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Image-to-Image Translation with Conditional Adversarial Networks

Mansour DIA

27 août 2021

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Introduction

General Architecture

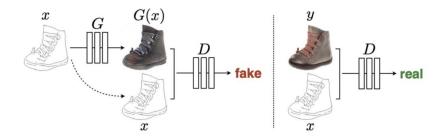


FIGURE - Pix2Pix Architecture.

PatchGAN Discriminator

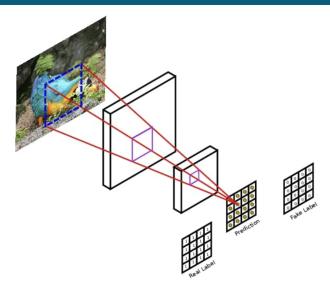


FIGURE - PatchGAN architecture. African Master in Machine Intelligence

Unet Generator

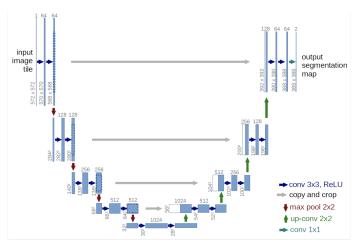


FIGURE - Unet architecture.

Pix2Pix loss function

$$\mathcal{L}_{cGAN}(G, D) = \mathbb{E}_{x,y}[\log D(x, y)] + \\ \mathbb{E}_{x,z}[\log(1 - D(x, G(x, z))]$$

$$\mathcal{L}_{L1}(G) = \mathbb{E}_{x,y,z}[\|y - G(x, z)\|_1].$$

$$G^* = \arg\min_{G} \max_{D} \mathcal{L}_{cGAN}(G, D) + \lambda \mathcal{L}_{L1}(G).$$

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patGAN hyperparameters

■ block (Conv2D/ConvTranspose2d + BatchNorm + Activation) ,

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- stride =2,

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- input_channels=3 and output_channels=3

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- stride =2,
- input_channels=3 and output_channels=3
- feature_map_dims = 64, 128, 256, 512

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Training loop



Final hyperparameters setting

- \blacksquare n_epochs = 250,
- noise_vect_dim = 64 ,
- batch_size = 128
- r = 0.00001

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FIGURE – loss of the generator.

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FIGURE - loss of the discriminator.

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FIGURE – epoch 1.

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FIGURE - epoch 20.

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FIGURE - epoch 250.

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Future work

Convolutional layers insted of MLP ,

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End

Thank you for your attention!