

DYNAMITE: Automated Negotiating Teams



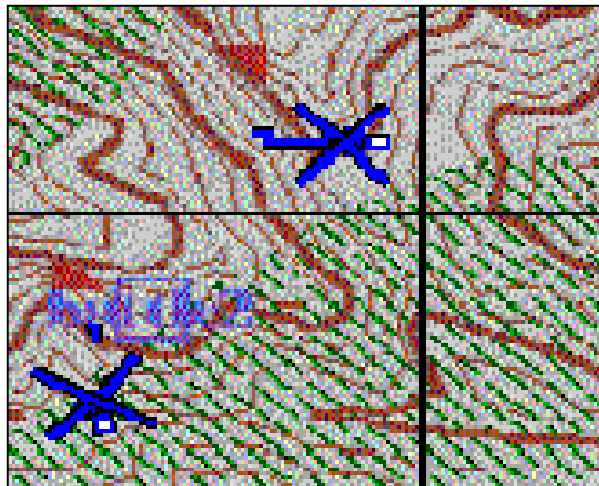
Weixiong (Wayne) Zhang, Milind Tambe and Wei-Min Shen

Information Sciences Institute
University of Southern California



Motivation for Negotiation in Agent Teams

- Conflicts arise in a group of agents, even if they are cooperative
 - ➔ Agents can access only local rather than global information
 - ➔ Agents' interpretation of the information differs
 - ➔ Agents may need to act despite missing information
- Conflict resolution through real-time negotiation
- Example: two pilot agents are unintentionally too close



Negotiation for movements

- ➔ maximize team's benefit (safety)
- ➔ minimize cost (time to move)



Main Issues

- **How to form an agent team for a common goal?**
 - ➔ Identifying a joint goal and shared resources
 - ➔ Identifying relevant agents: whom to negotiate with?
- **How to negotiate to resolve conflicts?**
 - ➔ Negotiation strategies and methods
 - ➔ What and how much information to exchange
- **How to be ready in any time?**
 - ➔ Meta reasoning about negotiation processes: cost vs. benefits
 - ➔ Iterative refinement

Initial Results: Collaborative Negotiation Based on Argumentation



■ What is Argumentation?

- ➔ Agents propose/counter-propose with arguments or justifications

■ Argumentation appropriate in Teamwork:

- ➔ No need to hide information(e.g. justification) from teammates
- ➔ Accomplishes persuasion by imparting information to teammates

■ Key Novelties: exploit a team setting in argumentation

- ➔ Negotiation cast as a team goal, so agents behave responsibly
- ➔ Based on reusable argumentation knowledge about teamwork
- ➔ Agents can improve teammate's argument (not just defeat it)
- ➔ Techniques for real-time argumentation

- builds on prior work on negotiation via argumentation (Tambe and Jung, 99).