Latent Variable Models Wrap Up, Implicit Models: GMMN

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Scribe notes: can edit

5b Latent Variable Models:

https://docs.google.com/presentation/d/17f-EiMLBygxHQW2jQ5DrFJzZjIZQZVhxKkGC5p_vTio/edit#slide=id.p

5c Implicit Models: Introduction

All the generative models we have seen till now are trying to optimize for likelihood, directly in the case of autoregressive and flow models or indirectly via variational bounds in case of VAE's. The rough goal of generative modeling is to learn the source distribution without learning simply an identity function so as to generate new samples from it.
KL divergence is one way to compare two distributions, but there are other metrics as well. Usage of these other metrics give rise to different bunch of approaches towards generative modeling.
GMMN: Generative Moment Matching Networks
GMMNetworks optimize for Mean Discrepancy Metric. When used with Autoencoders, they showed better likelihood metrics against GAN's albeit on toy data sets. Scaling these networks to large data sets remained a challenging problem. For original paper refer [1] and summary [2] MMDGAN, a combination of GMMN and GAN's were also tried in 2017 to understand more about GMMN. [3] It outperforms GMMN and is at par with other representative GAN's.

Other Resources

1. https://arxiv.org/abs/1502.02761 Li et. al. 2015 Generative Moment Matching Networks
2. https://github.com/aleju/papers/blob/master/neural-nets/Generative_Moment_Matching_Networks.md Detailed notes on Generative Moment Matching Networks Paper.
3. https://arxiv.org/abs/1705.08584 MMD GAN 2017 Paper
4. https://stats.stackexchange.com/questions/276497/maximum-mean-discrepancy-distance-distribution Useful discussion on Maximum Mean Discrepancy
5. https://openai.com/blog/generative-models/ Introduction to GAN's (2016 Article: bit dated)