CS543: Software Multiagent Systems
or
Applying Multiagent Systems to Current Societal Challenges

• Welcome

• Objective:
  o How can multiagent systems help in addressing societal challenges of today?
  o Intelligent agents and multiagent systems; focus on software; multiple agents or agents and humans interact.
  o Theory and applications
  o Use-motivated topics

• Syllabus includes a combination:
  o Key papers will be emailed out in advance.
  o Some notes handed out during class
Course Information:

Instructor office hours and contact:

- Prof. Milind Tambe
  - Computer Science Department
  - PHE 410
  - Office Hours: 4 pm Thu
  - Email: tambe@usc.edu
  - Tel: 213-740-6447
- Additionally, Dr. Albert Xin Jiang (albertjiang@gmail.com) and Dr. Matthew Johnson (mpjohnson@gmail.com) will provide some key lectures.

Grades/Announcements:

- blackboard.usc.edu
  - Grades
Schedule of Classes
CS 543: Software Multiagent Systems
January 2012

*Italic* indicates homework reading for students

1. (January 9): Course intro, syllabus, goals, key concepts: basic decision theory, basic linear programming  
   *Handout: Basic decision theory*

2. (January 11): Chapter 1: Introduction and overview of security games

3. (January 18): Chapter 2: Introduction to problems of security: Erroll Southers guest lecture  
   Handout: Introduction to game theory

4. (January 23): Normal form games, Dominance, iterative dominance, Nash equilibrium; Mixed strategy Nash equilibrium, Stackelberg games, security games  
   *Handout: Linear programming*

5. (January 25): Chapter 8 (up to 8.4): Introduction to Linear Programming, Integer programming, solving security games, marginals, ERASER, Sampling  
   *Homework: Excel solver*

   *Handout: Bayesian games; games of incomplete and imperfect information*

6. (Jan 30): Extensive form games, Subgame perfect Nash equilibrium, Bayesian games, games of incomplete information and imperfect information, Harsanyi transformation,…

7. (Feb 1): Continued with Bayesian games,…

   *Students form teams to read the following chapters and present in class:*


   *Chapter 5: J. Tsai, S. Rathi, C. Kiekintveld, M. Tambe, F. Ordonez IRIS: A tool for strategic security allocation in transportation networks*

   *Chapter 6: J. Pita, C. Kiekintveld, M. Tambe, E. Steigerwald, S. Cullen GUARDS - Game Theoretic Security Allocation on a National Scale*

8. (Feb 6): Student presentations in class (multiple teams, two teams for each chapter, focusing on different aspects of the applications).

   *Handout: Introduction to MDPs*
9. (February 8): Chapter 7, 8: MDPs, DOBSS, ASAP, ORIGAMI, ERASER-C, Sampling

10. (February 13): Chapter 7, 8: continued…

11. (February 15): Chapter 10: Emotions, behavioral game theory research


12. (February 22): Yang et al IJCAI’11, Quantal response

13. (February 27): Chapter 3: Guest lecture: Joe DiRenzo and David Boyd (US Coast Guard)


14. (February 29): PROTECT, latest research on game theory for security US Coast Guard

15. (March 5): Chapter 12: Frontiers of security game theory research


16. (March 7): Student project ideas presentation, discussion and feedback

17. (March 19): Chapter 9: ASPEN

18. (March 21): Forest protection, other applications

19. (March 26): Results of Homework, Review before midterm

20. (March 28): Midterm I

21. (April 2): Cybersecurity (Cliff Neuman)

22. (April 4): Cyber applications, contagion:

23. (April 9): TBD [Latest papers and research]

24. (April 11): TBD

25. (April 16): Richard John (psychology and game theory)

26. (April 18): TBD

27. (April 23): Project presentations

28. (April 25): Final discussion, feedback, reviews
Projects

- Will provide more guidance in class
- Need serious progress on a serious project related to security, safety, health, or some societal challenge.
- Groups of 3 students or more, project proposal due by Feb 29, final project presentation at the end of April
- 40% of your grade
Schedule of Assignments and Exams

Dates below are not completely finalized:

- Paper presentation, discussion: Feb 6, 2012 (5%)
- Homework I: Due Feb 22 (15%)
- Midterm project ideas and discussion: March 7 (5%)
- Homework II: Due March 26 (10%)
- Midterm: March 28 (25%)
- Project presentation: April 23-25 (35%)
- Class presence: (5%)

Homework assignments must be done individually; only the project can be done together.

Academic Integrity:

The USC Student Conduct Code prohibits plagiarism. All USC students are responsible for reading and following the Student Conduct Code, which appears on our school campus;