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### **GAN and LSGAN MNIST**

Show final results from training both your GAN and LSGAN (4x4 grid of images for both):

#### **GAN:**

Epoch = 10

Iter: 4500, D: 0.65, G:0.7434



#### **LSGAN:**

Epoch = 10

Iter: 4500, D: 0.2305, G:0.1599



## GAN and LSGAN Cats

Show final results from training both your GAN and LSGAN (4x4 grid of images for both):

### **GAN**

Epoch 49

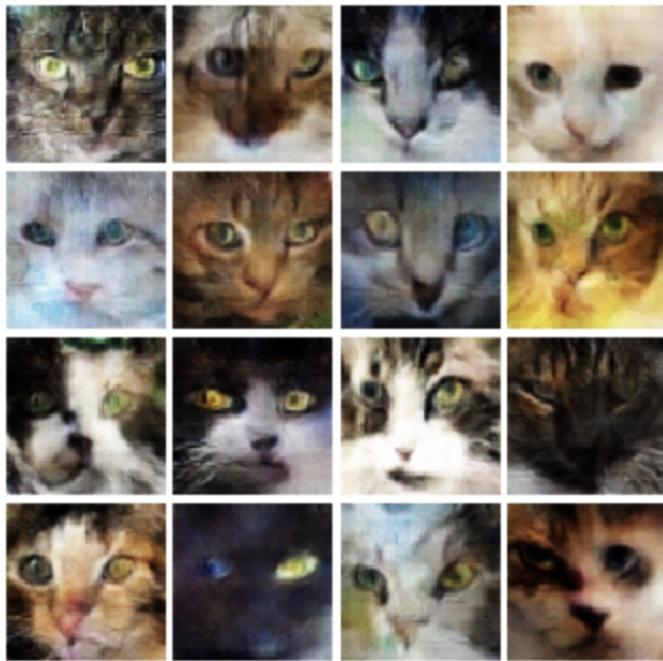
Iter: 24000, D: 0.02505, G:6.749



## LSGAN

Epoch = 48

Iter: 23500, D: 0.1876, G: 0.266



Discuss any differences you observed in the quality of output or behavior during training of the two GAN models.

- In GAN, after the 7th epoch, the images started looking like a cat. In contrast, for LSGAN, the first 24 epochs were almost like noise and after that, it started turning into the shape of a cat.
- For LSGAN, losses for both the discriminator and generator are within the range of 0 to 1, compared to the losses of GAN, which ranged between 0 to 10.
- GAN has a less diverse set of images as compared to LSGAN for both MINST and Cat dataset.

Do you notice any instances of mode collapse in your GAN training? Show some instances of mode collapse from your training output.

## GAN :

1. Epoch 37

Iter: 17000, D: 0.008898, G:12.08



3 cats in the red box and the 3 cats in the yellow box have nearly similar features.

2.

EPOCH: 38

Iter: 18250, D: 0.1524, G:6.66



Almost all the cat images have yellow/green colored eyes.

## LSGAN:

1. Epoch: 37

Iter: 18000, D: 0.2841, G:0.1399



Almost all the cat images have a slant texture.

2. Epoch 40

Iter: 19500, D: 0.2503, G:0.2848



5 cats in the red box have nearly similar features.

### 3. Epoch 44

EPOCH: 44  
Iter: 21250, D: 0.1577, G: 0.3741



Almost all the cat images have green-colored eyes.

#### Extra Credit - Alternative GAN Formulation

Explain what you did (describing all model changes and hyperparameter settings) and provide output images.