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<http://www.cs.csubak.edu/~icmla/icmla05/>

Presents

The Role of Symmetric Learning and Reuse in SoS Design

(1 hour)

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This keynote will present some recent successes and failures in symmetric learning theory. Recent successes include learning natural language translators, message summarizers, and KASERS. The most notable failure has been in the design of a non-symbolic recurrent neural network; but, what has been learned from this experiment overshadows that failure. As a result, a neat approach to symmetric learning will be advocated for scalable intelligent systems in the large. The role of symmetry in evolution, neural learning, and computability theory will be addressed. Recent work in learning to translate natural language and compute with words will be detailed. A capability to create intelligent system design tools follows from this work and will be exemplified. Moreover, it will be argued that scientists and journal editors alike need to take more risks in their research and scope, respectively, to further the twin goals of progress and education.

Traditional computability theory is extended to prove that the attainable density of knowledge is virtually unbounded. This result serves as the theoretical basis for this talk. That is, the more bits available for storage, the more information that can be stored, where the density of information per bit cannot be bounded above. The presentation will go on to explain how machine intelligence becomes possible as a result of the capability for creating, storing, and retrieving virtually unlimited information/knowledge. It follows from this theory that there is no such thing as a valid non-trivial proof, which in turn implies the need for heuristic search/proof techniques. Two examples are presented to show how heuristics can be developed, which are randomizations of knowledge. Even more intriguing, it is shown that heuristic proof techniques are to formal proof techniques what fuzzy logic is to classical logic.