Title:

From the sequence memoizer to the infinite, structured, explicit-duration hidden Markov model: recent developments in expressive, general-purpose, computationally-efficient probabilistic modeling.

Abstract:

Computational manipulation of uncertainty in the form of probability is of growing importance to the sciences in general, is the cornerstone of machine learning research, and is central to modern approaches to artificial intelligence. The harsh requirements imposed on learning algorithms by the latter continue to drive the development of increasingly expressive and efficient models. Some of these migrate and become broadly applied in the sciences. This talk will introduce two that are primed for such a migration: the sequence memoizer (SM) and the infinite, structured, explicit-duration hidden Markov model (ISEDHMM). The SM is an plug-in replacement for n-gram models. The ISEDHMM is a plug-in replacement for hidden Markov models. For these reasons, applications abound for both the SM and the ISEDHMM. Because both are Bayesian nonparametric models, a brief and honest introduction to Bayesian nonparametric modeling will included in the talk. Experience gained from using these models in a number of application settings will be shared as well.