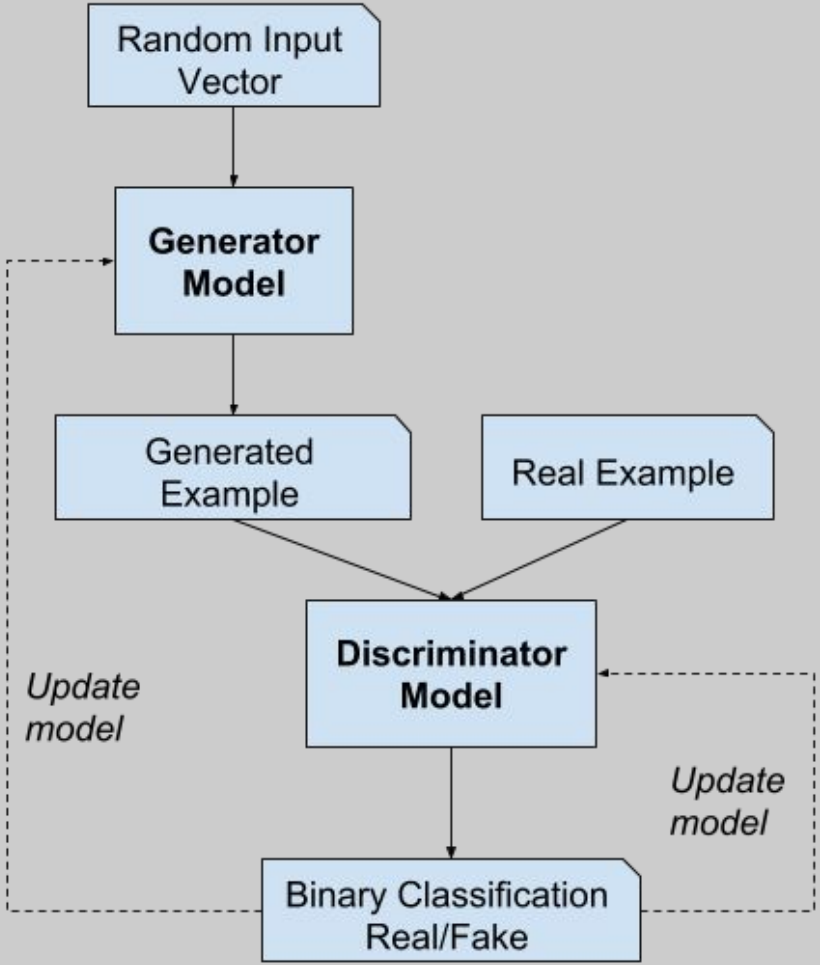
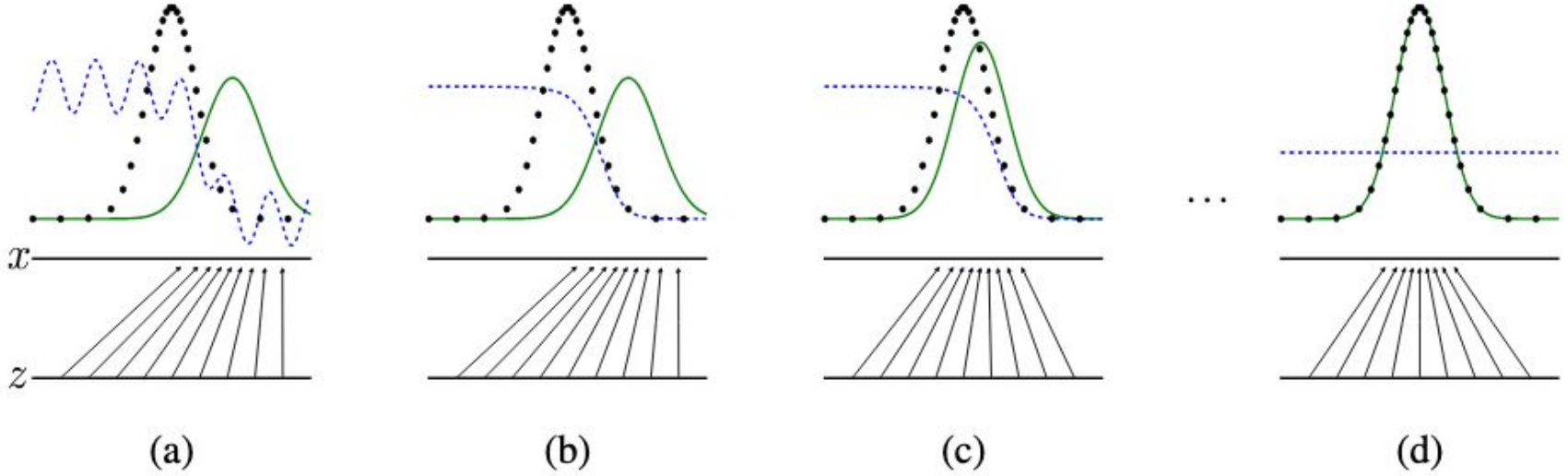
Generative Adversarial Nets

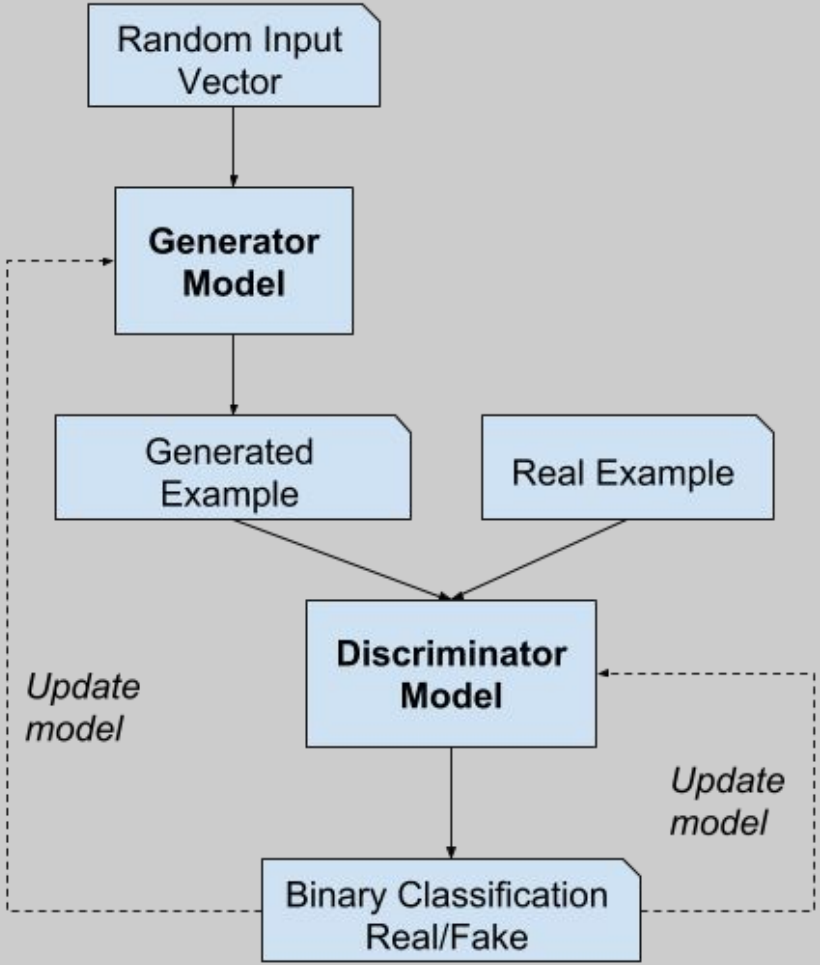
GAN


Random Input Vector
Generator Model
Generated Example
Real Example
Discriminator Model
Update model
Update model
Binary Classification Real/Fake

GAN



GAN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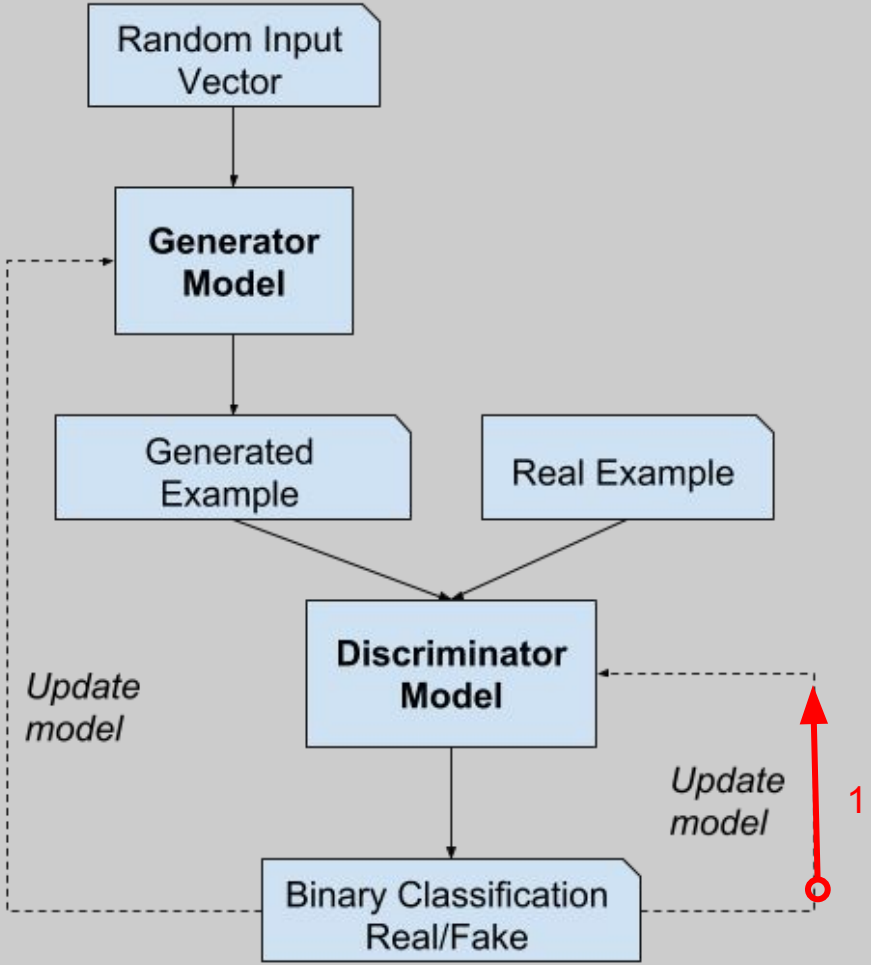
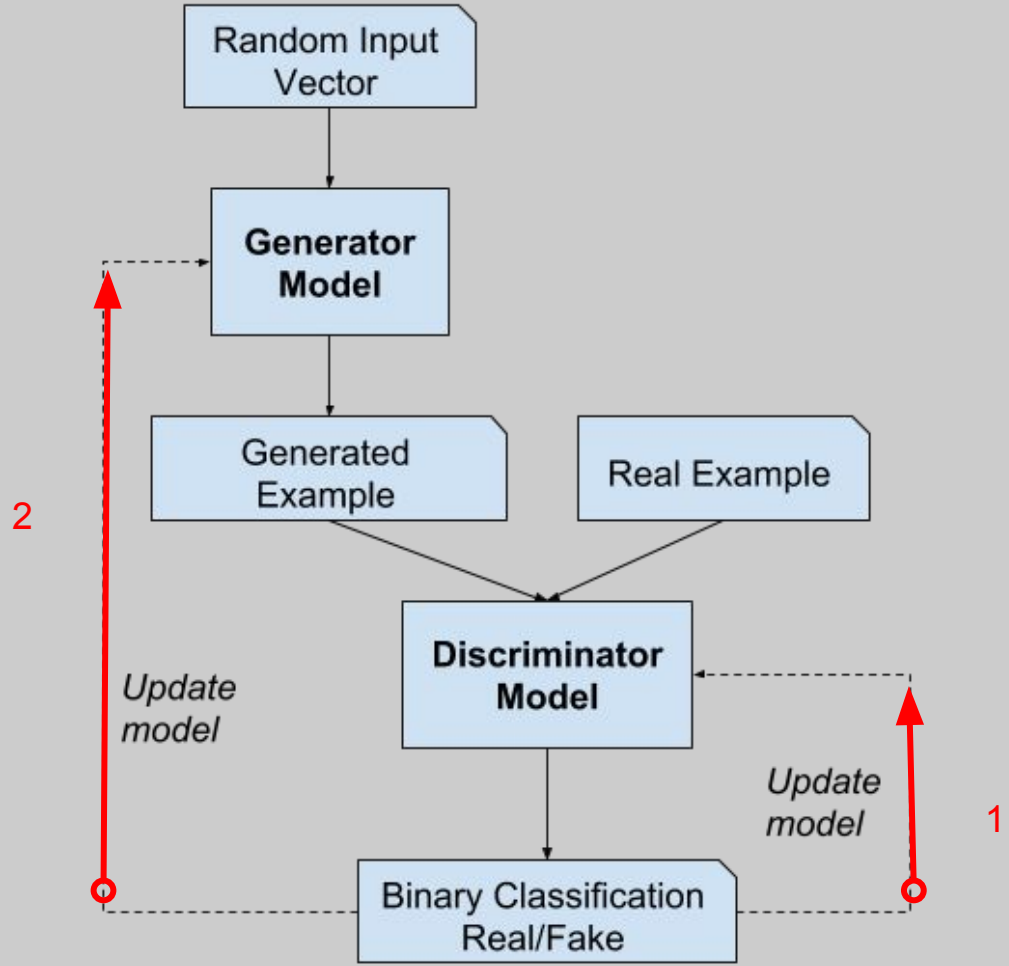
GAN


Random Input Vector
Generator Model
Generated Example
Real Example
Discriminator Model
Update model
Update model
1
Binary Classification Real/Fake

GAN


Random Input Vector
Generator Model
Generated Example
Real Example
Discriminator Model
Binary Classification Real/Fake
2
Update model
Update model
1

GAN

for number of training iterations **do**

for k steps **do**

- Sample minibatch of m noise samples $\{\boldsymbol{z}^{(1)}, \ldots, \boldsymbol{z}^{(m)}\}$ from noise prior $p_g(\boldsymbol{z})$.
- Sample minibatch of m examples $\{\boldsymbol{x}^{(1)}, \ldots, \boldsymbol{x}^{(m)}\}$ from data generating distribution $p_{\text{data}}(\boldsymbol{x})$.
- Update the discriminator by ascending its stochastic gradient:

$$\nabla_{\theta_d} \frac{1}{m} \sum_{i=1}^{m} \left[\log D\left(\boldsymbol{x}^{(i)}\right) + \log\left(1 - D\left(G\left(\boldsymbol{z}^{(i)}\right)\right)\right) \right].$$

end for

- Sample minibatch of m noise samples $\{\boldsymbol{z}^{(1)}, \ldots, \boldsymbol{z}^{(m)}\}$ from noise prior $p_g(\boldsymbol{z})$.
- Update the generator by descending its stochastic gradient:

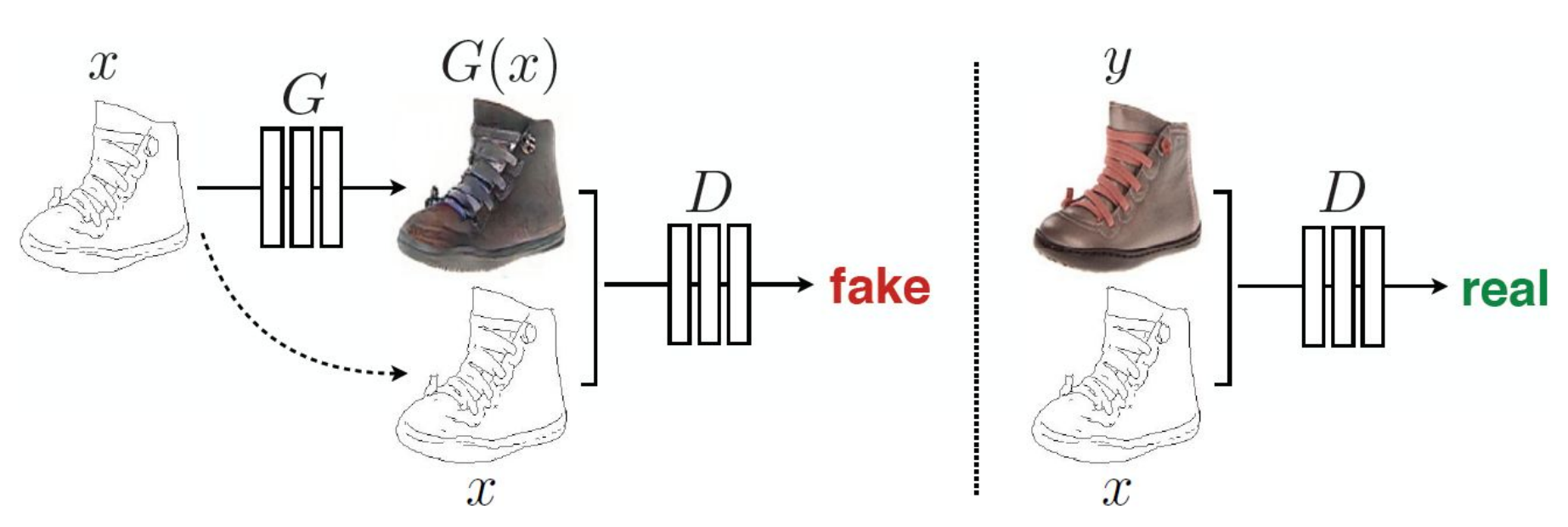
$$\nabla_{\theta_g} \frac{1}{m} \sum_{i=1}^{m} \log\left(1 - D\left(G\left(\boldsymbol{z}^{(i)}\right)\right)\right).$$

end for

The gradient-based updates can use any standard gradient-based learning rule. We used momentum in our experiments.

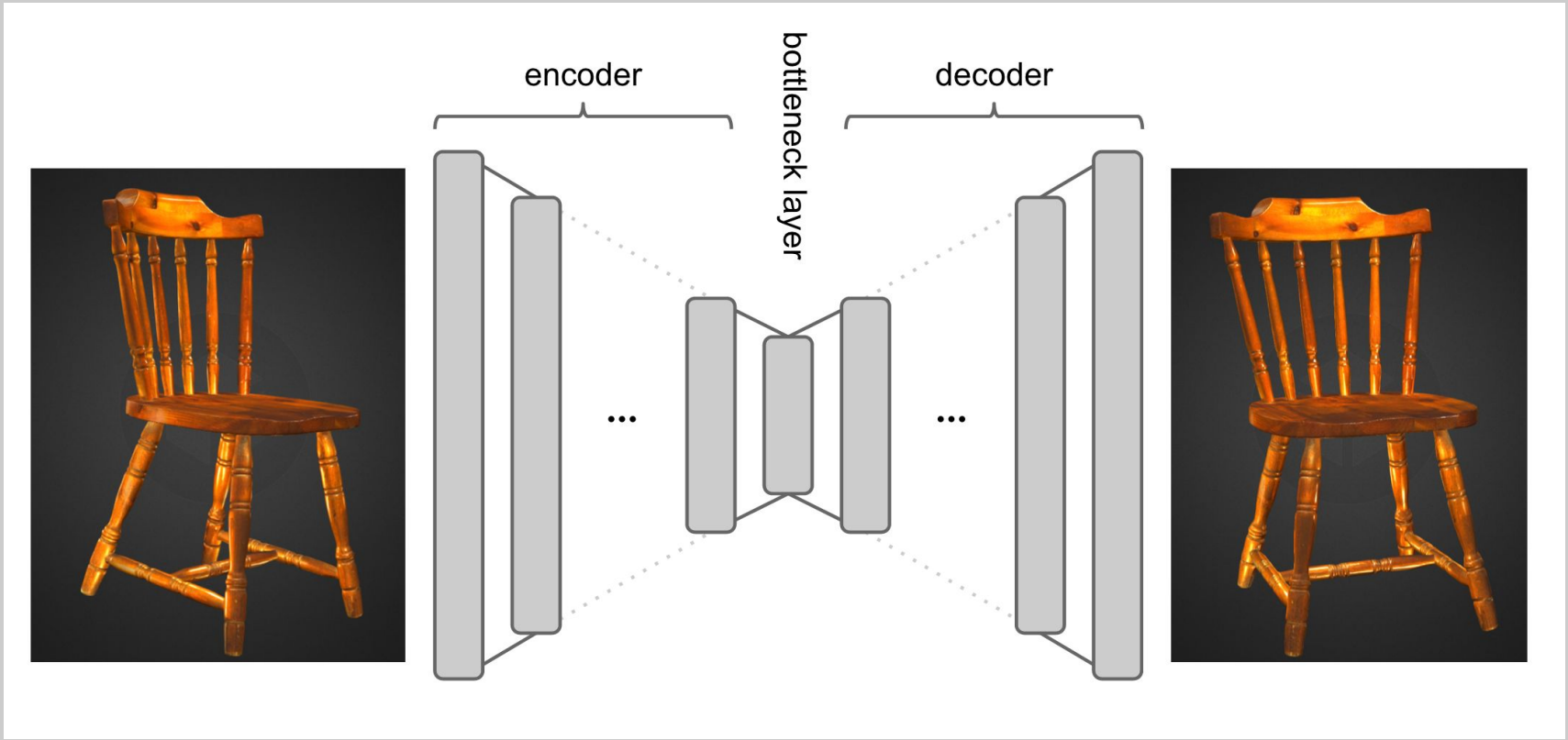
Original paper

Pix2Pix

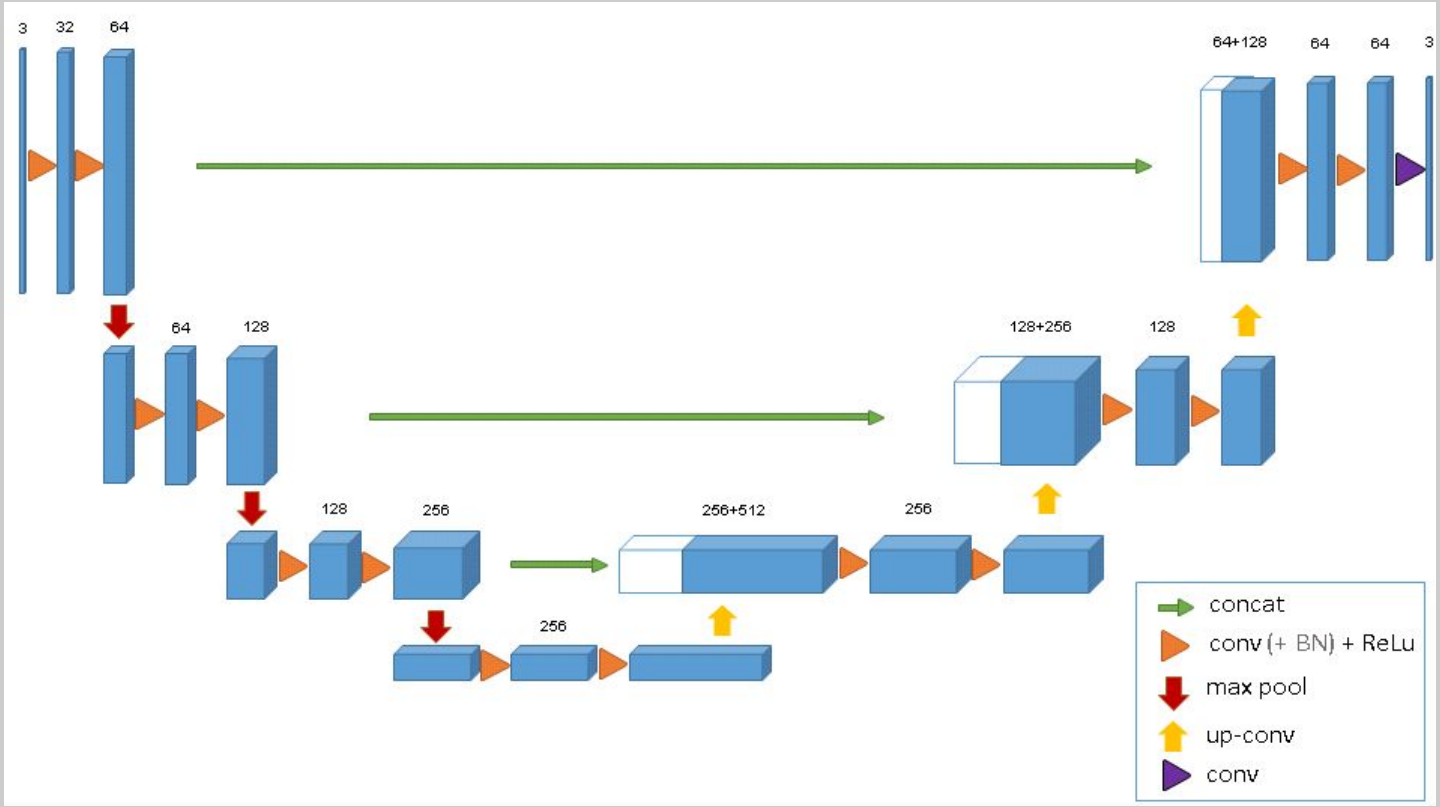


Original paper

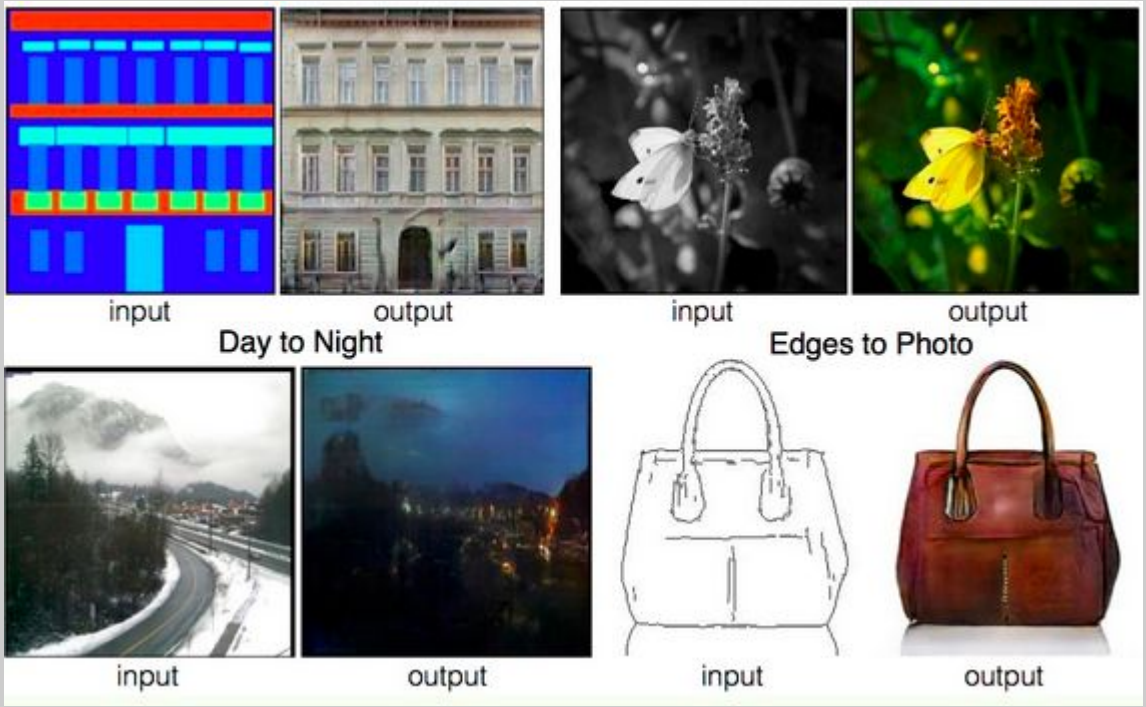
Pix2Pix



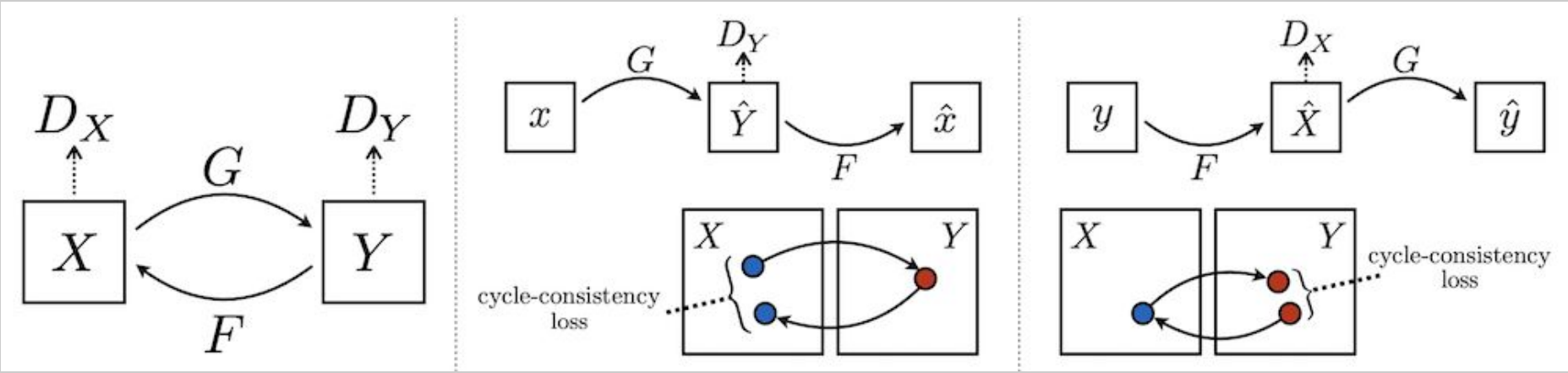
Pix2Pix Generator



Pix2Pix

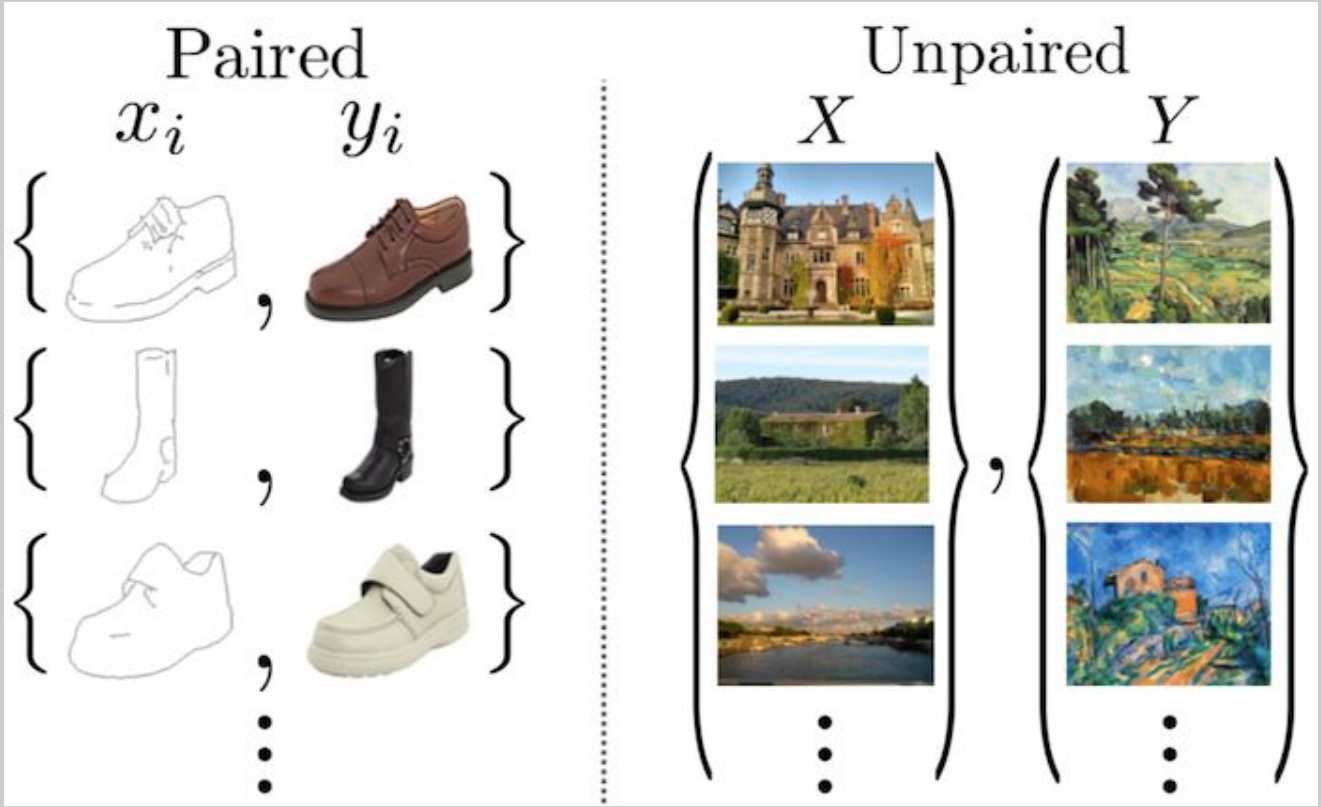

input
output
input
output
Day to Night
Edges to Photo
input
output
input
output

CycleGan



Original [paper]

CycleGan vs Pix2Pix



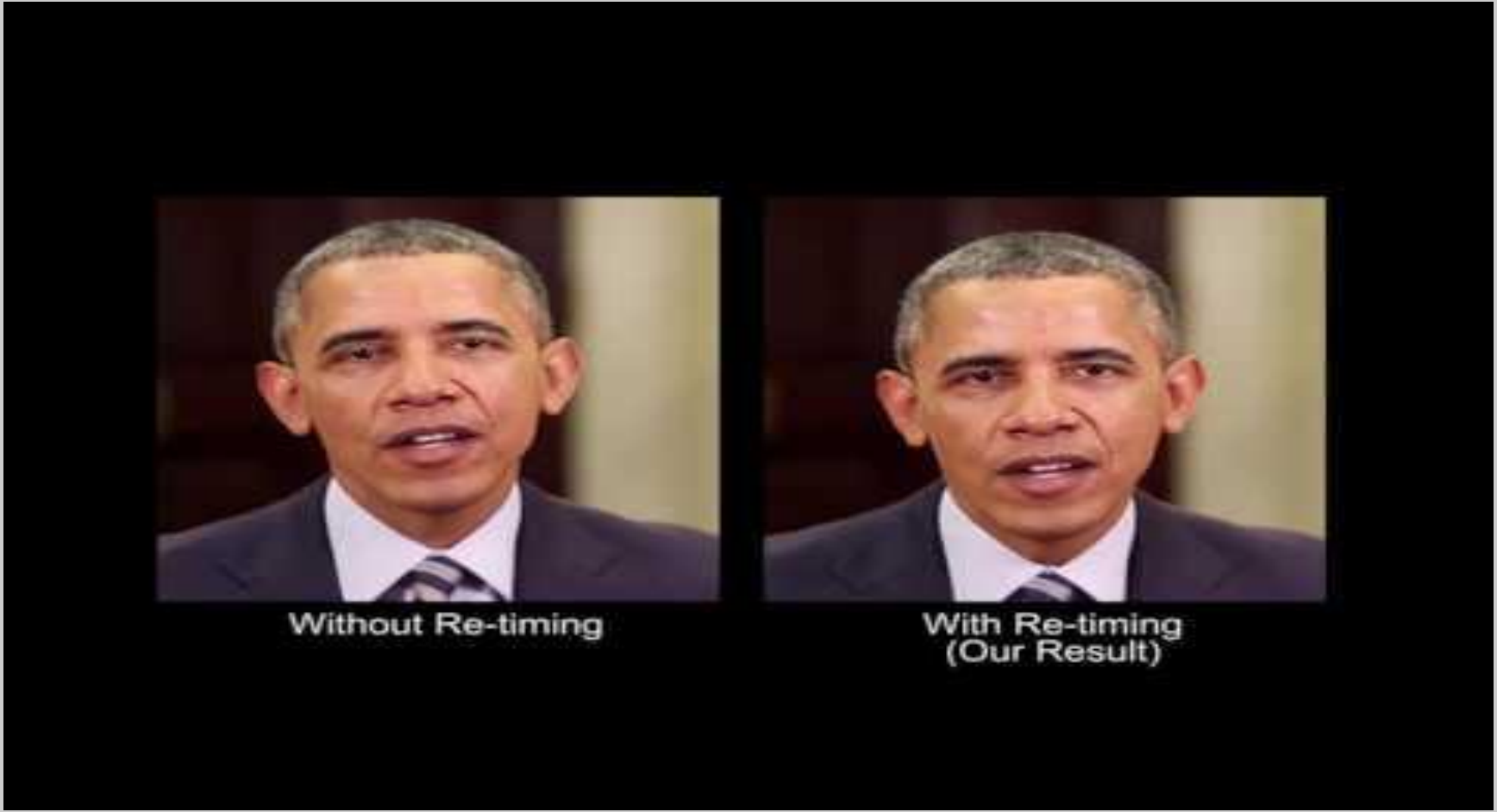
Немного референсов:

Keras implementation.

Туториал

Статья на Хабре

Очень хорошая статья на Хабре



Оригинальная статья