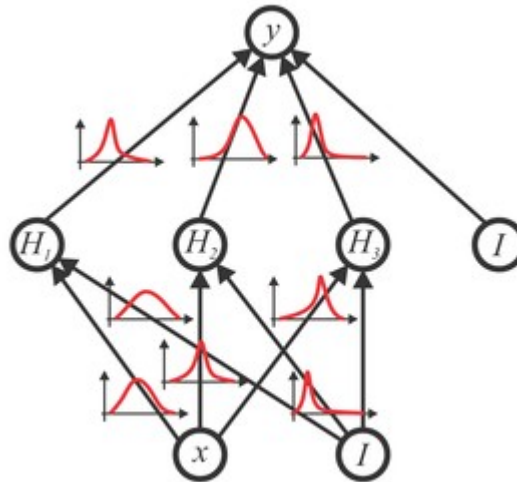


Bayesian Deep Learning in Medical Imaging

Master's Thesis/Project



Description:

The application of Bayesian theory to the deep learning framework recently has attracted the attention of both the computer vision and medical imaging community and is a currently growing field of research. By extending the mathematically grounded theory of neural networks with Bayesian theory, the ability to capture the uncertainty present in the data the model's weights is gained. With this, not only comparable performance to current state-of-the-art results in applications like classification, segmentation, and regression, can be reached, but also the quality of the predictions can be assessed by their predictive uncertainty. The ability to reason about the data and model uncertainty [1,2] is of crucial importance for many applications that are related to decision making.

Objective:

- Perform literature review on Bayesian deep learning.
- Implement Bayesian deep networks.
- Train and test the networks on segmentation tasks.

Qualification:

- Experience in Python or C++
- Knowledgeable with TensorFlow
- Interested in machine learning and computer vision

Literature:

- [1] Kendall et al., What Uncertainties Do We Need in Bayesian Deep Learning for Computer Vision?, NIPS, Long Beach, USA, 2017
 [2] Blundell et al., Weight Uncertainty in Neural Networks, ICML 2015

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