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Workshop on Recent Results in Formal Learning Theory

A Survey of Recent Results in Formal Learning Theory

Kevin T. Kelly

Formal learning theory provides a general framework for determining when it is possible for an agent to converge to the truth in each of a collection of possible circumstances. The theory was originally applied to questions about the learnability of classes of of languages, but recently the applications have been broadened to include automatic programming, theory discovery and other topics.

This lecture will present a general introduction the framework and some recent results of the theory, focussing on stuctural features of solvable and unsolvable discovery problems, and ways to apply the results to artificial intelligence and Bayesian learning.

Possibility and Impossibility Theorems for Cognitive Science

Clark Glymour

Learning theory provides a number of results about the possibility or the impossibility of solving fundamental discovery problems that arise in cognitive science. This lecture will describe applications to

*predicting the behavior of a "black box" containing an unknown arbitrary Turing machine--in general, you can't;

*predicting the behavior of a "black box" containing an arbitrary unknown finite automaton--in general, you can;

* deciding whether or not a system is Turing computable from its input/ouput behavior--in general, behavior cannot distinguish between computable and uncomputable systems.

* inferring cognitive architecture in cognitive neuropsychology from the capacities and incapacities of subjects with brain injuries.