

Workshop on Decision Making in Adversarial Domains



University of Maryland
College Park, Maryland

Motivation

- Adversarial decision making is studied in several different fields
 - ◆ Some of them overlap
 - ◆ Some are nearly disjoint
- Some of the approaches and techniques seem related
 - ◆ Hard to tell what the relationships are
 - » Different terminology
 - » Different ideas of
 - What terms to use
 - What assumptions to make
 - What the problem is
 - What constitutes a solution
 - » Some of this is stated explicitly, some is just assumed tacitly
- Goal of this workshop:
 - ◆ Bring people together from the relevant fields
 - ◆ Compare approaches and assumptions
 - ◆ Understand the relationships

Participants

- Even more diverse than we had expected:
 - ◆ Artificial Intelligence
 - ◆ Chemical Engineering
 - ◆ Control Theory
 - ◆ Economics
 - ◆ Industrial Engineering
 - ◆ Military Science
 - ◆ Operations Research
 - ◆ Psychology
 - ◆ Systems Science
 - ◆ ... *perhaps others* ...

Format

- Didn't want the typical conference format
 - ◆ In a group this diverse, people wouldn't understand each other
- Small number of keynote talks and panel discussions
 - ◆ Appeal to a multi-disciplinary audience
- Breakout groups
 - ◆ You get to help choose the topics
 - ◆ **Fill out and return the questionnaire *before lunch today***

Meals

- We'll provide lunch all three days, and dinner on Monday
- Lunch at the hotel buffet - *Bring your name tag*
- Dinner on Monday - Franklin's Restaurant and Brewery
 - ◆ Buffet, unlimited drinks - *Bring your name tag*
- Bus will start boarding at 6:15, will leave at 6:30
- To get there by car: directions & map in your registration materials



Workshop Proceedings

- No proceedings *per se*
- Instead, we'll create a permanent web site for the workshop
 - ◆ We'll post the presentations on the web site
- We'll pass a USB drive around to the panelists and keynote speakers
 - ◆ Please put a copy of your talk onto it
 - ◆ Please include your last name as part of the file name

- Recently created with help from AFOSR
 - ◆ This workshop is LCCD's very first activity
- Purpose
 - ◆ Decision making in different cultures
 - ◆ Build simulations, help policy experts form better decisions
 - ◆ Work with multiple international partners
 - » Develop computational models to solve socio-economic health, other problems
- V. S. Subrahmanian will give an overview on Tuesday morning

Who We Are

- » Dana Nau (chair)
- » Michael Fu (co-chair)
- » V.S. Subrahmanian (co-chair)

- Six different academic units (departments and institutes)
 - ◆ Dept. of Computer Science
 - ◆ Decision & Information Technology (i.e., Operations Research)
 - ◆ Electrical & Computer Engineering
 - ◆ Mechanical Engineering
 - ◆ Institute for Systems Research (ISR)
 - ◆ Institute for Advanced Computer Studies (UMIACS)

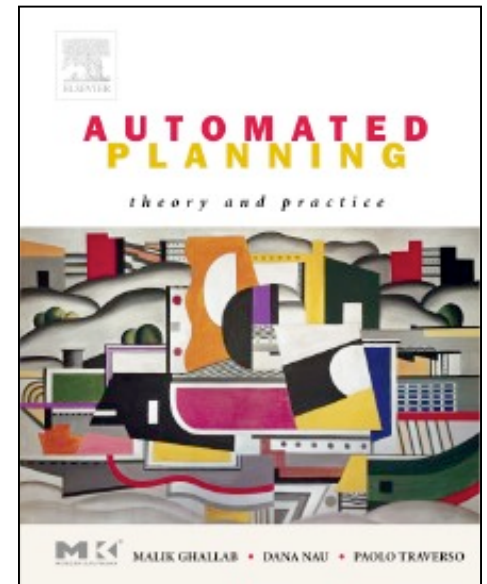
 - ◆ LCCD

Who We Are (cont'd)

- Dana Nau
 - ◆ Dept. of Computer Science
 - ◆ Institute for Systems Research (ISR)
 - ◆ Affiliate - Institute for Advanced Computer Studies (UMIACS)
 - ◆ Affiliate - Dept. of Mechanical Engineering
 - ◆ Director of LCCD
- My field of research: Artificial Intelligence
 - ◆ Search & game trees:
 - » game-tree pathology
 - » plan-based game-tree search - *Bridge Baron*
 - ◆ Automated planning:
 - » task decomposition - *SHOP2*
 - » *Automated Planning: Theory and Practice*
 - ◆ Manufacturing process planning:
 - » Search-based planning & manufacturability analysis - *IMACS, EDAPS*

BRIDGE BARON
WORLD'S BEST COMPUTER BRIDGE GAME

SHOP



Who We Are (cont'd)

- Michael Fu - Professor of Management Science
 - ◆ Decision and Information Technology Dept., R.H. Smith School of Business
 - ◆ Institute for Systems Research (ISR)
 - ◆ Affiliate - Dept. of Electrical & Computer Engineering
- Research: Operations Research
 - ◆ Simulation modeling/analysis, discrete-event systems, optimization
 - ◆ Applied probability - queueing theory, stochastic derivative estimation
 - ◆ Applications - manufacturing, telecommunications, finance



- V.S. Subrahmanian
 - ◆ Director - Institute for Advanced Computer Studies (UMIACS)
 - ◆ Department of Computer Science
 - ◆ Affiliate - Institute for Systems Research
- Research: Artificial Intelligence, Databases
 - ◆ Reasoning - logical, probabilistic, nonmonotonic, temporal
 - ◆ Databases - logical, probabilistic, multimedia
 - ◆ Software agents

Acknowledgments

- AFOSR
 - ◆ John Tangney, Neal Glassman, and Brendan Godfrey
- The UMIACS staff
 - ◆ Especially Cecilia Kullman - local arrangements





Keynote Talk: Michael Littman

- Associate Professor, Dept. of Computer Science, Rutgers University
- Previous research positions at AT&T Labs and Bellcore, faculty position at Duke University
- Head of the Rutgers Laboratory for Real-Life Reinforcement Learning, RL³
- Focus: learning and decision making in real environments
 - ◆ robotics, computer networking, human-computer interaction
- His 1994 paper on multiagent reinforcement learning helped introduced game-theoretic reasoning to the machine-learning community
- Today he'll present some tutorial information on computational models of adversarial decision making



Keynote Talk: Jonathan Schaeffer

- Professor, Dept. of Computer Science, University of Alberta
- Leads what I think is the best computer games group at any university in the world
- Author of Chinook
 - ◆ Official world checkers champion
 - ◆ First computer program to win a human world championship
- One of his group's current projects involves the game of poker
 - ◆ Program that plays at the level of expert humans
 - ◆ That's what he'll speak about today