IE 534, homework 6

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1. Training Progress

I trained the GAN for 300 epochs. The images generated after epoch 1, 50, 100, 200, 300 are shown as below:

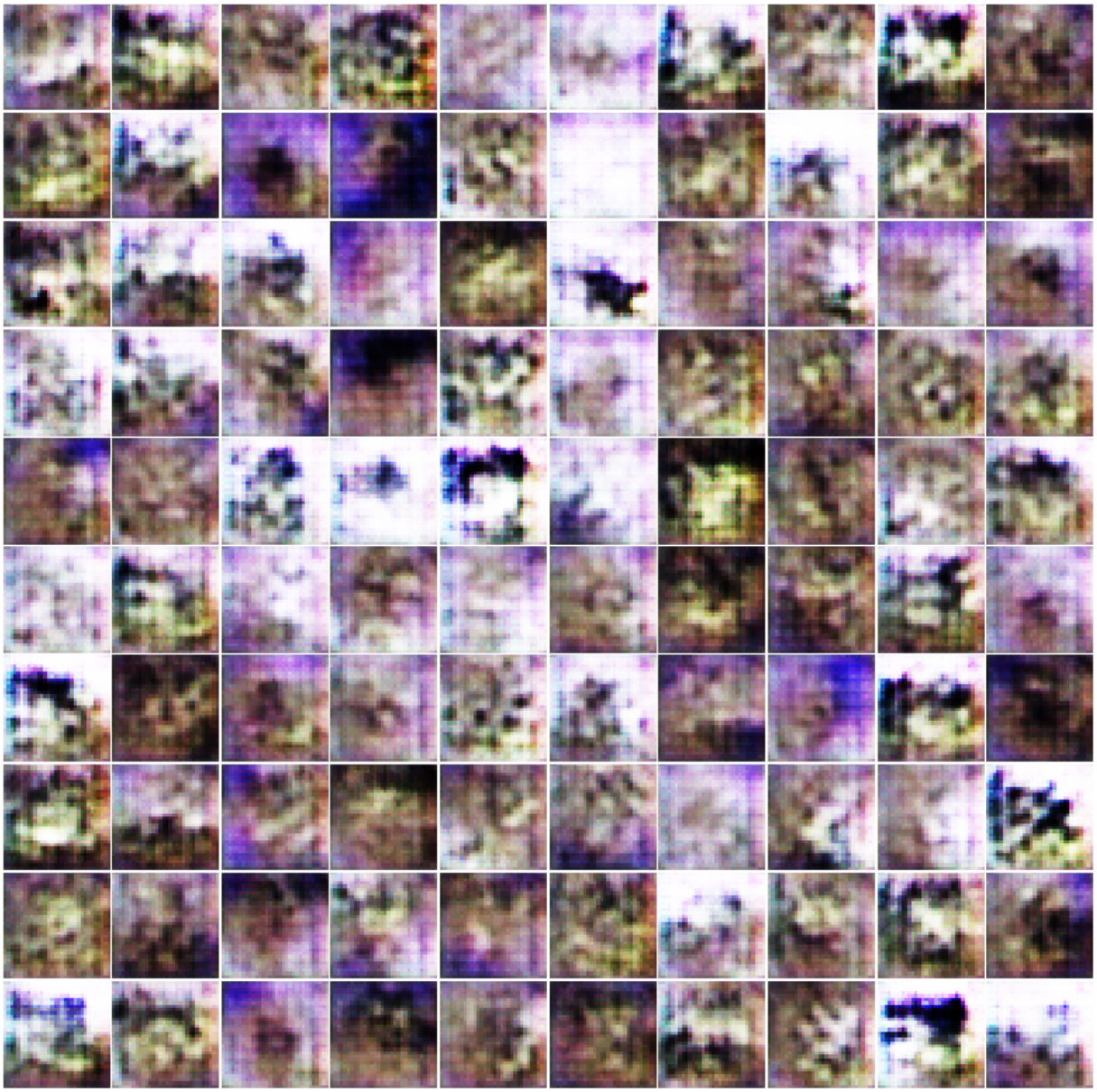


Figure 1: The image generated after epoch 1

Figure 2: The image generated after epoch 50

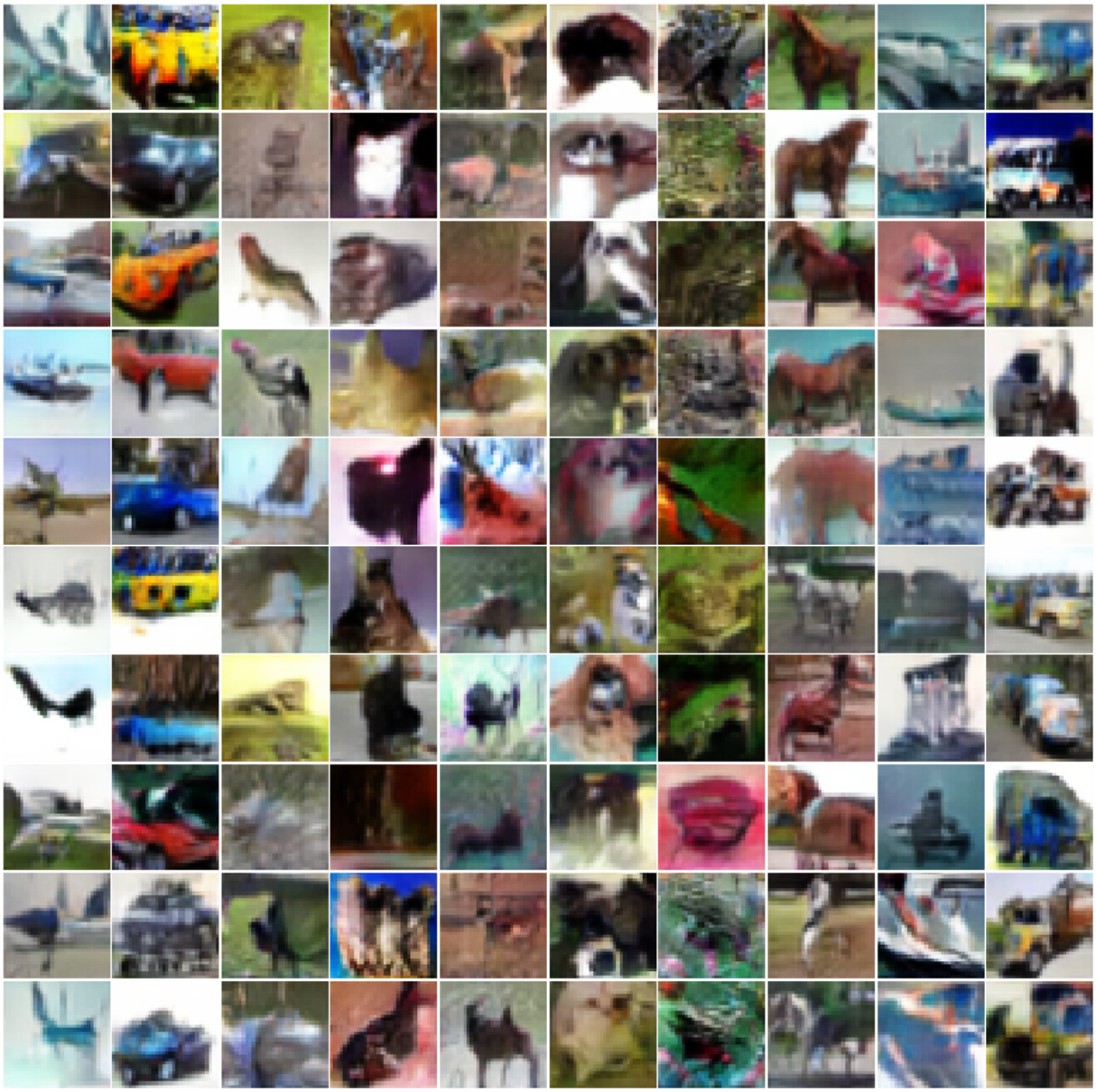


Figure 3: The image generated after epoch 100

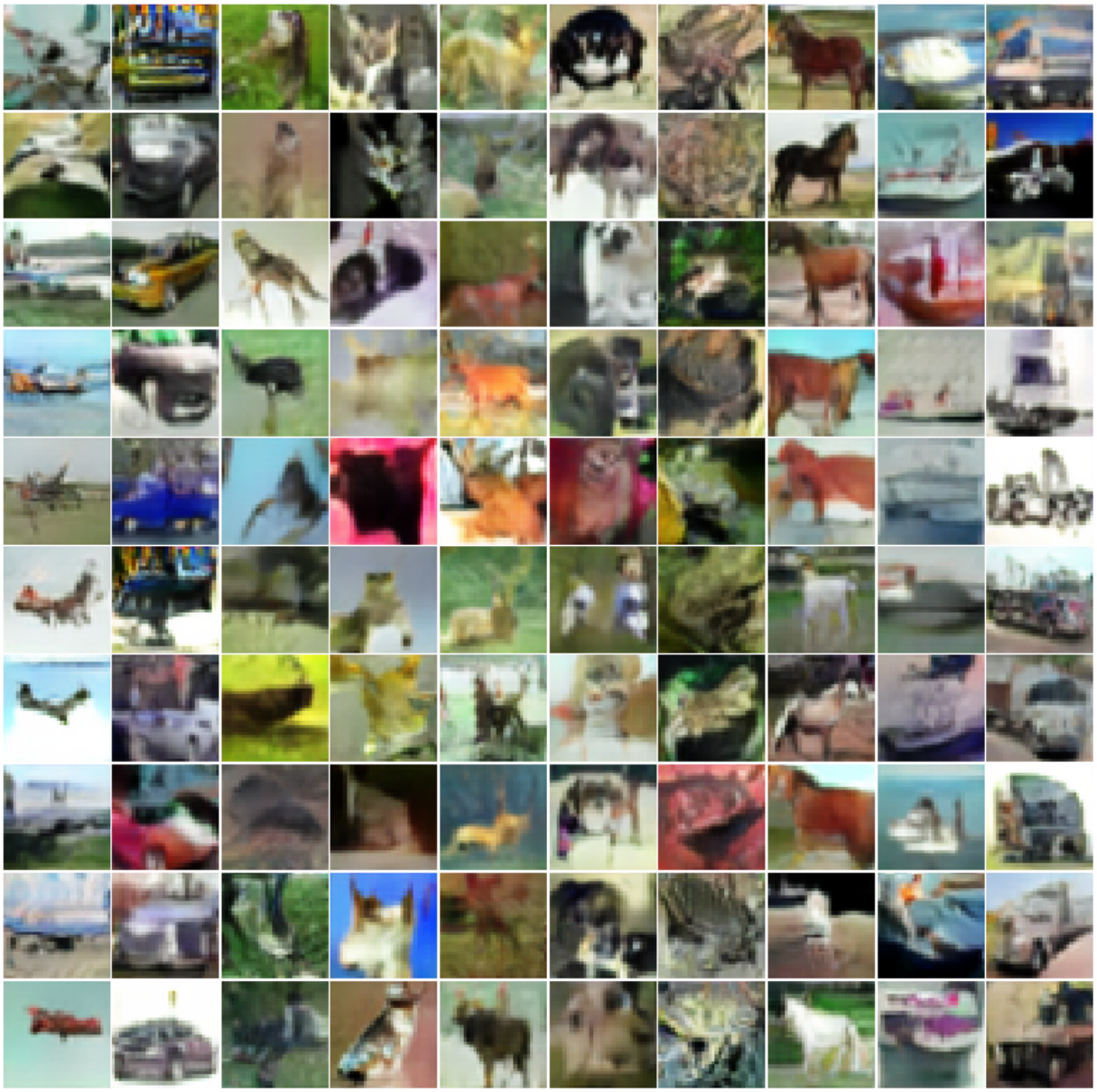


Figure 4: The image generated after epoch 200

Figure 5: The image generated after epoch 300

2. Perturb Real Images

In this part, 100 real images, 100 gradients from an alternate class for these images, and the modified images the discriminator incorrectly classifies are shown as below:

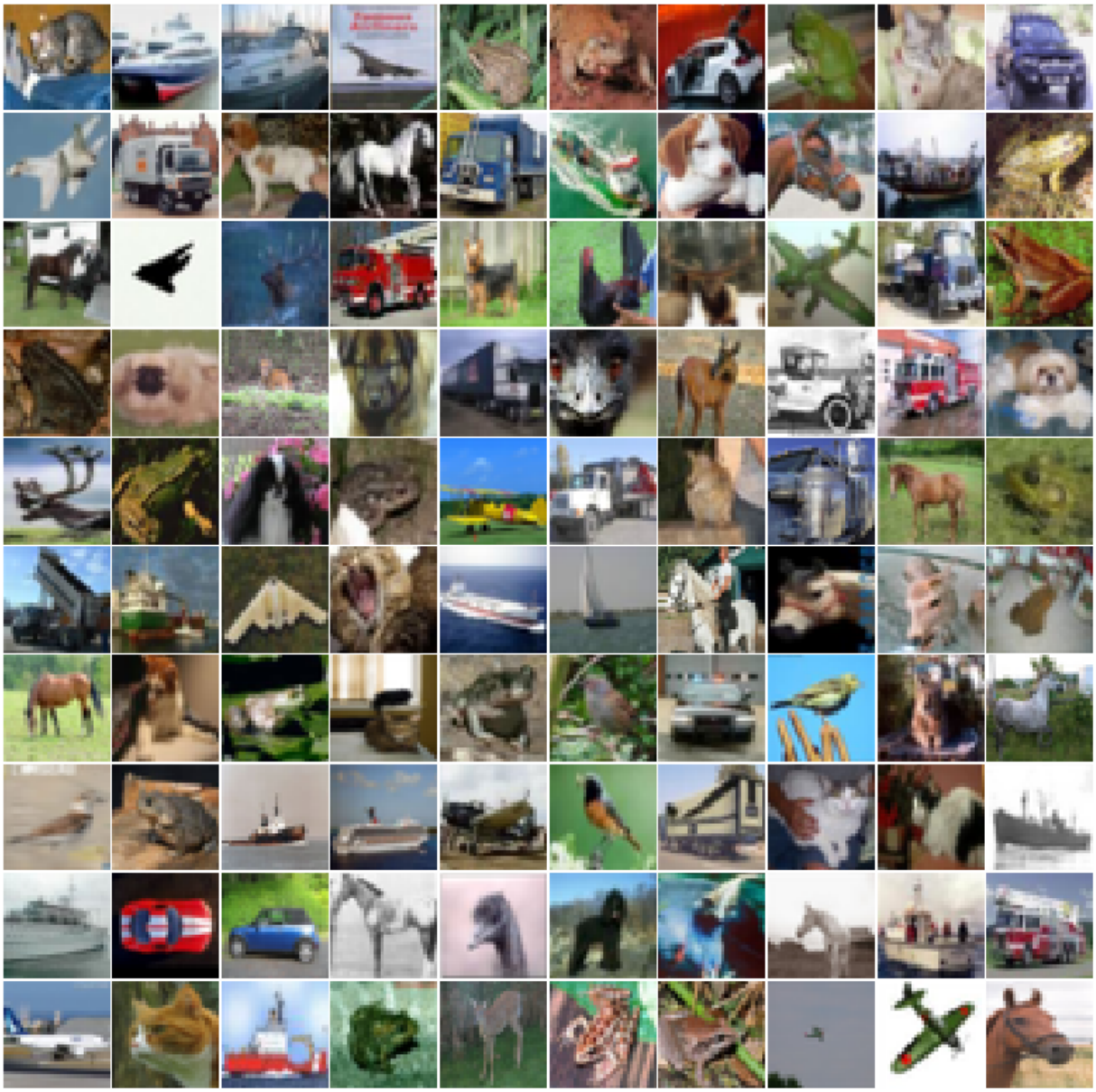


Figure 6: Real images

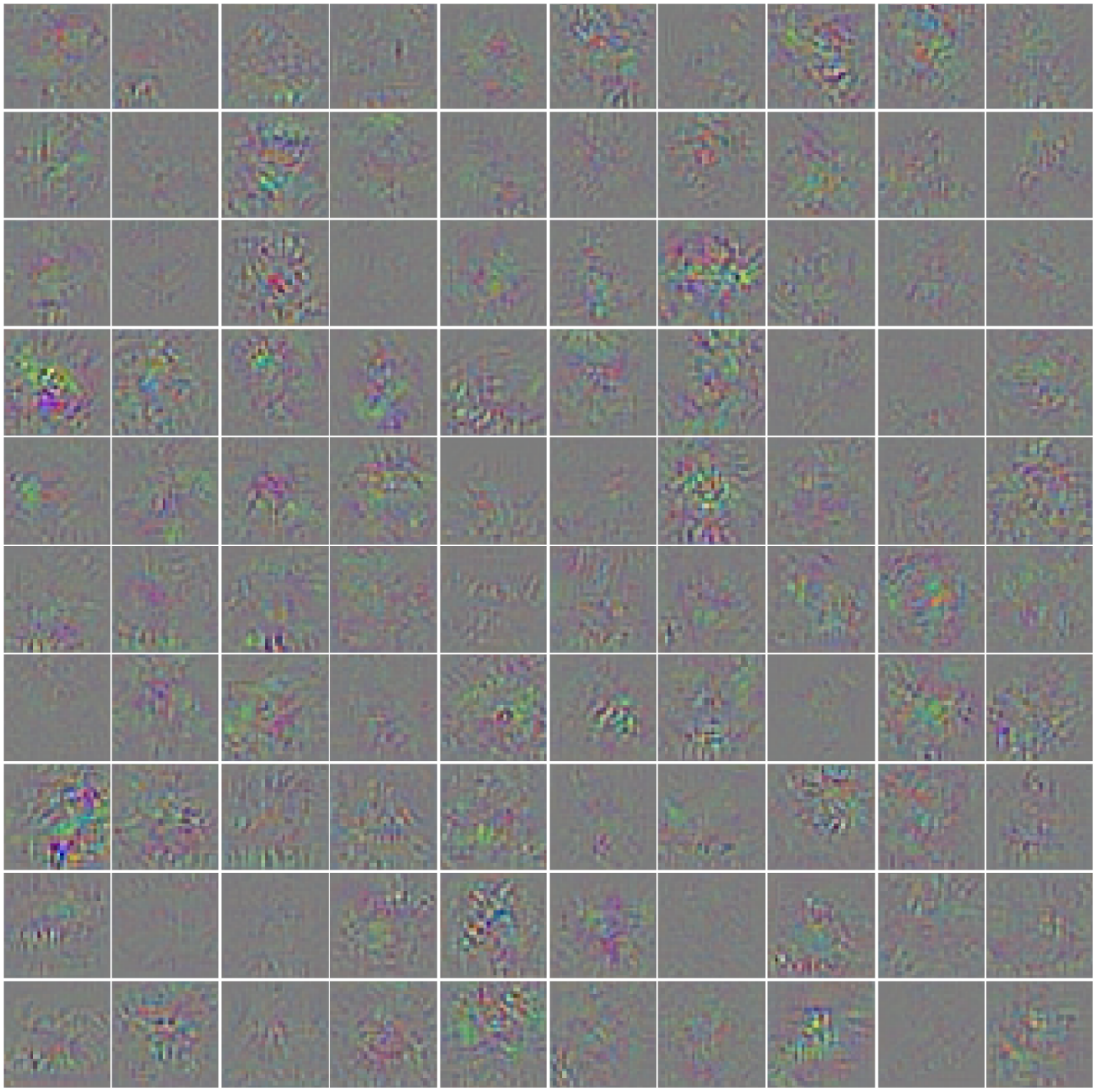


Figure 7: Gradients

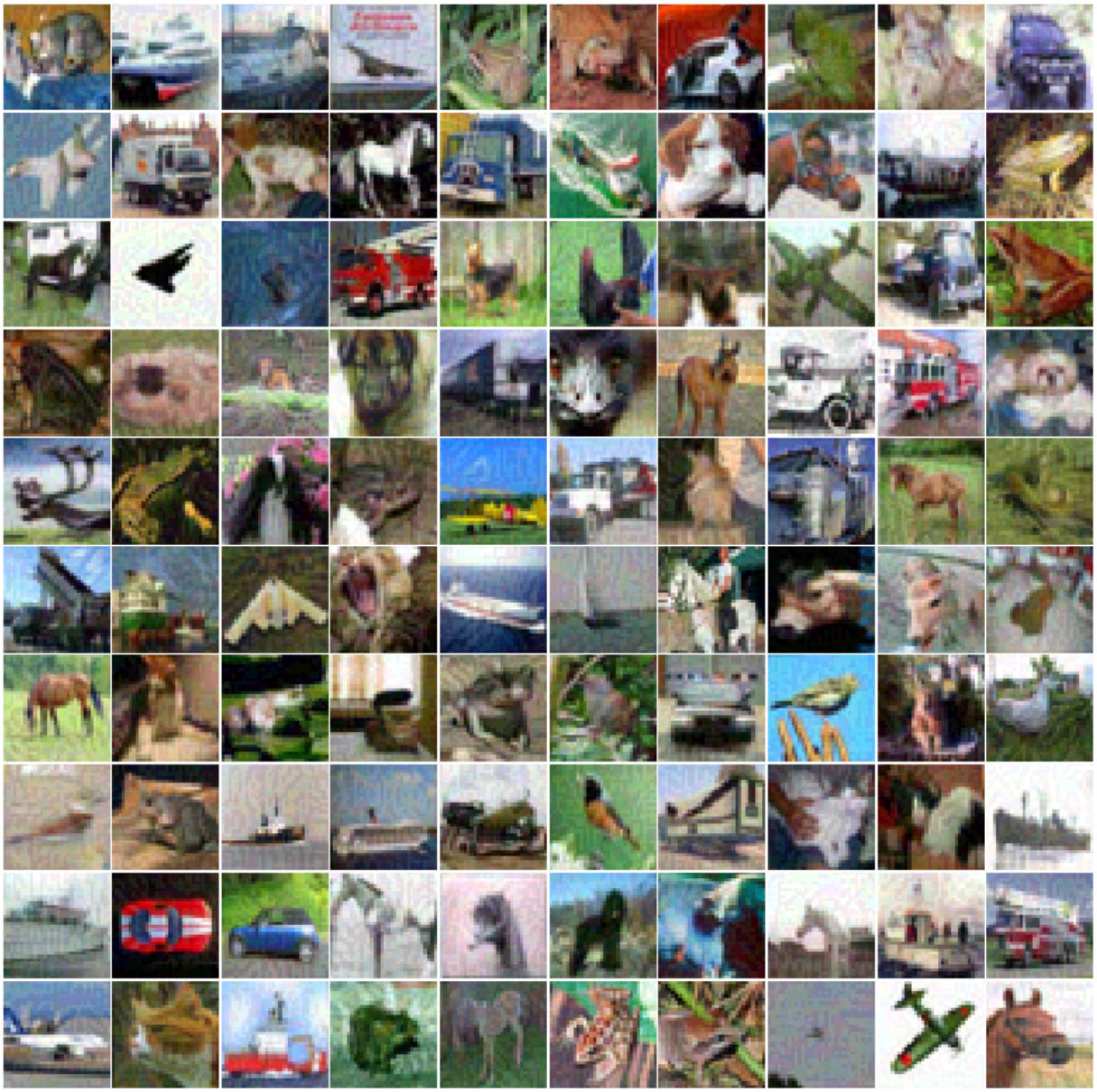


Figure 8: Altered images

3. Synthetic Images Maximizing Classification Output

In this part, the 10 copies output for discriminator trained without the generator and for discriminator trained with the generator are shown as below:

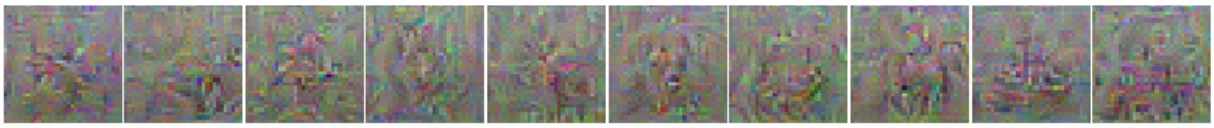


Figure 9: Synthetic images maximizing class output for discriminator trained without the generator

Figure 10: Synthetic images maximizing class output for discriminator trained with the generator

4. Synthetic Features Maximizing Features at Various Layers

In this part, the synthetic images maximizing layer 4 and layer 8 features for discriminator trained without the generator and for discriminator trained with the generator are shown as below:

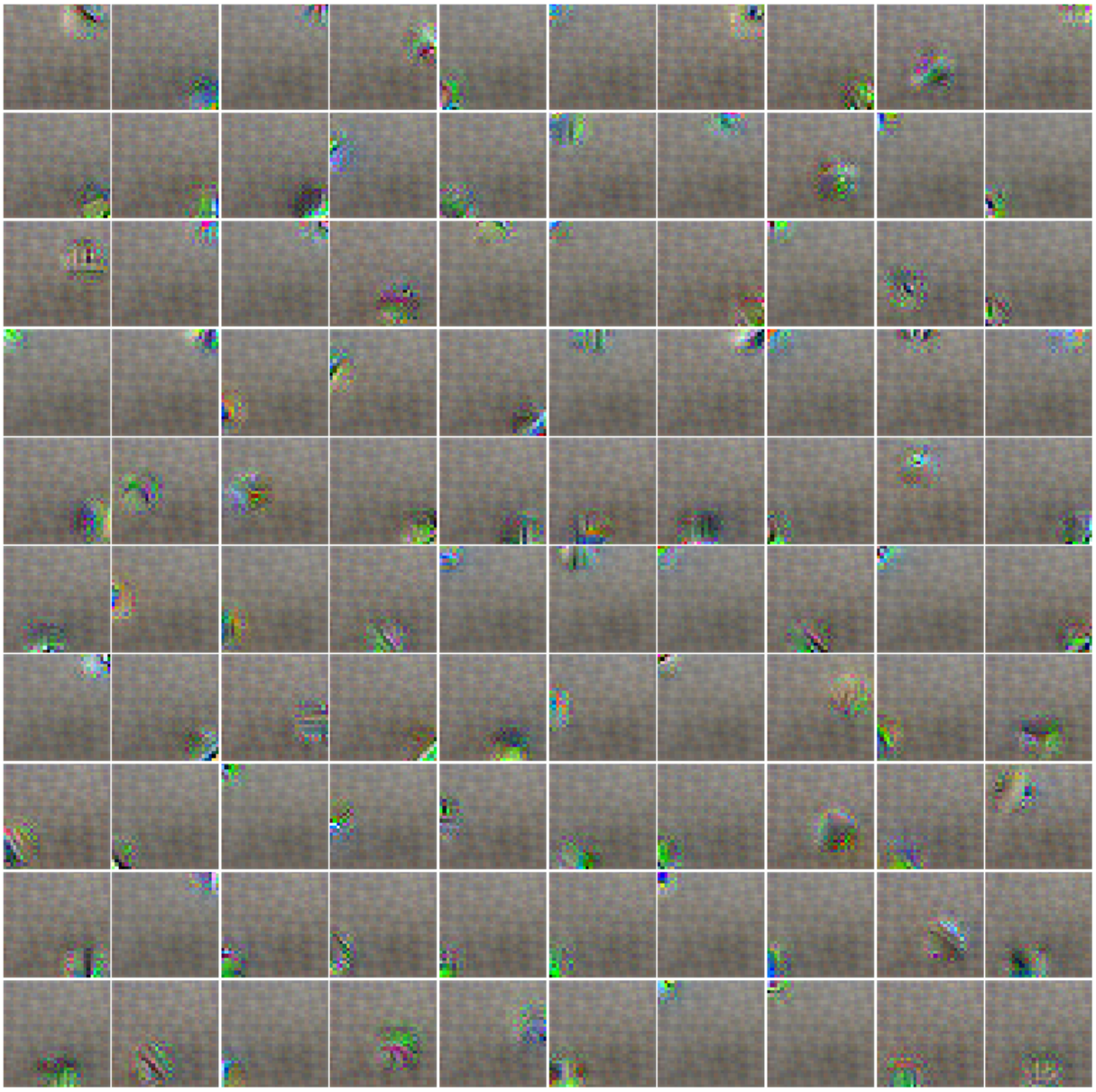


Figure 11: Synthetic images maximizing layer 4 features for discriminator trained without the generator

Figure 12: Synthetic images maximizing layer 8 features for discriminator trained without the generator

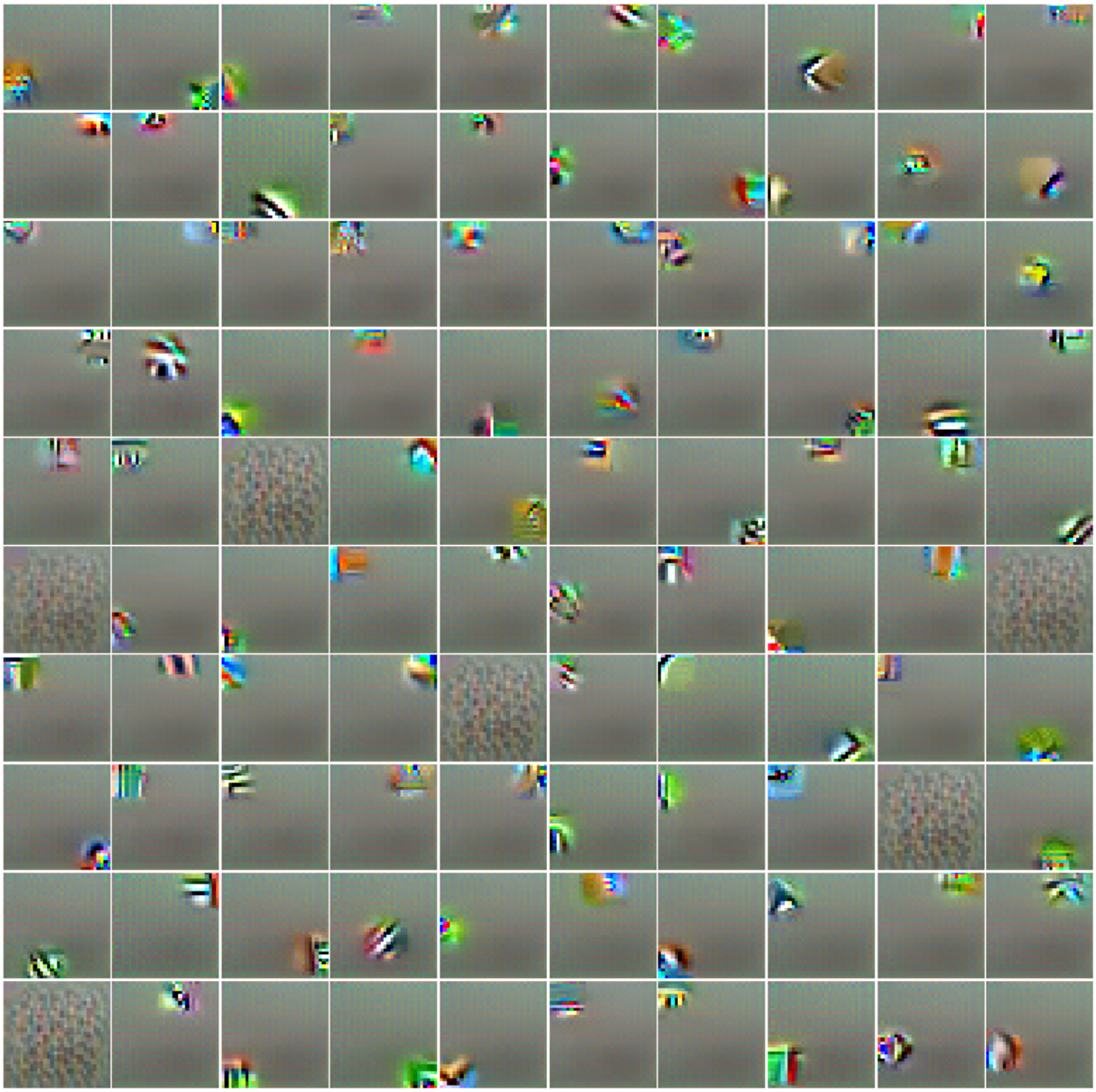
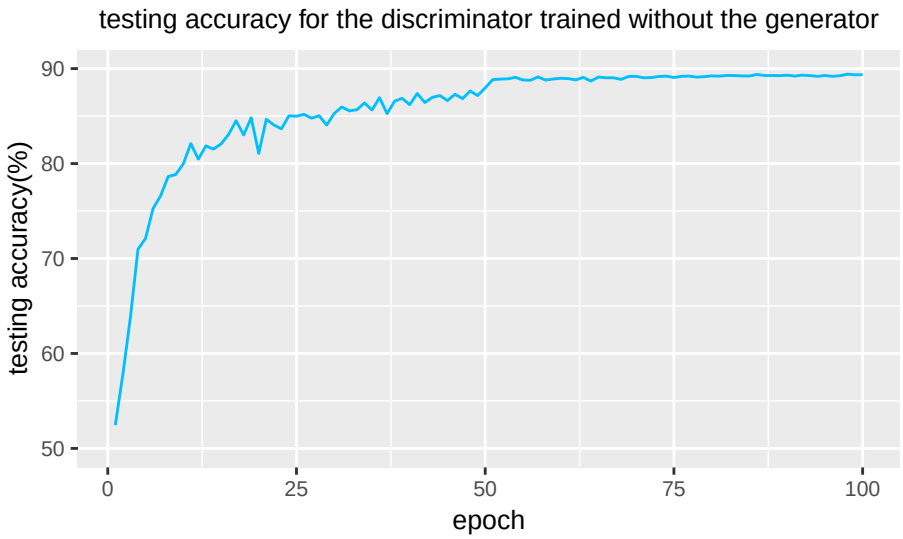


Figure 13: Synthetic images maximizing layer 4 features for discriminator trained with the generator

Figure 14: Synthetic images maximizing layer 8 features for discriminator trained with the generator

5. Testing Accuracy

For the discriminator trained without the generator, the number of epochs is set to be 100. After 48 epochs, the testing accuracy keeps above 87% and finally achieved 89%. The testing accuracy after each epoch are plotted as below:



For the discriminator trained with the generator, the number of epochs is set to be 300. After 209 epochs, the testing accuracy keeps above 80%. The testing accuracy after each epoch are plotted as below: