TTIC 31230 Fundamentals of Deep Learning

Problems for GANs.

Problem 1. This problem is class-conditional GANs. Here we consider a dataset, such as imagenet, consisting of a set of pairs where each pair consists of a image and class label. In class-conditional GAN we view the class label as the input x and the image as the thing to be predicted y. Obviously there is a lot of variation in the images that can be labeled as a dog. In a class-conditional GAN we build a model $P_\Phi(y|x)$ where x is a class label and y is an image.

(a) Write the conditional GAN adversarial objective function for this problem in terms of $P_\Phi(y|x)$ and $P_\Psi(i|y,x)$.

(b) Let $\hat{y}_\Phi(z)$ be the image output by a deconvolution CNN given a noise tensor input z. Describe an input noise tensor z that would be appropriate for sampling from $P_\Phi(y|x)$ when x is a class label.