Homework 7: GAN Implementation

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1 Generated Images

The GAN architecture was trained for 250 epochs with 196 features in each convolution layer. Test accuracy when training just discriminator **89.8%**. Test accuracy when training generator and discriminator **86.3%**.

Figure 1: Generated images after first epoch.

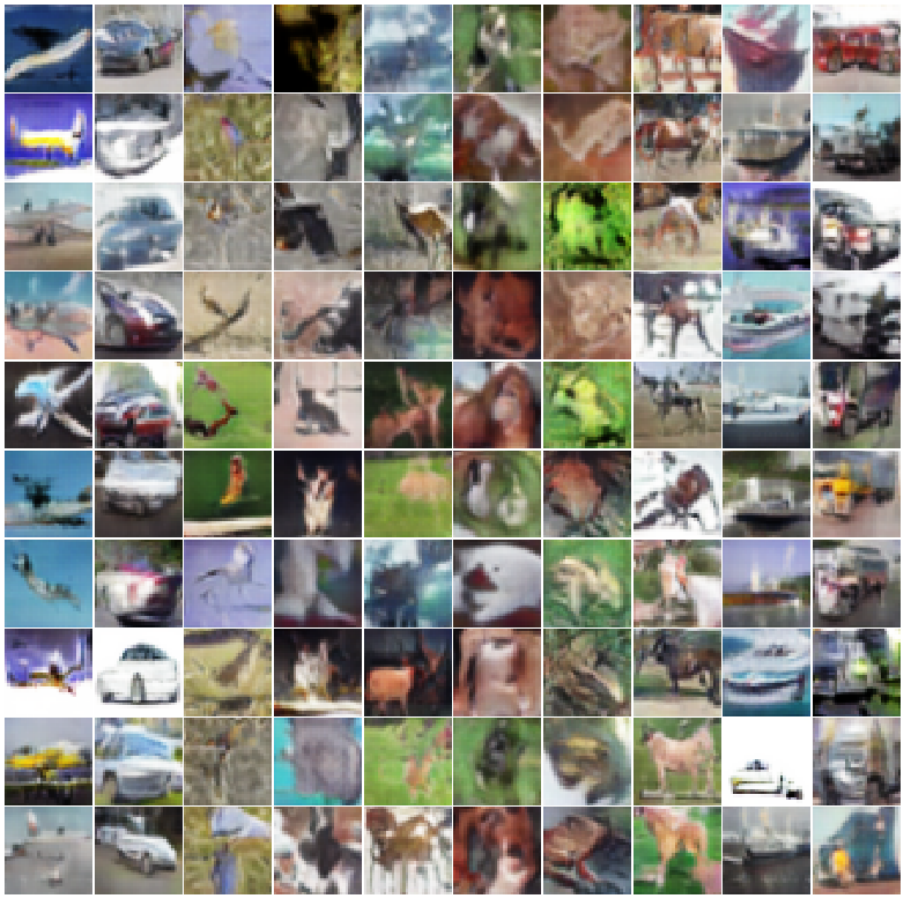

Figure 2: Generated images after 50 epochs.

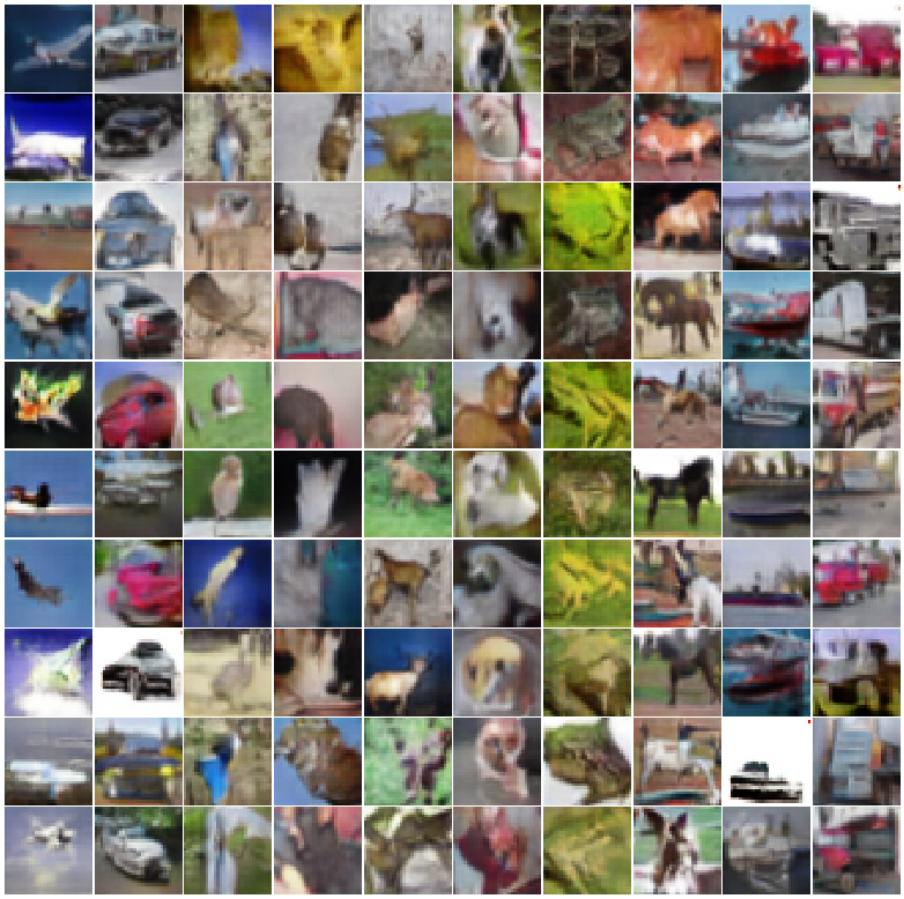

Figure 3: Generated images after 100 epochs.

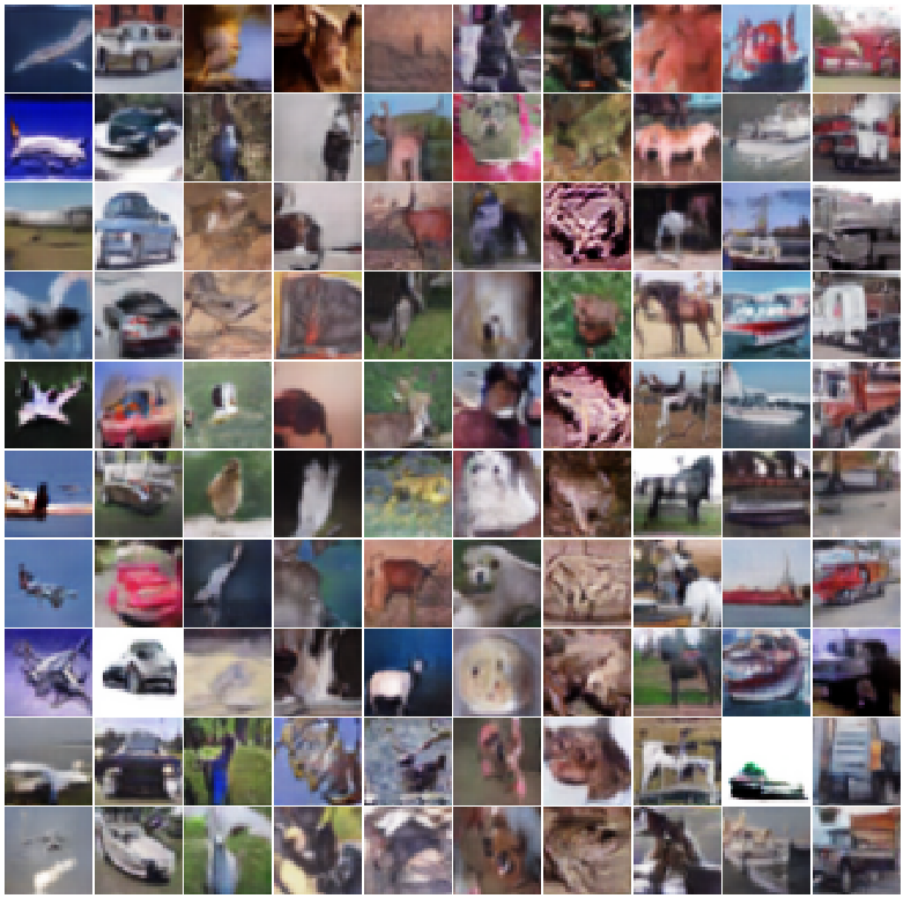

Figure 4: Generated images after 150 epochs.

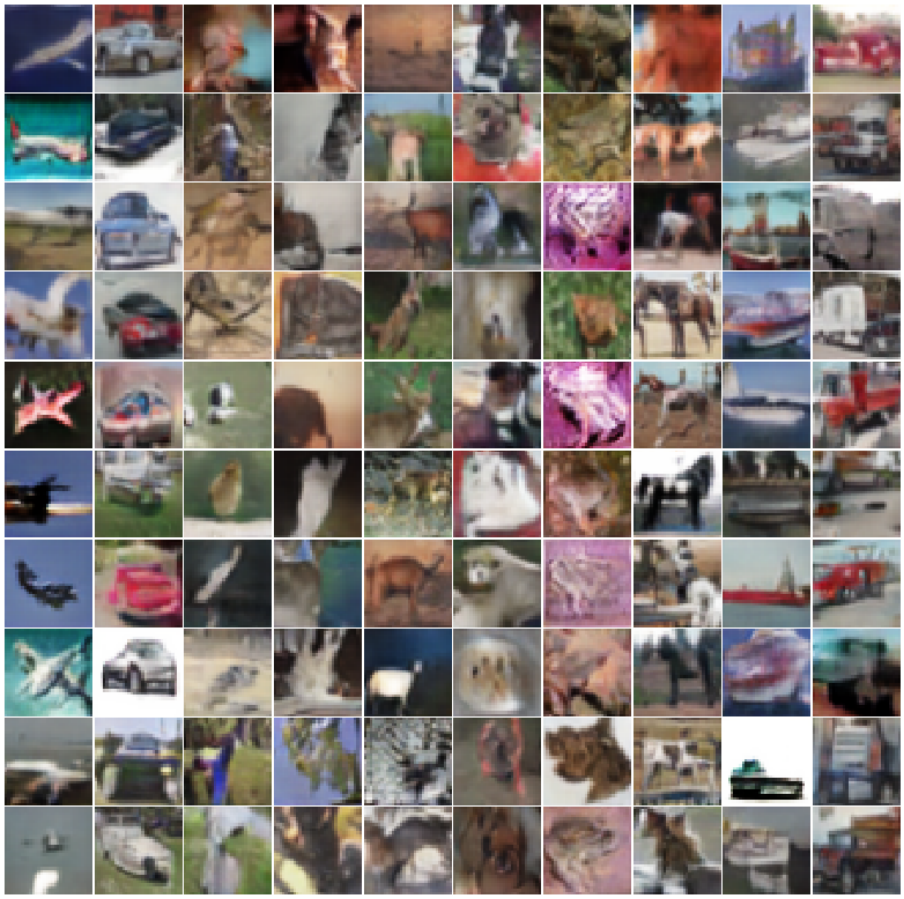

Figure 5: Generated images after 200 epochs.

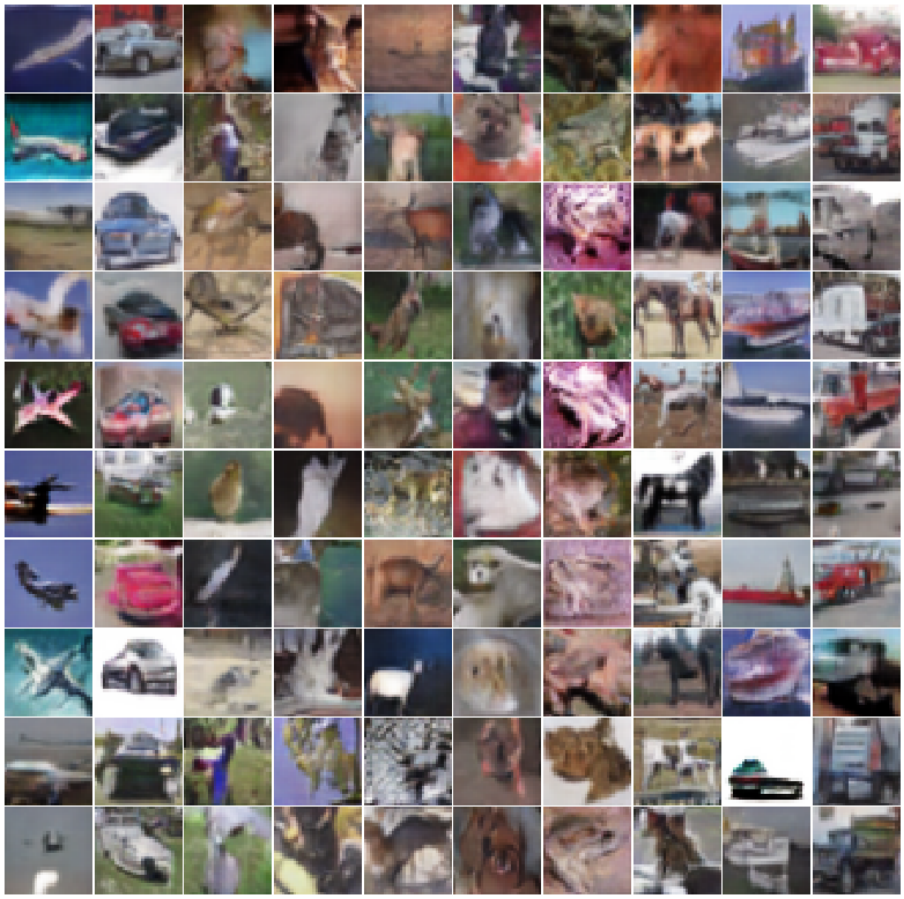

Figure 6: Generated images after 250 epochs.

2 Perturbed Images

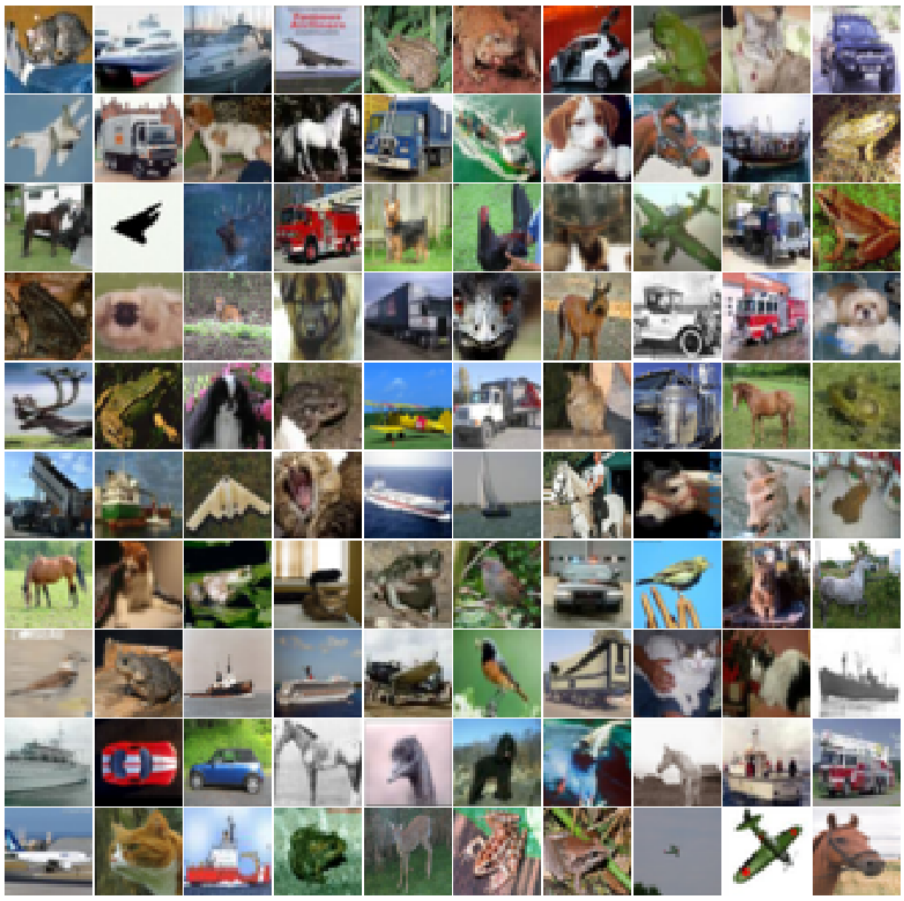

Figure 7: Real images from CIFAR10.

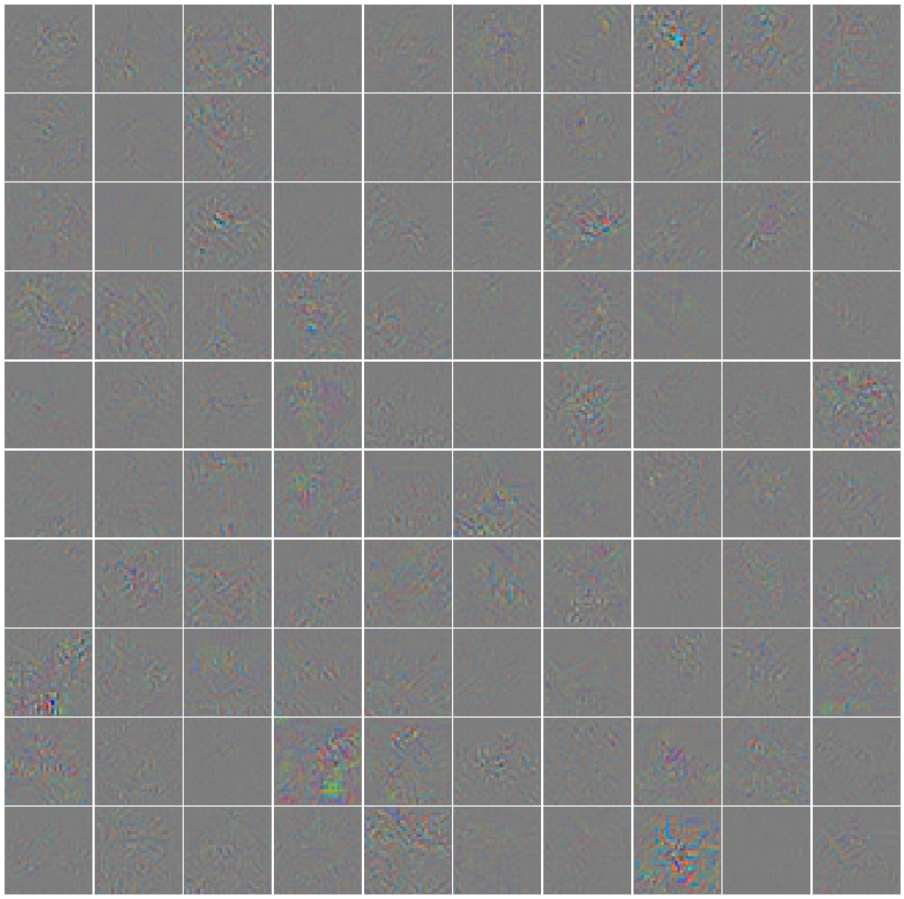

Figure 8: Gradients of the images.

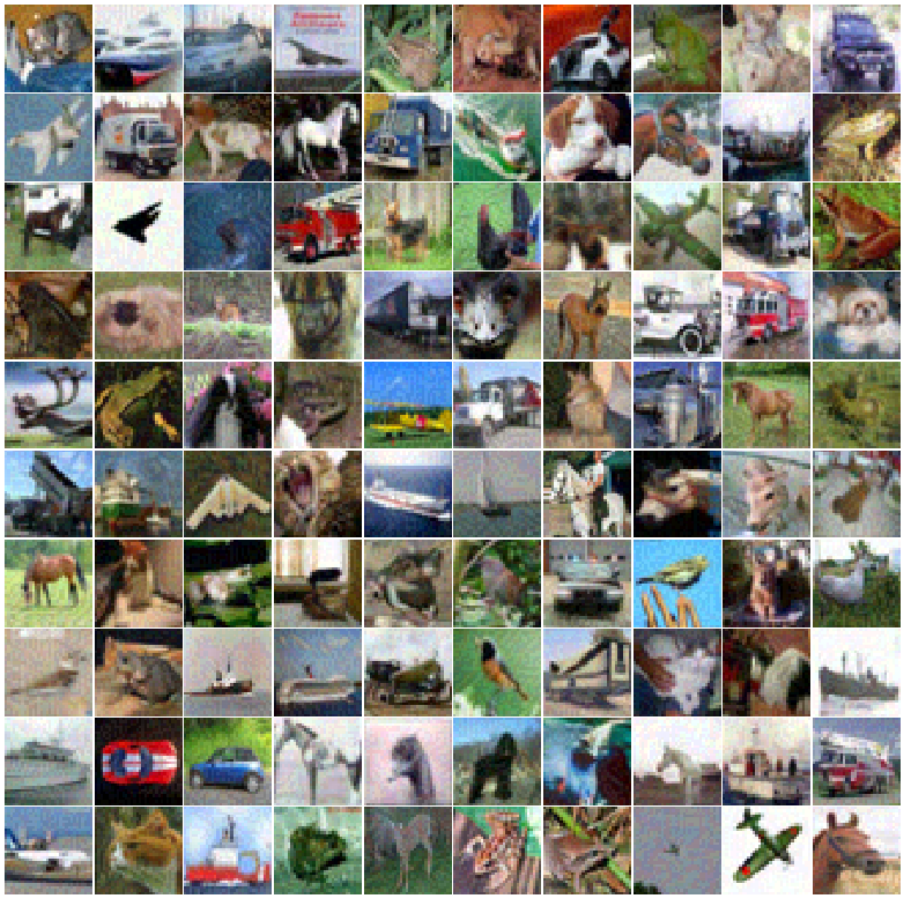

Figure 9: Perturbed images that are classified only slightly better than random guessing.

3 Synthetic Images to Maximize Class output

Note that my code also generates the blurry image issues described on Piazza.

Figure 10: Synthetic images that maximize the class output for a discriminator that was trained alone.

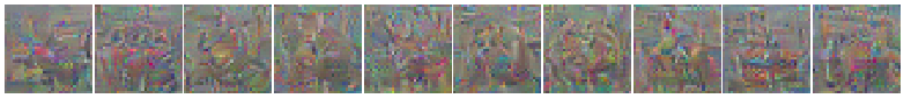

Figure 11: Synthetic images that maximize the class output for a discriminator that was trained concurrently with a generator.

4 Synthetic Images that Maximize Feature Layer

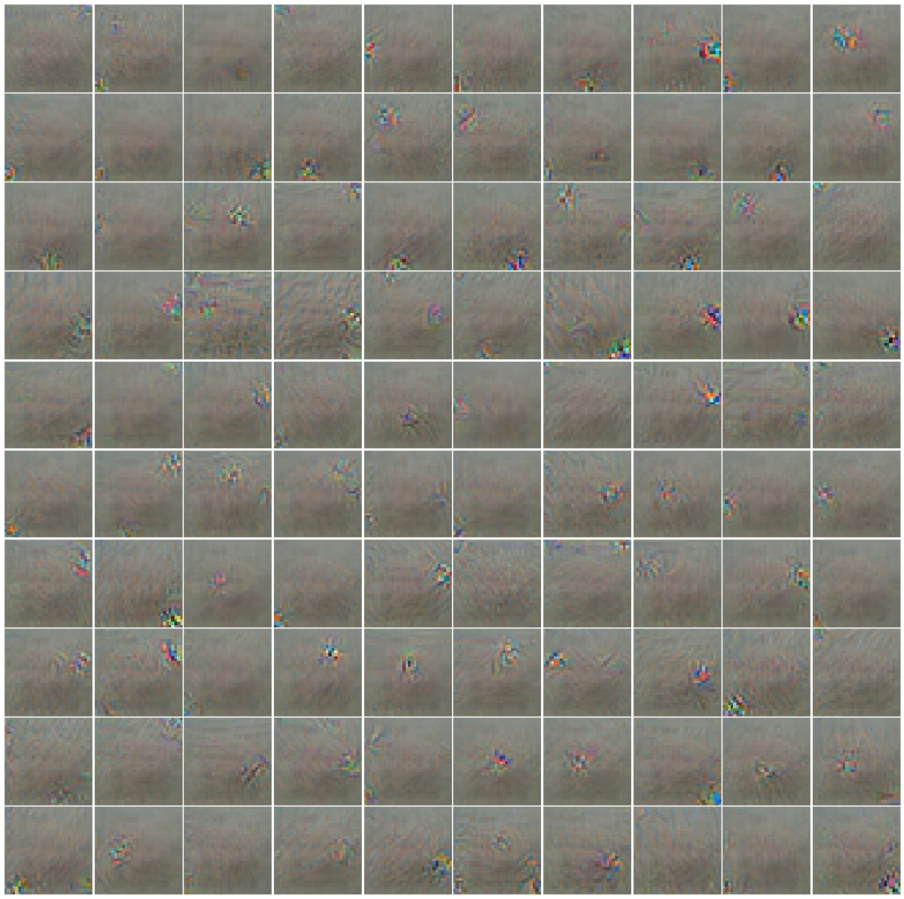

Figure 12: Synthetic images that maximize the fourth convolution layer features. Here the discriminator was trained alone.

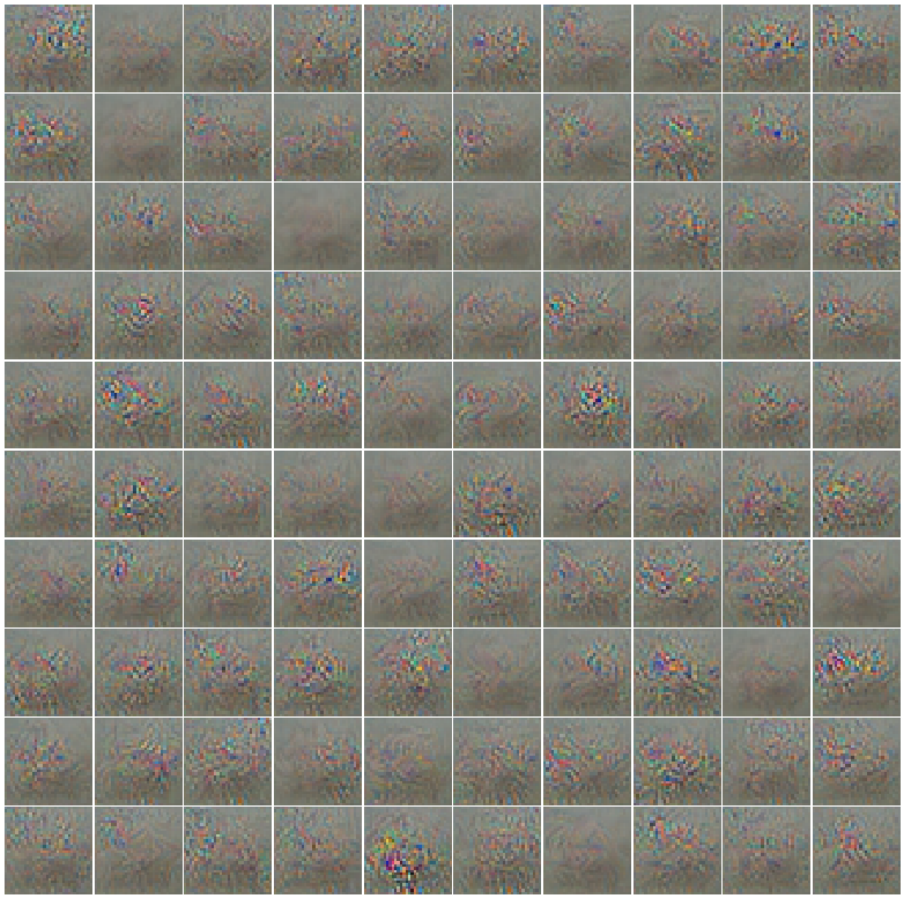

Figure 13: Synthetic images that maximize the eighth convolution layer features. Here the discriminator was trained alone.

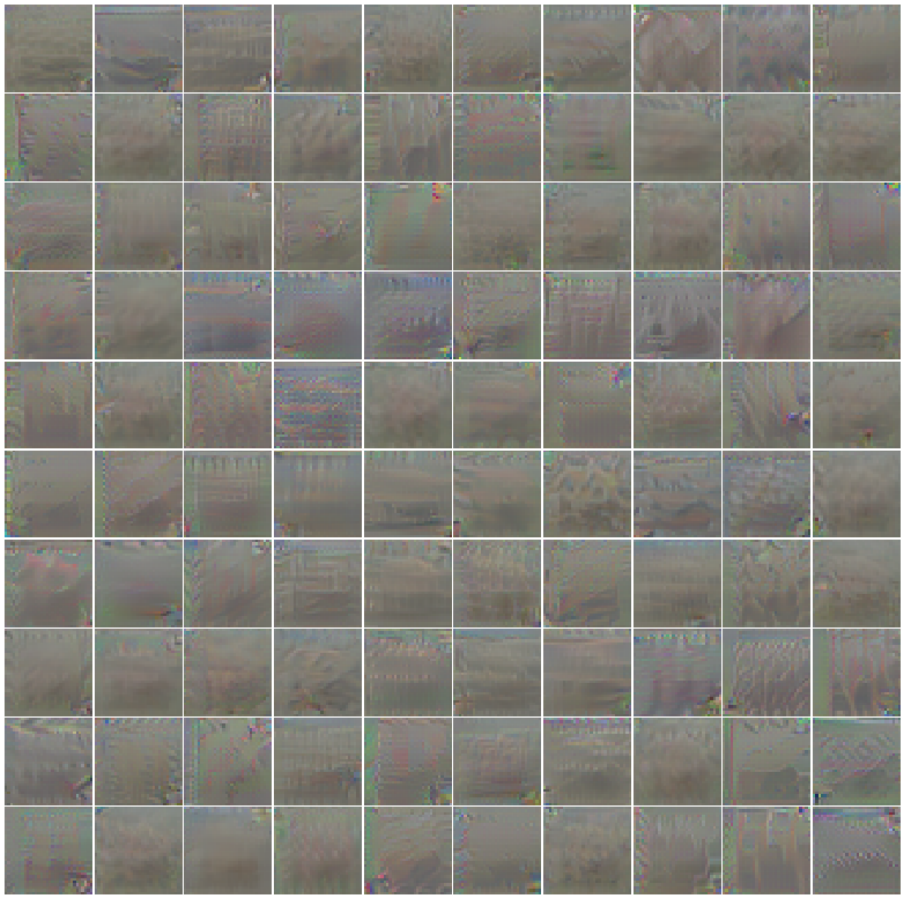

Figure 14: Synthetic images that maximize the fourth convolution layer features. Here the discriminator was trained concurrently with a generator.

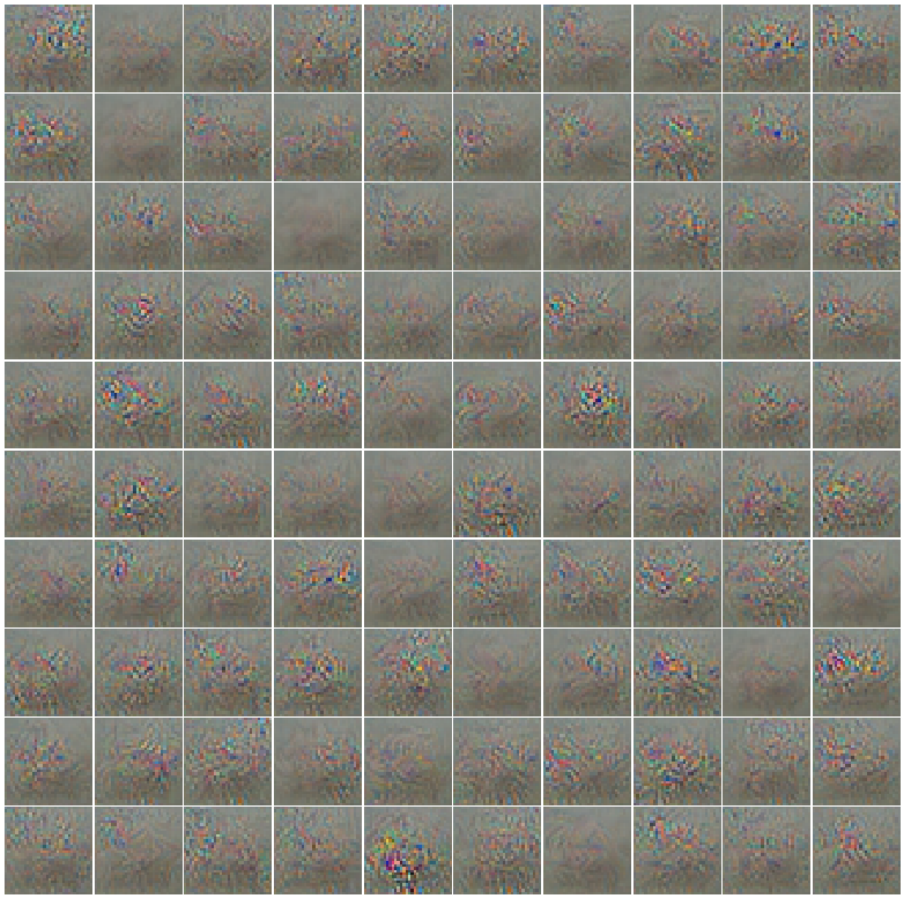

Figure 15: Synthetic images that maximize the eighth convolution layer features. Here the discriminator was trained concurrently with a generator.