Technical Supporting Area:
Causality and Learning Theory

Examiner
> Josh Tenenbaum
> Assistant Professor
> Brain and Cognitive Sciences, MIT

Description

Maintaining mental models that can provide a basis for language semantics requires machinery to analyze observations and build theories from them. An important aspect of theory learning is the ability to perform causal analysis, and to reason with the results of this analysis. In my technical supporting area, I propose to cover cognitively inspired computational approaches to causality and theory learning, and the applicability of mental theories to various reasoning tasks.

Signature_____ Date_____

Written Requirement

The written requirement will consist of a 24 hour take home exam administered by Professor Tenenbaum.

Reading List

Cheng, P.: 1997, From covariation to causation: a causal power theory, *Psychological Review* **104**, 367–405.

Gopnik, A., Glymour, C., Sobel, D., Schulz, L., Kushnir, T. and Danks, D.: 2002, A theory of causal learning in children: Causal maps and bayes nets, *PSA Workshops*, PSA.

Johnson-Laird, P.: 2001, Mental models and deduction, *Trends in Cognitive Sciences* **5**(10), 434–442.

Kuipers, B.: 1994, *Qualitative Reasoning: Modeling and Simulation with Incomplete Knowledge*, MIT Press, Cambridge, MA, USA.

Pearl, J.: 2000, *Causality*, Cambridge University Press, Cambridge, UK.

Schaeken, W., Johnson-Laird, P. and d'Ydewalle, G.: 1996, Mental models and temporal reasoning, *Cognition* **60**(3), 205–234.

Sobel, D., Tenenbaum, J. B. and Gopnik, A.: 2002, The development of causal learning based on indirect evidence: More than associations, *under revision*.

Spirtes, P., Glymour, C. and Scheines, R.: 2001, *Causation, Prediction and Search*, 2nd edn, MIT Press, Cambridge, MA, USA.

Steyvers, M., Tenenbaum, J. B., Wagenmakers, E. J. and Blum, B.: 2002, Inferring causal networks from observations and interventions, *under revision*.

Tenenbaum, J. B. and Griffiths, T. L.: 2002a, Structure learning in human causal induction, *Neural Information Processing Systems 14*.

Tenenbaum, J. B. and Griffiths, T. L.: 2002b, Theory-based causal inference, *Neural Information Processing Systems*.