Determining Missing Constraint Values in Bayesian Networks with Maximum Entropy: A First Step Towards a Generalized Bayesian Network

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Abstract. The author's past work in this area has shown that the probability of a state of a Bayesian network, found using the standard Bayesian techniques, could be equated to the Maximum Entropy solution and that this result enabled us to find minimally prejudiced estimates of missing information in Bayesian networks. In this paper we show that in the class of Bayesian networks known as Bayesian trees, we are able to determine missing constraint values optimally without the use of Bayesian techniques, using only the Maximum Entropy Formalism. We also show that it is possible to produce a generalized Bayesian network, which is specified entirely within the Maximum Entropy formalism.

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