

Efficient Evaluation of the Partition Function of Restricted Boltzmann Machines with Annealed Importance Sampling

Ferran Mazzanti Castrillejo,^{*} Enrique Romero Merino,[†] Jordi Martí Rabassa,[‡] and Arnau Prat Pou[§]
Universitat Politècnica de Catalunya (UPC)

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The calculation of the partition function Z is fundamental in probabilistic models such as Restricted Boltzmann Machines (RBMs)[1]. Its evaluation can easily become a forbiddingly expensive task, as it growth exponentially with the size of the problem. Annealed Importance Sampling (AIS)[2] is an algorithm that gives a stochastic estimation of the value of Z . So far, the standard application of the AIS algorithm has required the use of a very large number of Monte Carlo steps. In this work we show that, with a proper initialization, one can significantly reduce the number of sampling steps needed to converge. In order to find the best strategy, several initial probability distributions used to start the AIS algorithm are tested. As a result of this analysis, we find a few successful strategies that performs well in all the problems studied. We conclude that those strategies are a good starting point to estimate the partition function through AIS with a relatively low computational cost.

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^{*} ferran.mazzanti@upc.edu

[†] eromero@cs.upc.edu

[‡] jordi.marti@upc.edu

[§] arnau.prat.pou@upc.edu