GANs

Adán González Rodríguez
Sara Porto Álvarez

Sobre el código:

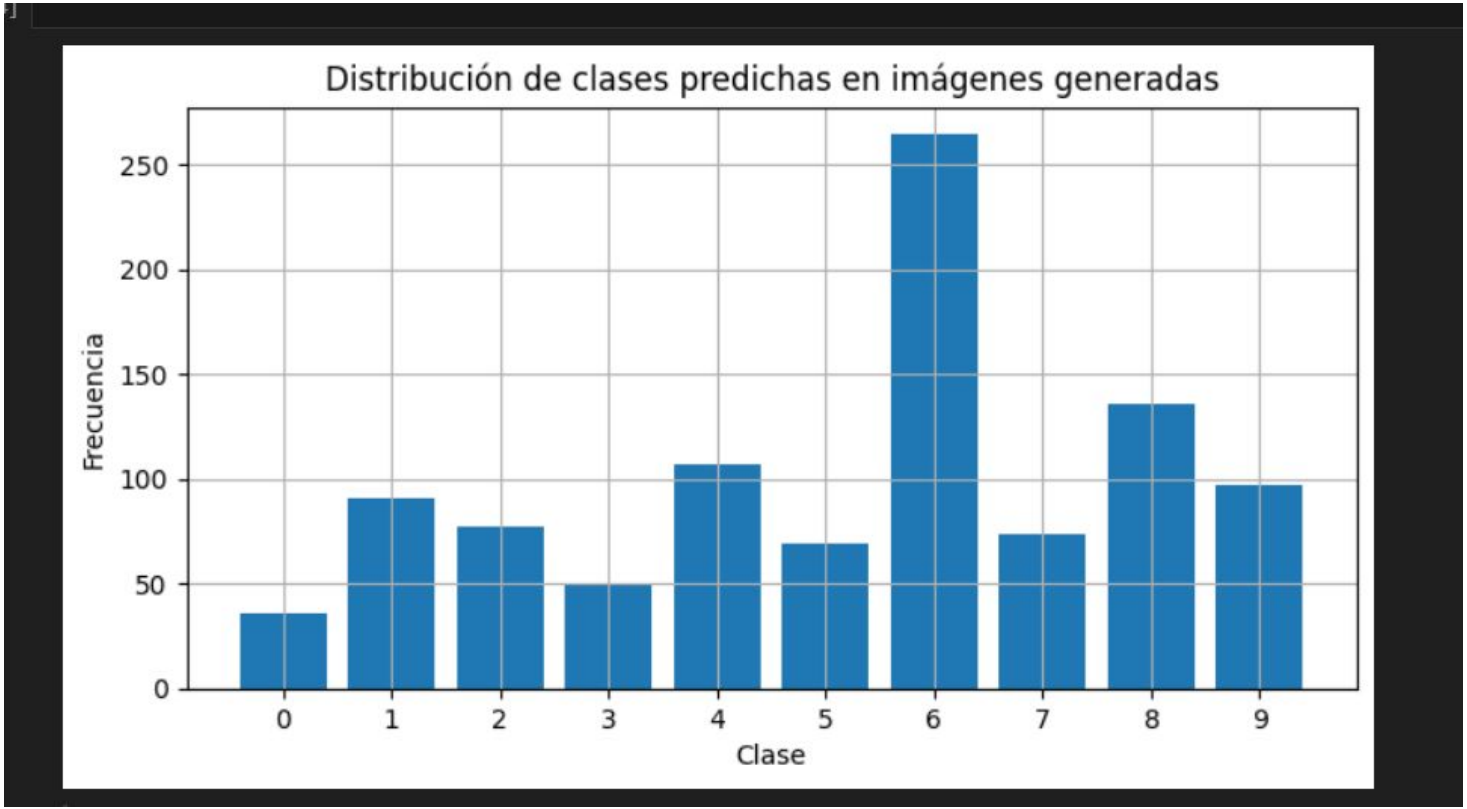
Link al código

Explicación del Dataset:

Atributo	Valor
Número de clases	10
Tamaño de imagen	28 x 28 píxeles (grises)
Número de imágenes de entrenamiento	60,000
Número de imágenes de prueba	10,000
Formato	Escala de grises (1 canal)
Tipo de datos	Imagen + Etiqueta (label)

Distribución por clases del Dataset:

0 – T-shirt/top
1 – Trouser
2 – Pullover
3 – Dress
4 – Coat
5 – Sandal
6 – Shirt
7 – Sneaker
8 – Bag
9 – Ankle boot



Red neuronal del Generator:

```
----------------------------------------------------------------
        Layer (type)               Output Shape         Param #
================================================================
   ConvTranspose2d-1            [-1, 256, 3, 3]         230,656
       BatchNorm2d-2            [-1, 256, 3, 3]             512
              ReLU-3            [-1, 256, 3, 3]               0
   ConvTranspose2d-4            [-1, 128, 6, 6]         524,416
       BatchNorm2d-5            [-1, 128, 6, 6]             256
              ReLU-6            [-1, 128, 6, 6]               0
   ConvTranspose2d-7           [-1, 64, 13, 13]          73,792
       BatchNorm2d-8           [-1, 64, 13, 13]             128
              ReLU-9           [-1, 64, 13, 13]               0
  ConvTranspose2d-10            [-1, 1, 28, 28]           1,025
             Tanh-11            [-1, 1, 28, 28]               0
================================================================
Total params: 830,785
Trainable params: 830,785
Non-trainable params: 0
----------------------------------------------------------------
Input size (MB): 0.00
Forward/backward pass size (MB): 0.42
Params size (MB): 3.17
Estimated Total Size (MB): 3.59
----------------------------------------------------------------
Generator(
```

Red neuronal del Critico:

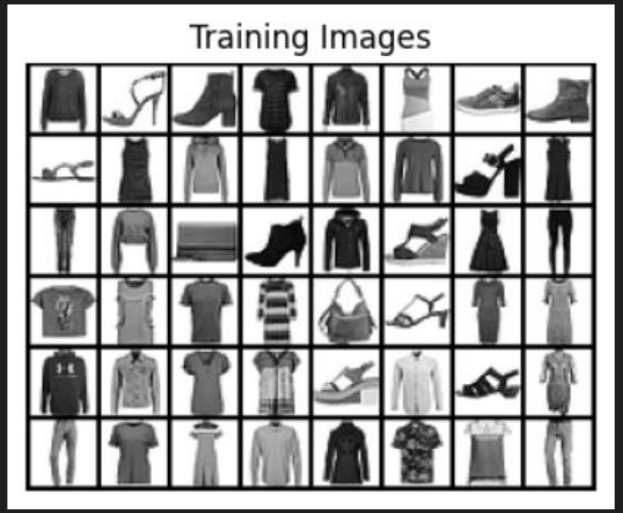
```
----------------------------------------------------------------
        Layer (type)               Output Shape         Param #
================================================================
            Conv2d-1          [-1, 64, 13, 13]           1,088
       BatchNorm2d-2          [-1, 64, 13, 13]             128
         LeakyReLU-3          [-1, 64, 13, 13]               0
            Conv2d-4           [-1, 128, 5, 5]         131,200
       BatchNorm2d-5           [-1, 128, 5, 5]             256
         LeakyReLU-6           [-1, 128, 5, 5]               0
            Conv2d-7             [-1, 1, 1, 1]           2,049
================================================================
Total params: 134,721
Trainable params: 134,721
Non-trainable params: 0
----------------------------------------------------------------
Input size (MB): 0.00
Forward/backward pass size (MB): 0.32
Params size (MB): 0.51
Estimated Total Size (MB): 0.84
----------------------------------------------------------------
Critic(
  (disc): Sequential(
    (0): Sequential(
      (0): Conv2d(1, 64, kernel_size=(4, 4), stride=(2, 2))
      (1): BatchNorm2d(64, eps=1e-05, momentum=0.1, affine=True, track_running_stats=True)
...
```

Resultados

Resultados de una ejecución

```
Epoch 1, Loss: 99.22, Accuracy: 77.46%
Epoch 2, Loss: 62.71, Accuracy: 86.03%
Epoch 3, Loss: 49.16, Accuracy: 88.72%
Epoch 4, Loss: 40.58, Accuracy: 90.78%
Epoch 5, Loss: 33.01, Accuracy: 92.31%
Epoch 6, Loss: 26.89, Accuracy: 93.97%
Epoch 7, Loss: 20.41, Accuracy: 95.06%
Epoch 8, Loss: 16.66, Accuracy: 96.03%
Epoch 9, Loss: 12.76, Accuracy: 96.98%
Epoch 10, Loss: 9.83, Accuracy: 97.91%
Epoch 11, Loss: 7.72, Accuracy: 98.32%
Epoch 12, Loss: 4.40, Accuracy: 99.22%
Epoch 13, Loss: 2.76, Accuracy: 99.51%
```

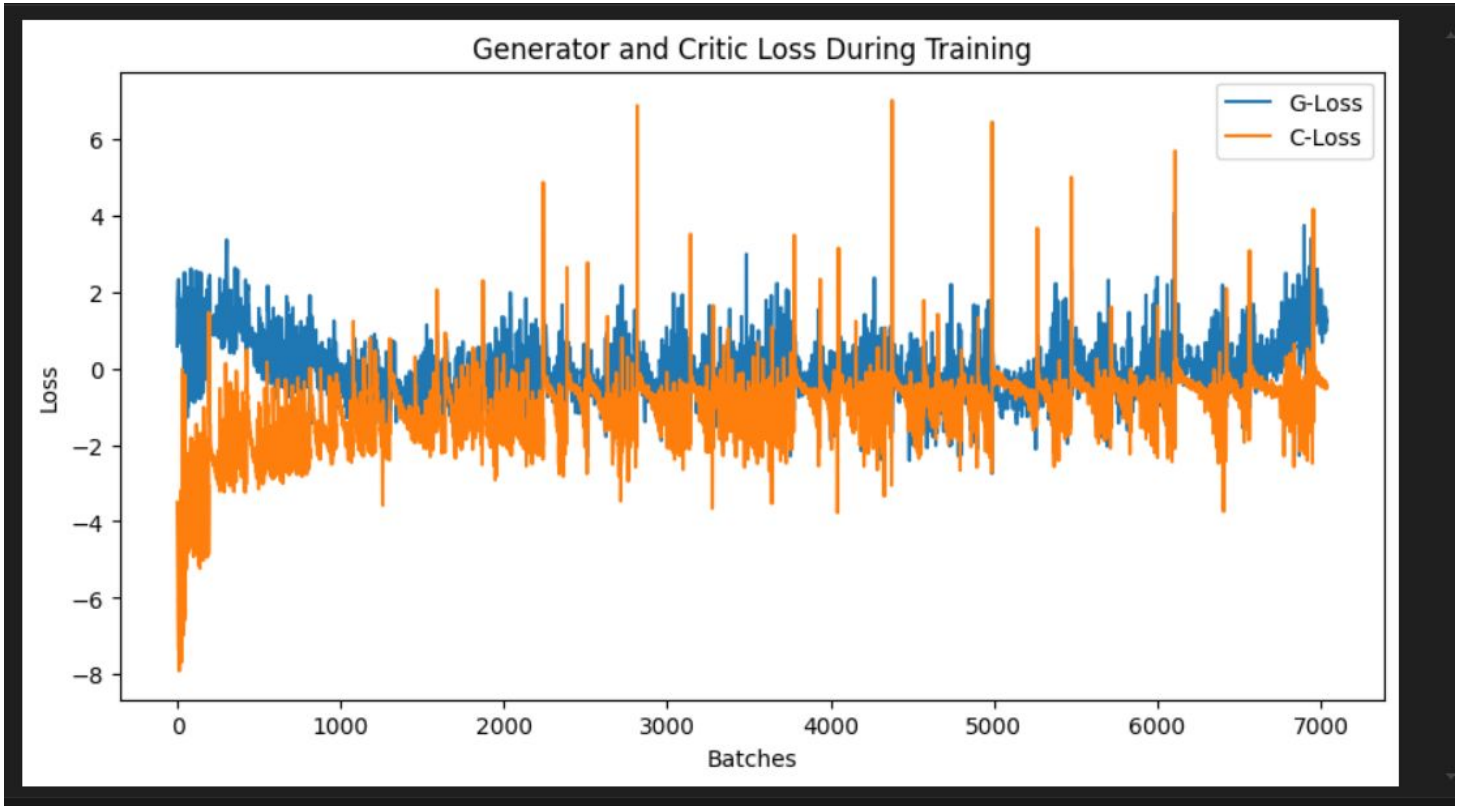
```
Time is 0.0149617195129394 53 sec
Shape of loading one batch: torch.Size([128, 1, 28, 28])
Total no. of batches present in trainloader: 469
```



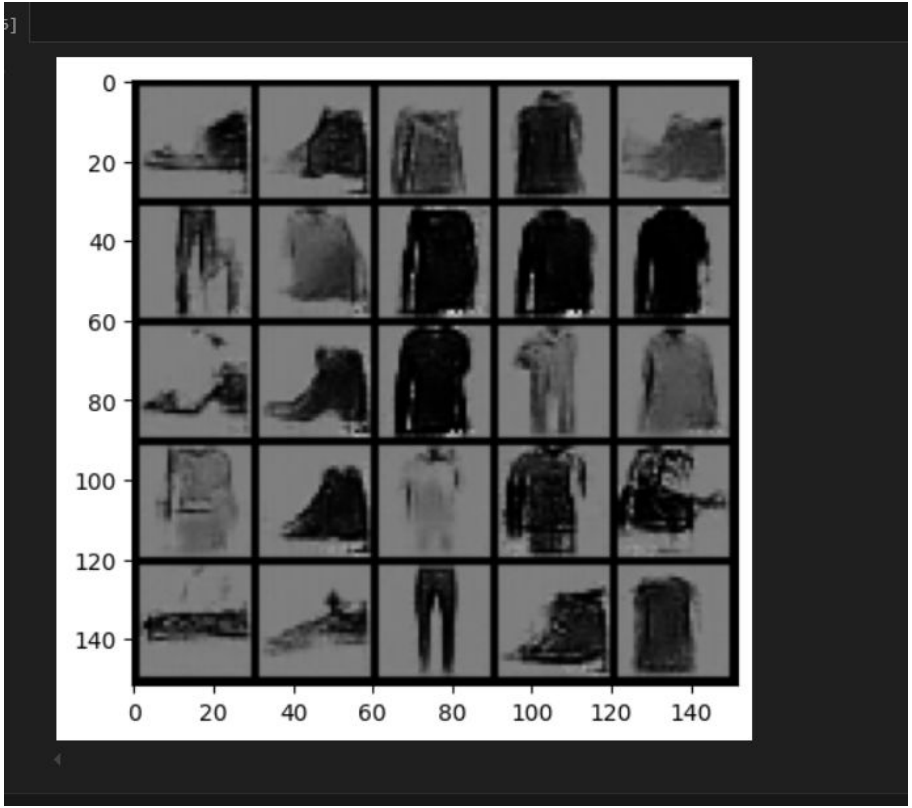
Generar + Código + Mar

Training Loss (Generator and Critic) Epochs

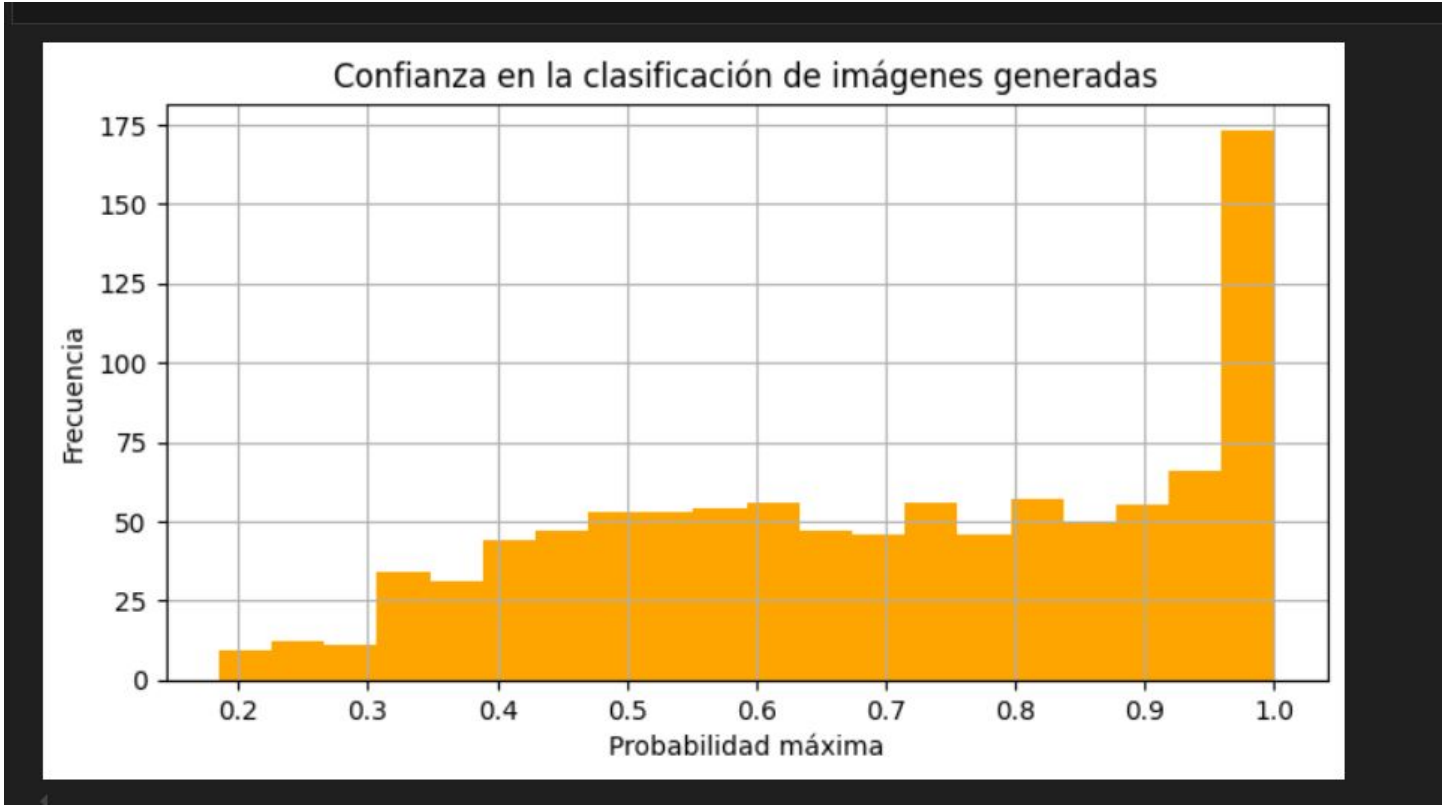
Training Loss (Generator and Critic) Batches



Ejemplo de Generación de Imágenes con la GAN



Confianza Obtenida de la generación de imágenes



Resultados adicionales:

Link a resultados adicionales