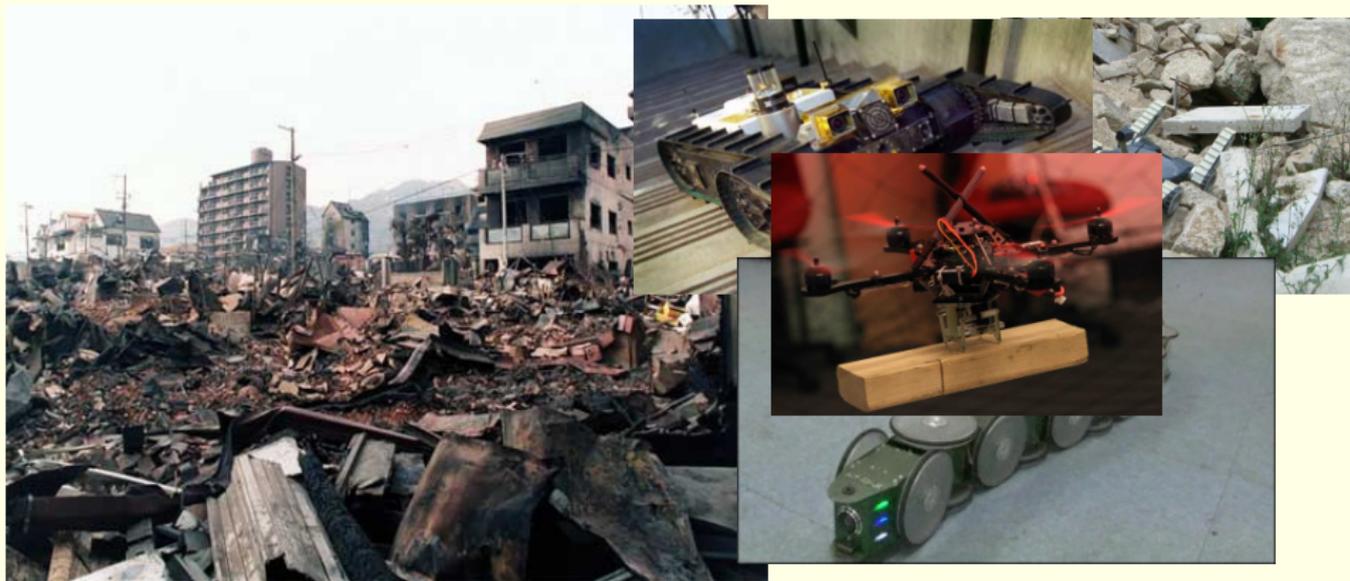
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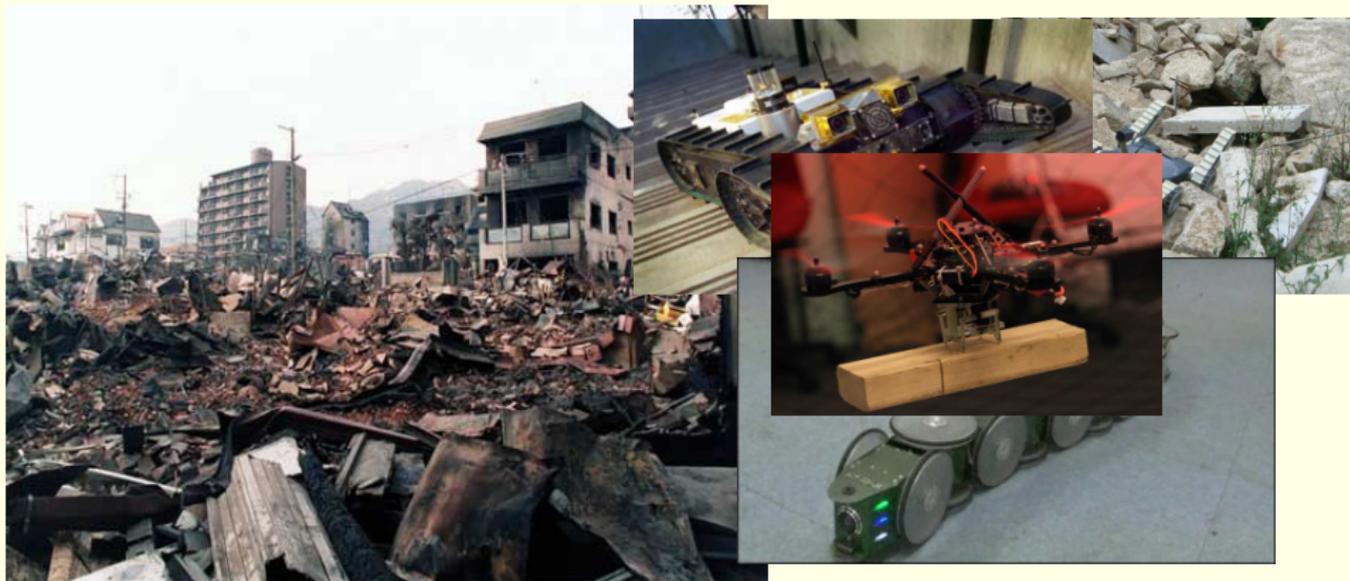
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Example Ad Hoc Teamwork Scenario: Earthquake Response & Rescue



- **Pre-coordination** may **not be possible**
- Agents should be **robust** to various teammates
- Agents need to **adapt quickly!**

Ad Hoc Teamwork

- Not in control of all agents on team
- Unknown teammates
- Shared goals
- No pre-coordination

Example in humans: Pick up soccer



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Research Question:

How can an agent cooperate with unknown teammates?

RoboCup Drop-In Player Challenges

- RoboCup is an international robotics competition where autonomous robots play soccer
- Games between teams consisting of different randomly chosen players from participants in the competition
- No pre-coordination between teammates, teammates/opponents unknown before start of a game
- Teams provided standard communication protocol for use during games
- Testbed for ad hoc teamwork
- Challenge held across three leagues at the 2013 RoboCup competition
 - ▶ Standard Platform League (SPL)
 - ▶ 2D Simulation League
 - ▶ 3D Simulation League



Standard Platform League (SPL)

- Use Nao robots
- Teams of 5 vs 5 autonomous robots play soccer
- Robots can communicate over wifi



Video

2D Simulation League

- Teams of 7 vs 7 autonomous agents play soccer
- Agents use primitives of "dash", "kick", and "turn" to interact with environment
- Agents receives noisy visual information about environment
- Agents can communicate over limited bandwidth channel



Video

3D Simulation League

- Teams of 10 vs 10 autonomous agents play soccer
- Agents modeled after Aldebaran Nao robot
- Realistic physics using Open Dynamics Engine (ODE)
- Agents receives noisy visual information about environment
- Agents can communicate over limited bandwidth channel



Video

Topics Covered in Paper

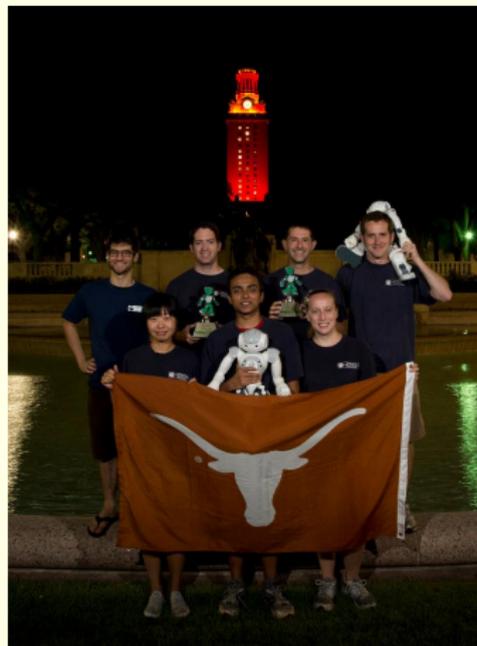
- How to **create a testbed** for **ad hoc teamwork**
- How to **select/assign agents** to different **teams**
- How to **measure/evaluate/score performance** of **individual agents** in an ad hoc teamwork setting
- **Strategies** for ad hoc teamwork

More Information

More information and videos at:

<http://tinyurl.com/iros14dropin>

Email: patmac@cs.utexas.edu



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