STATS 232A Project 4: Generative modeling

1 Variational Autoencoder

Read sections 2 and 3 in `https://arxiv.org/pdf/1312.6114.pdf` for implementation details. Specifically, you need to inplement the reparameterization trick, and use equation (10) as loss term.

Fill the blank parts in `./vae/model_vae.py`. After training, show the reconstructed images and sampled images. If tuning network structure carefully, you should get good results after 30 epoches.

2 Generative Adversarial Network

Read section 3 in `https://papers.nips.cc/paper/5423-generative-adversarial-nets.pdf` for implementation details. `https://arxiv.org/pdf/1511.06434.pdf` contains more tricks about how to define your network structure.

Fill the blank parts in `./gan/model_gan.py`. After training, show the sampled images. You should also get good results after 30 epoches.

3 What to submit

Please use TensorFlow (version ≥ 1.0) to do this project. You may train with GPU or without GPU. Write a report to show your results. And zip the report with your code.

Hint: Use leaky ReLu and batch normalization in your network structure. Since MNIST is a very simple dataset, you don't need too deep networks. Usually 2 layers or 3 layers is enough.