

Kingma et. al. (2014) Paper Summary

Link to the paper: <https://arxiv.org/pdf/1406.5298.pdf>

Overview

Semi-supervised learning allows for effective generalization from small labelled datasets to large unlabelled ones. This paper presents a generative model that can be used for semi-supervised learning. It leverages improvements in variational methods to make approximate Bayesian inferences in an efficient and scalable way. Application areas include image search, genomics, natural language parsing, and speech analysis.

Strengths

- Efficient approximate Bayesian inferences using bounds from model objective functions and Monte Carlo approximation
- Demonstrates an effective technique for Semi-Supervised learning using a Deep Generative Model
- Computation complexity of model is similar to alternative approaches based on an auto-encoder or neural model

Weaknesses

- Limitation of the model is linear scaling with the number of classes in the datasets
- We discussed in class how Monte Carlo approximation can be relatively slow to train because an estimate has to be generated for each parameter

Questions for discussion

How might semi-supervised learning using a Deep Generative Model contribute to your project? If applicable, are there alternative approaches you have considered? If so, why?