U.S. Kavli Frontiers of Science Symposium Series

Twenty-first Annual Kavli Frontiers of Science Symposium

National Academy of Sciences
November 12-14, 2009 - Irvine, California, USA

Game Theory, Economic Modeling, and Economic Regulation From a Computational Perspective -Presentation

Robert D. Kleinberg, Cornell University

Please click on the above link to watch the presentation - both slides and audio. This presentation file is in Adobe Flash player format, available free online.

Research at the interface of economics and computation has flourished in the past ten years, largely in response to the Internet's emergence as the world's first large-scale computational artifact created not by a single entity, but by the strategic interactions of many. Economics studies systems governed by the conflicting interests of multiple parties, whereas computer science analyzes systems that operate under constraints on computational resources such as processing time, memory, and communication. Overlaying these two perspectives leads to a rich set of mathematical problems that encompass the design of markets under limitations on computation and communication, algorithms for identifying the equilibria of those markets, theorems bounding the inefficiency of said equilibria compared to a centrally regulated system, and the analysis of how all of these aspects of a system are influenced by the structure of the (typically sparse) network of interactions among its participants. Recent research in the area has moved beyond analyzing equilibria to study the dynamics of the processes of learning and adaptation by which many interconnected algorithms may update their behavior in response to the observed behavior of other agents with whom they interact. This research incorporates traditional computer science and economics techniques (learning theory and game theory) as well as perspectives from other sciences (evolutionary biology, statistical physics) to make predictions about the dynamics of networked interaction among self-interested individuals.

Background Review Reading:
T. Roughgarden, An Algorithmic Game Theory Primer, TCS '08 (invited survey).

Further reading:

Related Links:

Watch Cutting Edge Science on the Web

Chinese-American Kavli Frontiers (2009):

- Cyberinfrastructure / LHC Data Challenge
- Drug Design/Protein Structure
- Epgenetics / Disease
- Gamma-Ray Bursts
- Life in Extreme Environments / Early Life
- Neural Plasticity / Sleep
- Organic Devices in Energy and Electronics
- Quaternary Climate Change / Paleoecology

U.S. Kavli Frontiers (2009):

- Antibiotic Resistance
- Game theory, economic modeling, and economic regulation from a computational perspective
- Geoengineering
- Holography
- MicroRNA
- Our Hot and Uncertain Future: Is Adaptation to Climate Change Possible?
- Sex Differences in the Brain
- Understanding Dark Matter

Japanese-American Kavli Frontiers (2008):

- Bayesian Statistics & Massive Data Streams
- Detecting Dark Matter
- Evolution of Sleep and Memory
- Measurements and Conditions for Happiness
- Nanomedicine
- New Chemistry of Renewable Raw

Algorithmic Game Theory, N. Nisan, T. Roughgarden, E. Tardos, and V. Vazirani (eds.), Cambridge University Press.

- Materials
- Optical Measurement and Control of Neuronal Activity
- Prediction of Future Sea Level in a Greenhouse World - Theory and Observations

Indo-American Frontiers (2009):

- Atmospheric Haze
- Bioinspired Chemistry
- Cellular Mechanisms for Encoding Information
- Infection and Cognition
- Particle physics at the Energy and Intensity Frontiers
- String Theory and Geometry
- The Changing Brain
- Unraveling the tiny wrinkles in Cosmic Microwave Background radiation: Determining the past and future evolution of the Universe

National Academy of Sciences
500 Fifth Street, NW
Washington, DC 20001

Terms of Use | Privacy Policy
Contact Us | Site Map