Deep convolutional generative adversarial network (GAN)

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1 Run the code, train GAN model and generate your own MNIST images.

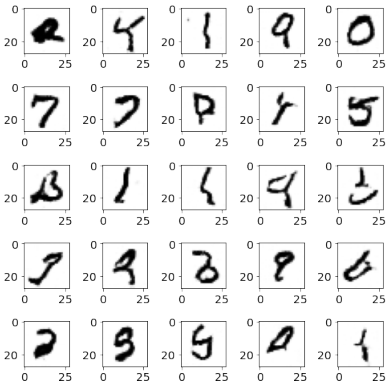


Figure 1: MNIST images generated by GAN model.

2 What if we increase/decrease the latent space size?

Results in different *latent_space_dim*:

Latent space size	Generator	Discriminator
10	0.7023	0.6972
50	0.7298	0.6893
100	0.7513	0.6797
200	0.7432	0.6833
300	0.7361	0.6903

Table 1: Table of GAN's results for different *latent_space_dim*

We can see that the smallest Generator loss is for latent space size equal 10 and when we are looking at Discriminator loss the best result we get for latent space size equal 100.

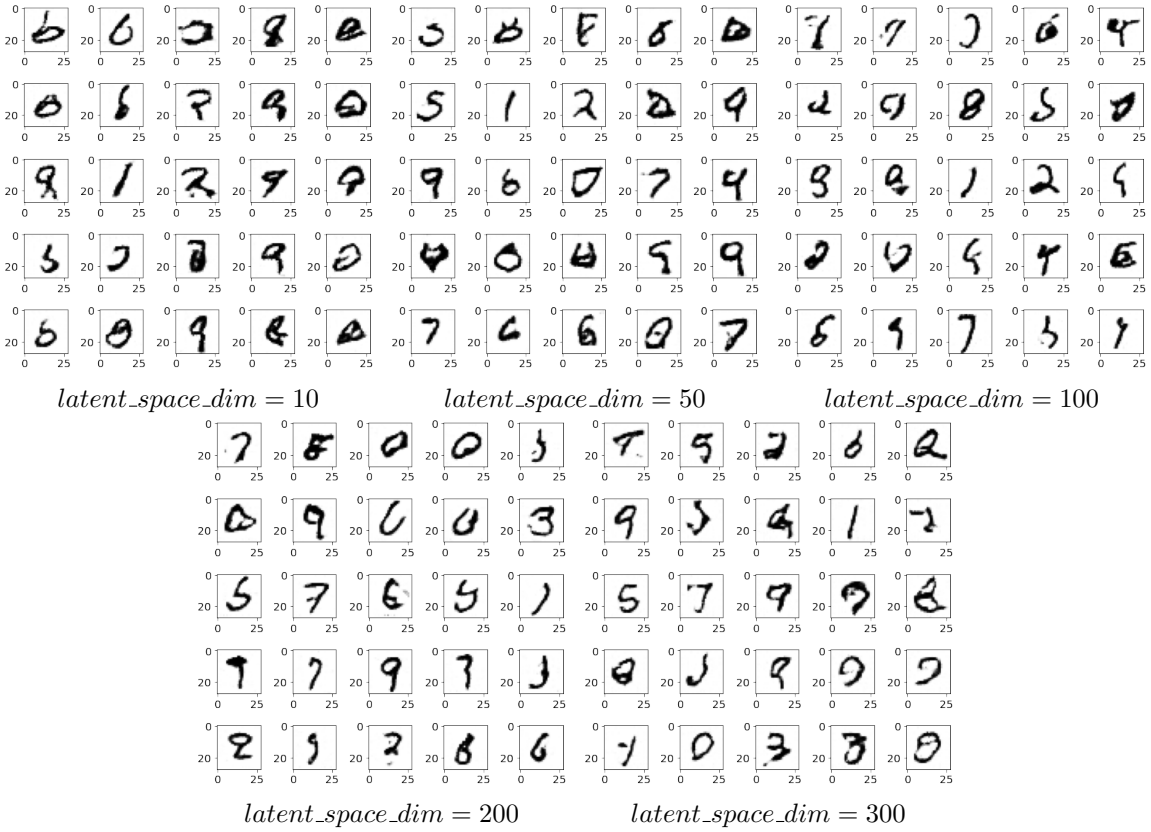
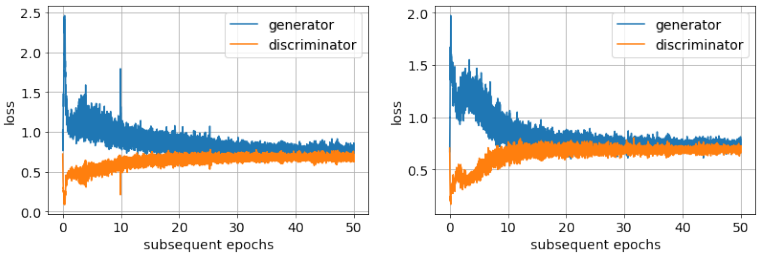


Figure 2: MNIST images generated by GAN model.

3 What if we change the LeakyReLU units into standard ReLU?

Comparison of the GAN model with the LeakyReLU activation function and the regular ReLU:



LeakyReLU *ReLU*

Figure 3: Comparsion of the GAN with LeakyReLU and ReLU.

Activation function	Generator	Discriminator
LeakyReLU	0.7513	0.6797
ReLU	0.7276	0.6860

Table 2: Comparsion of the GAN with LeakyReLU and ReLU.

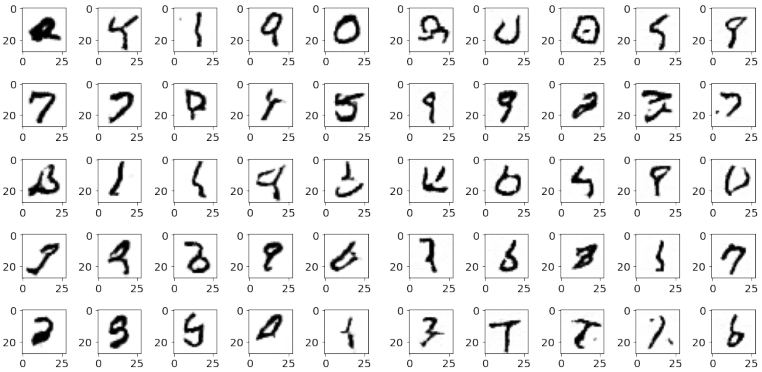


Figure 4: Comparsion of the GAN with LeakyReLU and ReLU.

4 Try the same with Fashion MNIST or other MNIST-like datasets, or with CIFAR (needs to change some input/output layers).

I have used FashionMNIST dataset which contains 70000 pictures of clothes.

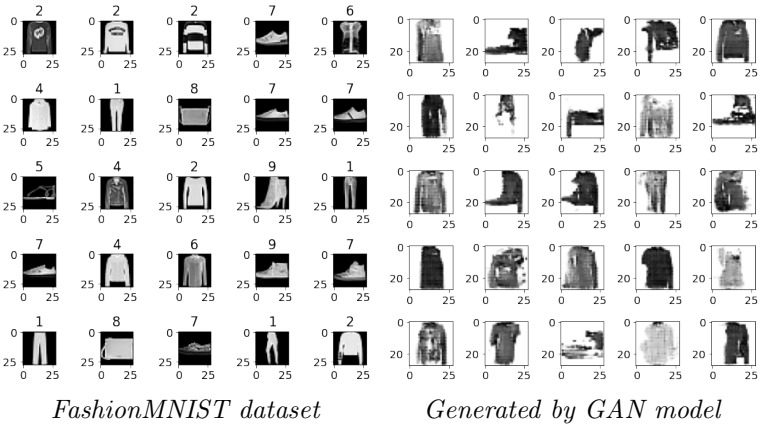


Figure 5: Comparsion of the pictures from FashionMNIST dataset and generated by GAN model.

Model	Generator	Discriminator
GAN	0.7500	0.6927

Table 3: Generator and Discriminator loss for fashion picture.