



Factored expectation propagation for input-output FHMM models in systems biology

Botond Cseke, Guido Sanguinetti

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We consider the problem of joint modelling of metabolic signals and gene expression in systems biology applications. We propose an approach based on input-output factorial hidden Markov models and propose a structured variational inference approach to infer the structure and states of the model. We start from the classical free form structured variational mean field approach and use an expectation propagation to approximate the expectations needed in the variational loop. We show that this corresponds to a factored expectation constrained approximate inference. We validate our model through extensive simulations and demonstrate its applicability on a real world bacterial data set.

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