Assignment 2

Learning latent space representations

and application to image generation

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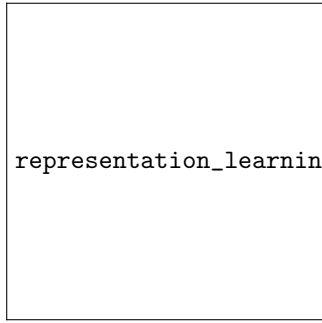
MILES
Machine Intelligence and Learning Systems

Goal of Assignment 2

1. Train a GAN on MNIST.
2. The structure of the Generator is fixed.
3. Use different one or two possible improvements to improve the data generation.



Possible improvements

- f-GANs
  1. f-GAN: Training Generative Neural Samplers using Variational Divergence Minimization
- WGAN
  1. Wasserstein GAN
- Rejection Sampling
  1. Discriminator Rejection Sampling
  2. Metropolis-Hastings Generative Adversarial Networks
- Latent Rejection sampling
  1. Latent reweighting, an almost free improvement for GANs
- Gradient ascent
  1. Discriminator optimal transport
  2. Refining Deep Generative Models via Discriminator Gradient Flow
  3. Your GAN is Secretly an Energy-based Model and You Should use Discriminator Driven Latent Sampling
- Classifier guidance generation
  1. MMGAN: Generative Adversarial Networks for Multi-Modal Distributions
  2. Gaussian Mixture Generative Adversarial Networks for Diverse Datasets, and the Unsupervised Clustering of Images

Requirements Assignment 2

1. Train a vanilla GAN
2. Write a script generate.py that generate 10000 samples in the folder samples (use mine).
3. Based on these 10k samples, you will be evaluated on FID, Precision and Recall.
   Precision/Recall