The University of Chicago

Department of Statistics

Seminar Series

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University of California at Los Angeles

"The Mathematics of Causal Inference"

WEDNESDAY November 9, 2005 at 11:30 AM
110 Eckhart Hall, 5734 S. University Avenue

ABSTRACT

I will review concepts, principles, and mathematical tools that were found useful in applications involving causal inference. The principles are based on structural-model semantics, in which functional (or counterfactual) relationships, representing autonomous physical processes are the fundamental building blocks. This semantical framework, enriched with a few ideas from logic and graph theory, enables one to interpret and assess a wide variety of causal and counterfactual relationships from various combinations of data and theoretical modeling assumptions. These include:

(1) Predicting the effects of actions and policies
(2) Identifying causes of observed events
(3) Assessing direct and indirect effects,
(4) Assesseing the extent to which causal statements are corroborated by data

For background information, see Causality (Cambridge University Press, 2000), or www.cs.ucla.edu/~judea/, or the following papers:

gentle-introduction: http://bayes.cs.ucla.edu/IJCAI99/
paper1: http://bayes.cs.ucla.edu/R218-B.pdf
paper2: ftp://ftp.cs.ucla.edu/pub/stat_ser/R271.pdf
paper3: ftp://ftp.cs.ucla.edu/pub/stat_ser/R273.pdf

Bio: Judea Pearl

Judea Pearl is a professor of computer science and statistics at the University of California, Los Angeles. He joined the faculty of UCLA in 1970, where he currently directs the Cognitive Systems Laboratory and conducts research in artificial intelligence and philosophy of science. He has authored three books, Heuristics (1984), Probabilistic Reasoning (1988), and Causality (2000). A member of the National Academy of Engineering, and a Founding Fellow the American Association for Artificial Intelligence (AAAI), Judea Pearl is the recipient of numerous scietific awards, including the Lakatos Award (2001) from the London School of Economics for his book Causality.