

Invited Talk: Learning probability by comparison

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Abstract

Learning probability by probabilistic modeling is a major task in statistical machine learning and it has traditionally been supported by maximum likelihood estimation applied to generative models or by a local maximizer applied to discriminative models. In this talk, we introduce a third approach, an innovative one that learns probability by comparing probabilistic events. In our approach, we give the ranking of probabilistic events and the system learns a probability distribution so that the ranking is well respected. We implemented this approach in PRISM, a logic-based probabilistic programming language, and conducted learning experiments with real data for models described by PRISM programs.

Biography

Taisuke Sato is an emeritus professor at Tokyo Institute of Technology and an invited senior researcher at AI research center, National Institute of Advanced Industrial Science and Technology (AIST) in Japan. He received his M.S. in Electrical Engineering in 1975 and his Ph.D. in Computer Science 1987 from Tokyo Institute of Technology. His early work includes program transformation and synthesis in logic programming. Then he has been working on the integration of logical reasoning and probabilistic reasoning. In particular he has been developing a logic-based probabilistic programming language PRISM (PRogrammign In Statistical Modeling) that offers a variety of learning methods for generative modeling (MLE, Viterbi training, variational Bayes, MCMC) and discriminative modeling such as CRFs. Recently, he focuses on formalizing and implementing logical inference in vector spaces.