A brief promo...

NESCAI

THE THIRD NORTH EAST STUDENT COLLOQUIUM ON AI

NESCAI is a student run conference for students from North Eastern North America who are interested in all aspects of AI. It is a great opportunity to present your work, meet other graduate students and get feedback about your research.

INVITED SPEAKERS:
Lillian Lee - Cornell University
Ben Taskar - University of Pennsylvania

Submission date: March 7, 2008
Registration close: April 18, 2008
Registration fee: $50 (includes 2 nights of accommodation)

www.cs.cornell.edu/Conferences/nescai/

CORNELL UNIVERSITY - ITHACA, NY
MAY 2 - 4, 2008
Bringing students to CS

• Fewer Computer Science students!
• Especially at the freshman level
• Students think computer science is dull
• Show them cutting-edge research: AI!
• Can’t have “one-size-fits-all”
Why AI for a CS intro?

- Concreteness
  - Robots, spam-filtering, search engines
- Broad, interdisciplinary appeal
  - Connections to economics, linguistics, psychology, sociology, and other fields
Four courses

- Computation, Information, and Intelligence
- Networks
- Computation and Culture in a Digital Age
- Introduction to Computation with Robotics

- All have websites; some texts in prep
Computation, Information, and Intelligence

- No programming
- No prerequisites besides calculus
  - But students know web search, language
- Pencil-and-paper problems
Perceptron learning

- Introduce via geometric and trigonometric ideas
- Discuss proof of convergence
- Modify proof and discuss consequences
Information Retrieval

- Students are familiar with search engines
- Vector-space model
  - Builds on geometric concepts
- Link model
  - PageRank, Hubs-and-authorities
Other Topics and Results

- Search, game-playing
- Network structure of the web
- Natural language processing
- Turing test, Chinese room, Loebner prize
- High enrollment of women
Networks

- Social, technological, natural worlds all exhibit network structure
- Cross-listed in CS, Economics, Information Science, and sociology

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Networks

Some Questions

• How do opinions, fads, and political movements move through society?

• How fragile are food webs and financial markets?

• How is the popularity of websites distributed and why?
Networks

Graph theory & Game Theory

- Social networks
- Nash equilibria in auctions, traffic
- Markets and strategic interaction
Networks

Information networks and the web

- Search engines
- Keyword-based advertising
- Policy implications - voting, intellectual property
**Networks**

This is a supplemental blog for a course which will cover how the social, technological, and natural worlds are connected, and how the study of networks sheds light on these connections.

**Choosiness and Cooperation in Human Behavior**

http://www.nature.com/nature/journal/v451/n7175/full/nature06455.html
http://www.nature.com/nature/journal/v451/n7175/box/nature06455_BX1.html "The coevolution of choosiness and cooperation" from Nature magazine http://en.wikipedia.org/wiki/Evolutionarily_stable_strategy Supplementary Wikipedia article: “Evolutionarily Stable Strategy” The motivation for analyzing choosiness and cooperation between individuals is to seek a better understanding of biological systems and human societies. The interaction that occurs specifically between non-relatives is what the article focuses on. The way choosiness and cooperation relate to the [...] 

**Millions of Queries**

Despite ongoing research and constant improvements to online search engines, no user is guaranteed the results he/she desires for any given search. Of course we may believe sometimes that our computers can read our minds – with advances such as AutoComplete and cookie–based recognition – but inevitably we find ourselves modifying search queries and/or scrolling [...] 

**Flaws in the PageRank Algorithm**

Link: http://en.wikipedia.org/wiki/PageRank I find the page rank system that we discussed in class to be overly simple. Yes it works for the application of simple networks that we are looking for, but I really didn’t understand how that could be used on such a large scale. The Wikipedia page that I found on this algorithm really [...] 

**Online Advertising and the Monetization of Social Networks**

In class last week we focused on keyword–search based advertisement auctions used by search engines such as Google, Yahoo!, and Microsoft. While the majority of the revenue of these companies is received through this type of advertisement, all of the big players in the industry are looking for ways to [...] 

**Information Cascade Cause of Housing Bubble?**

After reading about information cascades in the text, I searched recent articles written about this herd mentality, and came across several that attribute the recent housing bubble to this phenomenon. In an article appearing in the New York Times, Robert Shiller, an economist at Yale University, attributes the unawareness of the looming bubble to herd [...] 

**Buying, Selling, and Trading in Azeroth**

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Networks

Other topics and results

• Class blog (3 graded posts per student)

• Attracted interest from business world

• High re-enrollment in second running (over 200 students, over 25 majors)

• Almost no existing reading material at the right level
Computation and Culture in a Digital Age

- Summer course for high school students
- Cornell’s Summer Explorations Program
- Goal: explore ideas from computing and their role in society
Machine learning

- A program that gets better from experience
- Some methods - rules, weights, memory
- Spam classification
Natural Language Processing

- Tasks - question answering, translation
- Experiments with web translators
- Puzzles from the North American Computational Linguistics Olympiad
The following are some sentences in Maasai, and the English translations in random order. Indicate which translation goes with each Maasai sentence by placing the letter of the correct translation in the space provided:

<table>
<thead>
<tr>
<th>Maasai Sentence</th>
<th>English Translation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. éósh olmurání olásuráì</td>
<td>English translations in random order</td>
</tr>
<tr>
<td>2. áadól olásuráì</td>
<td>A. 'The warrior cuts me.'</td>
</tr>
<tr>
<td>3. áaósh olmurání</td>
<td>B. 'The warrior cuts the tree for me.'</td>
</tr>
<tr>
<td>4. ídól olmuránì</td>
<td>C. 'The warrior cuts it.'</td>
</tr>
<tr>
<td>5. íóshokí olmuránì olásuráì</td>
<td>D. 'I cut the tree for the warrior.'</td>
</tr>
<tr>
<td>6. ádúŋokí olmurání olcetá</td>
<td>E. 'The warrior hits me.'</td>
</tr>
<tr>
<td>7. ádúŋ olcetá</td>
<td>F. 'You see the warrior.'</td>
</tr>
<tr>
<td>8. áaduŋokí olmurání olcetá</td>
<td>G. 'The warrior hits the snake.'</td>
</tr>
<tr>
<td>9. áadúŋ olmurání</td>
<td>H. 'The snake sees me.'</td>
</tr>
<tr>
<td>10. édúŋ olmurání</td>
<td>I. You hit the snake for the warrior.'</td>
</tr>
<tr>
<td></td>
<td>J. 'I cut the tree.'</td>
</tr>
</tbody>
</table>

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Computation and Culture in a Digital Age

Other Topics

• Introduction to programming with MATLAB
• Human Computer Interaction
• Ethics and culture

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Introduction to Computing with Robotics

- Focus on sensing, not reasoning or control
- Programming in MATLAB

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Finding the red light

- Determine position and orientation of a light stick
- Algorithmic development
- Sorting, median-finding
A Robot Speedometer

- Analyze odometry data
- Least-squares fitting
- Implement gradient descent
Introduction to Computing with Robotics

Other Topics

• Distinguishing between Coke & Pepsi cans
• Which robot moved? - Image differencing
• Open-ended final projects
Other Introductory CS at Cornell

- Computing in the Arts
- Visual Imaging in the Electronic Age
- “regular” intro courses
  - Java, MATLAB
Acknowledgments

Teaching assistants and course consultants

Steve Baker, Jared Cantwell, Tze Jian Chear, Chris Danis, Ray Doyle, Rafael Frongillo, Nick Gallo, Jon Guarino, Abraham Heifets, Amanda Holland-Minkley, Marek Janicki, Tian Liang, Homan Lee, Yuzhe Liu, Selina Lok, Ezra Kannof, Devin Kennedy, Blazej Kot, Elliot Kulakow, Shannon McGrath, Brian Mick, Anton Morozov, Milo Polte, Ben Pu, Neeta Rattan, Brian Rogan, Gurmeet Singh, Sara Tansey, Mark Yatskar, Adam Yeh, Chong-Suk Yoon, and Yisong Yue

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