딥러닝 이해하기

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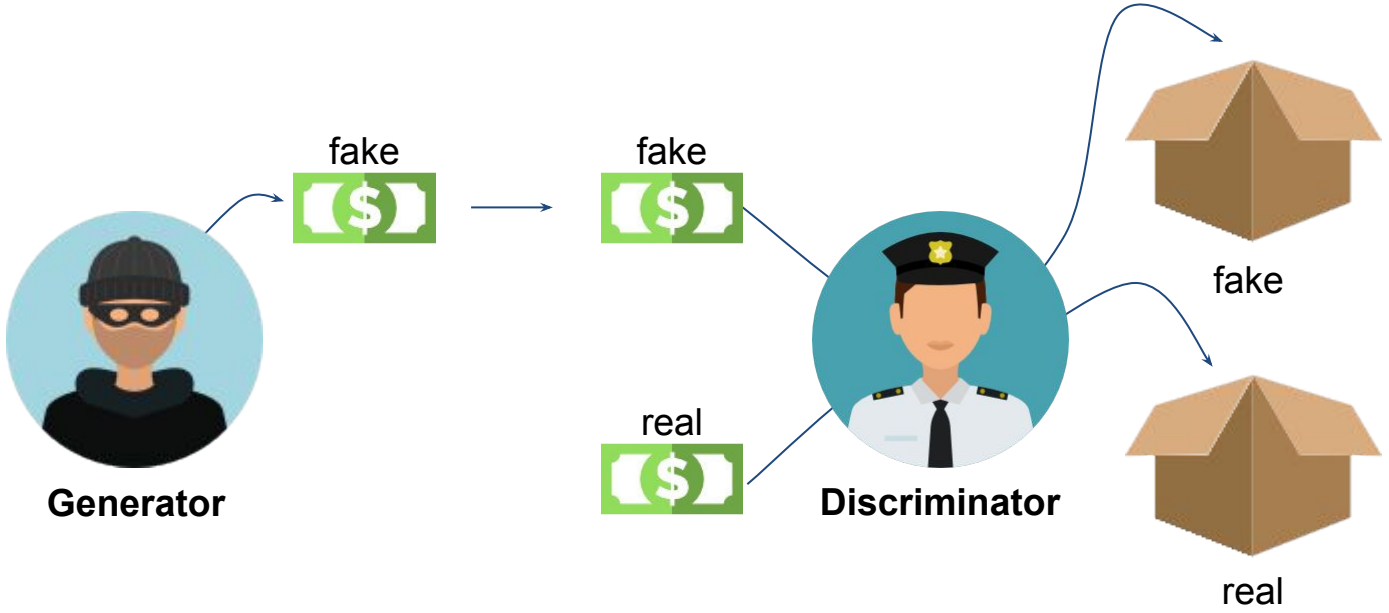
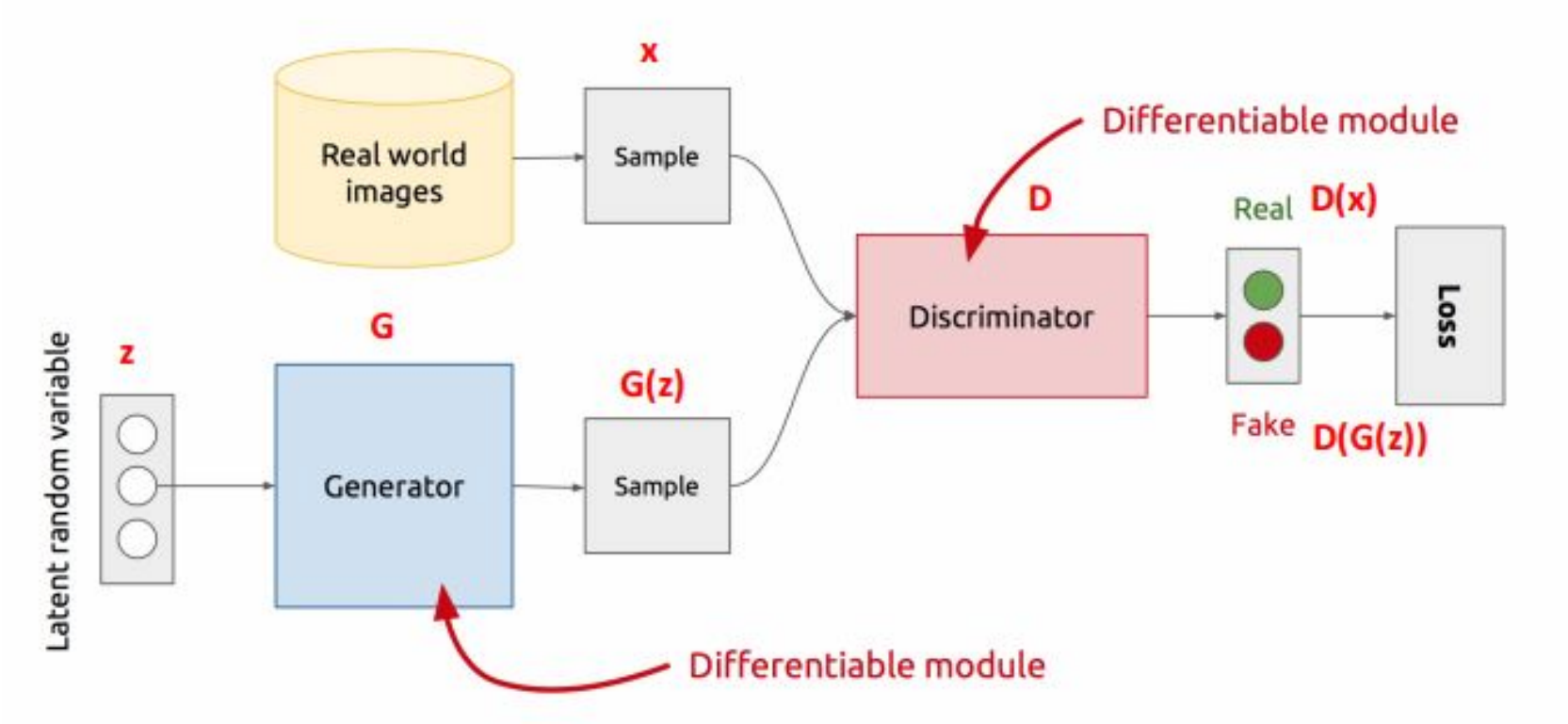
Project

GAN

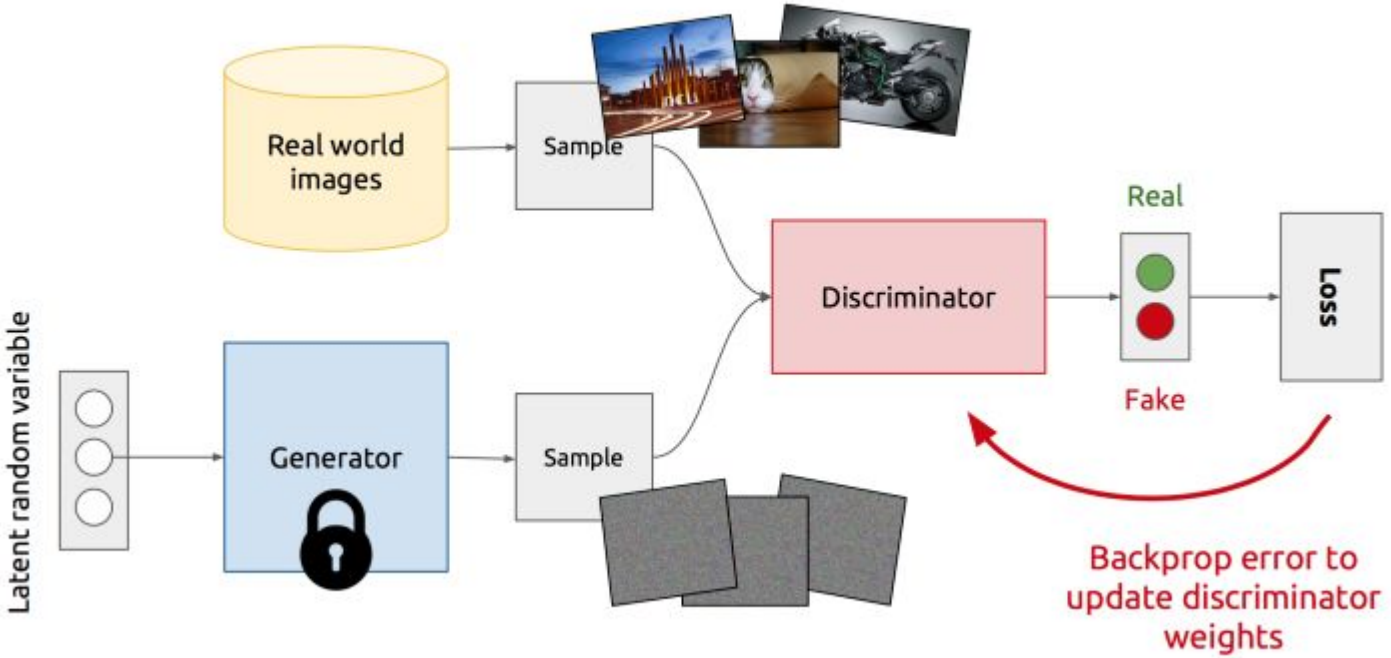


GAN

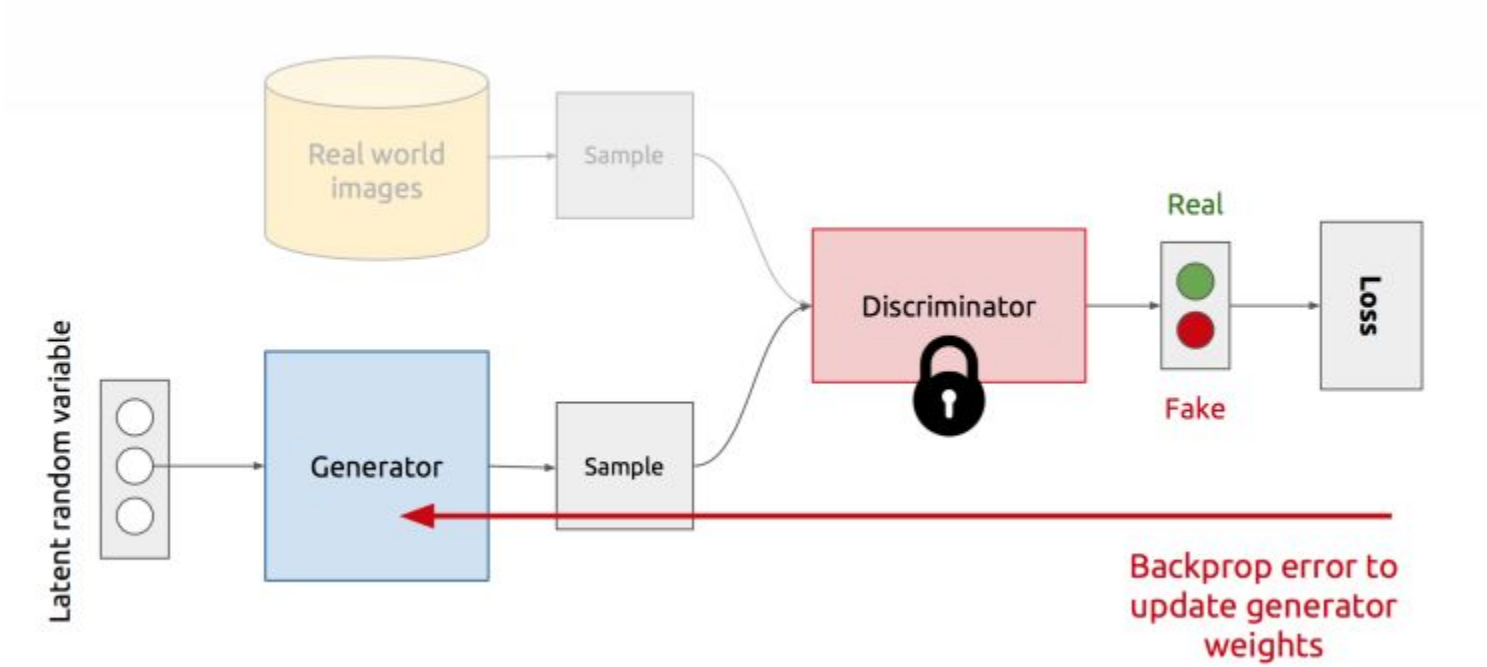
GAN


x
Real world images
Sample
Differentiable module
D
Real
D(x)
Discriminator
Loss
G
z
G(z)
Latent random variable
Generator
Sample
Fake
D(G(z))
Differentiable module

GAN


Real world images
Sample
Latent random variable
Generator
Sample
Discriminator
Real
Fake
Loss
Backprop error to update discriminator weights

GAN


Real world images
Sample
Real
Discriminator
Loss
Fake
Latent random variable
Generator
Sample
Backprop error to update generator weights

구조

Generator
Convolution Transposed : (입력 채널 : 2, 출력 채널 : 256, 커널 크기 : 5, 스트라이드 : 1, 패딩 : 1) BatchNormalization(256) ReLU()
ConvTransposed : (256, 128, 5, 1, 1) BatchNormalization(128) ReLU()
ConvTransposed : (128, 64, 5, 2, 0) BatchNormalization(64) ReLU()
ConvTransposed : (64, 1, 4, 2, 0) Tanh()

구조

Discriminator
Convolution : (입력 채널 : 1, 출력 채널 : 64, 커널 크기 : 5, 스트라이드 : 2, 패딩 : 1) LeakyReLU(0.2)
Convolution : (64, 128, 4, 2, 1) BatchNormalization(128) LeakReLU(0.2)
Convolution : (128, 256, 4, 2, 1) BatchNormalization(256) LeakReLU(0.2)
Convolution : (256, 1, 3, 1, 0) Sigmoid()

Hypermatameters

BCE loss
batch size 100
z size(noise의 크기) = nz = 2
learning rate 0.001(generator) 0.0002(discriminator)
MNIST normalize (0.5,),(0.5,)

GAN

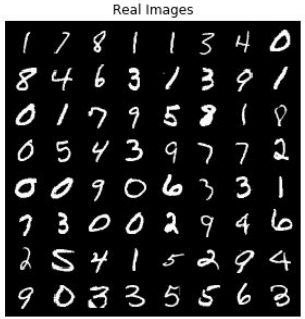
Hints

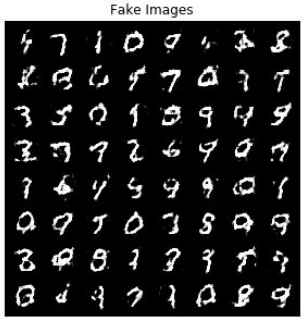
1. Discriminator 학습
   a. real data + label 1
   b. fake data + label 0 (이 때 generator는 학습하지 않음. detach() 함수 사용)
2. Generator 학습
   a. fake data + label 1 (이 때 discriminator는 학습하지 않음.)
3. 특정모델만 학습하기 위해 optimizer 2개 사용. zero_grad()함수와 optimizer.step()을 적절히 사용할것

fake data 생성 예시

```
noise = torch.FloatTensor(batch_size, nz, 1, 1).normal_(0, 1).to(device)
fake_data = net_generator(noise)
label.data.fill_(fake_label)
```

시각화 함수






```python
def show_generated_data(real_data, fake_data):
    plt.figure(figsize=(15, 5))
    plt.subplot(1, 2, 1)
    plt.axis("off")
    plt.title("Real Images")
    plt.imshow(np.transpose(vutils.make_grid(real_data[:64], padding=5, normalize=True).cpu(), (1, 2, 0)))

    # Plot the fake images from the last epoch
    plt.subplot(1, 2, 2)
    plt.axis("off")
    plt.title("Fake Images")
    plt.imshow(np.transpose(vutils.make_grid(fake_data.detach()[:64], padding=5, normalize=True).cpu(), (1, 2, 0)))
    plt.show()
```

학습에 사용한 실제 데이터, 가짜 데이터를 입력으로 넣으면(미니배치 채로)
해당 배치의 데이터를 시각화 시켜줍니다.

실습 코드 링크

https://colab.research.google.com/drive/13fc2yswz26j0uQXqN3OvLiqlro5vl1Ko