



Student project / BA-/MA-Thesis

Implementing Variational Inference for Probabilistic Reasoning

Topic

Bayesian Networks and other graphical models for probabilistic reasoning are usually intuitive to use since their graphical nature allows easier interpretation. Probabilistic reasoning in general can be used for a wide range of scenarios and humans are argued to process information more or less in a probabilistic Bayesian way (subject to approximations of course). Our own inference implementation PRIMO (<https://gitlab.uni-bielefeld.de/scs/PRIMO>) already allows the use of different kinds of networks as well as inference methods, however it does not yet make use of Variational Inference, an approximate inference method that finds the desired distributions via optimization. This is primarily intended as a Bachelor Thesis or student project, but could be extended for a Master Thesis as well.

Recommended skills

- Decent knowledge of Bayesian Networks and probabilistic inference
- Proficient knowledge in probability theory
- Knowledge regarding (automatic) differentiation and optimization helpful

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