

# FALL 2011

## Computer Science Special Topics

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### CS 491/591 Section 1

Tuesday & Thursday

3:35 – 4:50 p.m.

Pulliam 112

Instructor -

Dr. Henry Hexmoor

### Exploring Game Theory for a Massively Networked Population

Game theory is the formal study of strategic reasoning. Game theoretic concepts apply whenever the actions of several agents are interdependent. An agent may be an individual, a group, a firm, or any combination of these. The first part of this course is an introduction to game theory and strategic thinking including dominance, Nash equilibrium, and stability. In the second part, we will examine how game theoretic concepts can be used in developing reasoning strategies, i.e., algorithms. Algorithmic topics covered will include extensive games, regret minimization, negotiation, auctions, voting, social choice, resource allocation, fictitious play, and mechanism design.

The confluence of social network analysis and automated collective reasoning among contemporary ubiquitous devices such as smart phones will be explored for humanitarian applications of benefit for massively interconnected populations. An example is emergent discovery of food, shelter, and scarce skills in natural disasters. For class project, students will select application of game theory in an approved setting with quantifiable benefits.

Prerequisite: CS 330 with a grade of C or better, or approval of instructor.

Textbook: N. Nisan, et. al., 2007. Algorithmic Game Theory, Cambridge University Press.