THE FLOW OF INFORMATION IN NETWORKS OF PROBABILITY VECTORS

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ABSTRACT

Recent non-parametric techniques for learning use the Pitman-Yor distribution as a way of handling hierarchical and networked nodes of probability vectors. This is done for sequential topic models, n-gram models, part-of-speech models and many others. The Pitman-Yors are an example of the general class of species sampling models that are, in a particular sense, conjugate to the multinomial and themselves. Conjugacy comes at the expense of introducing auxiliary latent variables that correspond to the portion of a sample that passes up the hierarchy/network. Information among nodes (probability vectors) in such a network therefore passes upwards in the form of partialsamples and downwards in the form of prior parameters. One can therefore measure, from both these influences, the entropy change in vectors with this flow of information. The talk will present some results on the information flow and examples taken from a number of networks.