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On Stochastic Belief Revision and Update and their Combination

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Abstract

I propose a framework for an agent to change its probabilistic beliefs when a new piece of propositional information a is observed. Traditionally, belief change occurs by either a revision process or by an update process, depending on whether the agent is informed with a in a static world or, respectively, whether a is a 'signal' from the environment due to an event occurring. Boutilier suggested a unified model of qualitative belief change, which "combines aspects of revision and update, providing a more realistic characterization of belief change." In this paper, I propose a unified model of quantitative belief change, where an agent's beliefs are represented as a probability distribution over possible worlds. As does Boutilier, I take a dynamical systems perspective. The proposed approach is evaluated against several rationality postulated, and some properties of the approach are worked out.