

The Department of Mathematics and Computer Science

SPEAKER: Rich Sutton
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LOCATION: C640

EXPERIENCE-ORIENTED ARTIFICIAL INTELLIGENCE

I propose that experience – the explicit sequence of actions and sensations over an agent’s life--should play a central role in all aspects of artificial intelligence. In particular:

1. Knowledge representation should be in terms of experience. Recent work has shown that a surprisingly wide range of world knowledge can be expressed as predictions of experience, enabling it to be automatically verified and tuned, and grounding its meaning in data rather than in human understanding.
2. Planning/reasoning should be in terms of experience. It is natural to think of planning as comparing alternative future experiences. General methods, such as dynamic programming, can be used to plan using knowledge expressed in the aforementioned predictive form.
3. State representation should be in terms of experience. Rather than talk about objects and their metric or even topological relationships, we represent states by the predictions that can be made from them. For example, the state “John is in the coffee room” corresponds to the prediction that going to the coffee room will produce the sight of John.

Much has yet to be worked out. Each of the “shoulds” above can also be read as a “could” or even a “perhaps could.” I am optimistic and enthusiastic because of the potential for developing a compact and powerful theory of AI in the long run, and for many easy experimental tests in the short run.