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 last 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. Because n-gram models and HMMs are widely used, applications

for the SM and the ISEDHMM abound. Because both the SM and ISEDHMM

are Bayesian nonparametric models, a brief and honest introduction to

Bayesian nonparametric modeling will included in the talk. Experience

gained from using SM and ISEDHMM in a number of applied settings will

be shared as well.