Inception Score

Inception score measure two parameters:
1> Images have variety.
2> Generated images should be of good quality.

Inception score is equivalent to KL divergence between each image label distribution and the sum of label distribution for the entire set of images (marginal label distribution). Uniform marginal label distribution of the generated set of images indicates variety between samples. Also, we want each image to be distinct, which implies that an image's label distribution should be skewed towards one class. Therefore, by analysing each image's label distribution with the marginal label distribution for the entire set of images, we estimate a score which quantify the difference between these two distributions.

Mean SSIM Score

One of the most noticeable problems with GAN training is mode collapse. It happens when the generator generates a limited diversity of samples, or even the same sample, regardless of the input. The inception score cannot measure whether a model has collapsed. We can get high inception score value even when the generator is producing a similar type of images. For evaluating intra class diversity and to make sure that our generator model hasn't slipped into mode collapsed we used SSIM metric. SSIM stands for structure similarity Index and is a measure of perceptual similarity between pair of images, Its values range between 0.0 and 1.0; higher MS-SSIM values correspond to perceptually more similar images. Samples from classes with higher diversity will have a low SSIM score.

FocalGAN Architecture