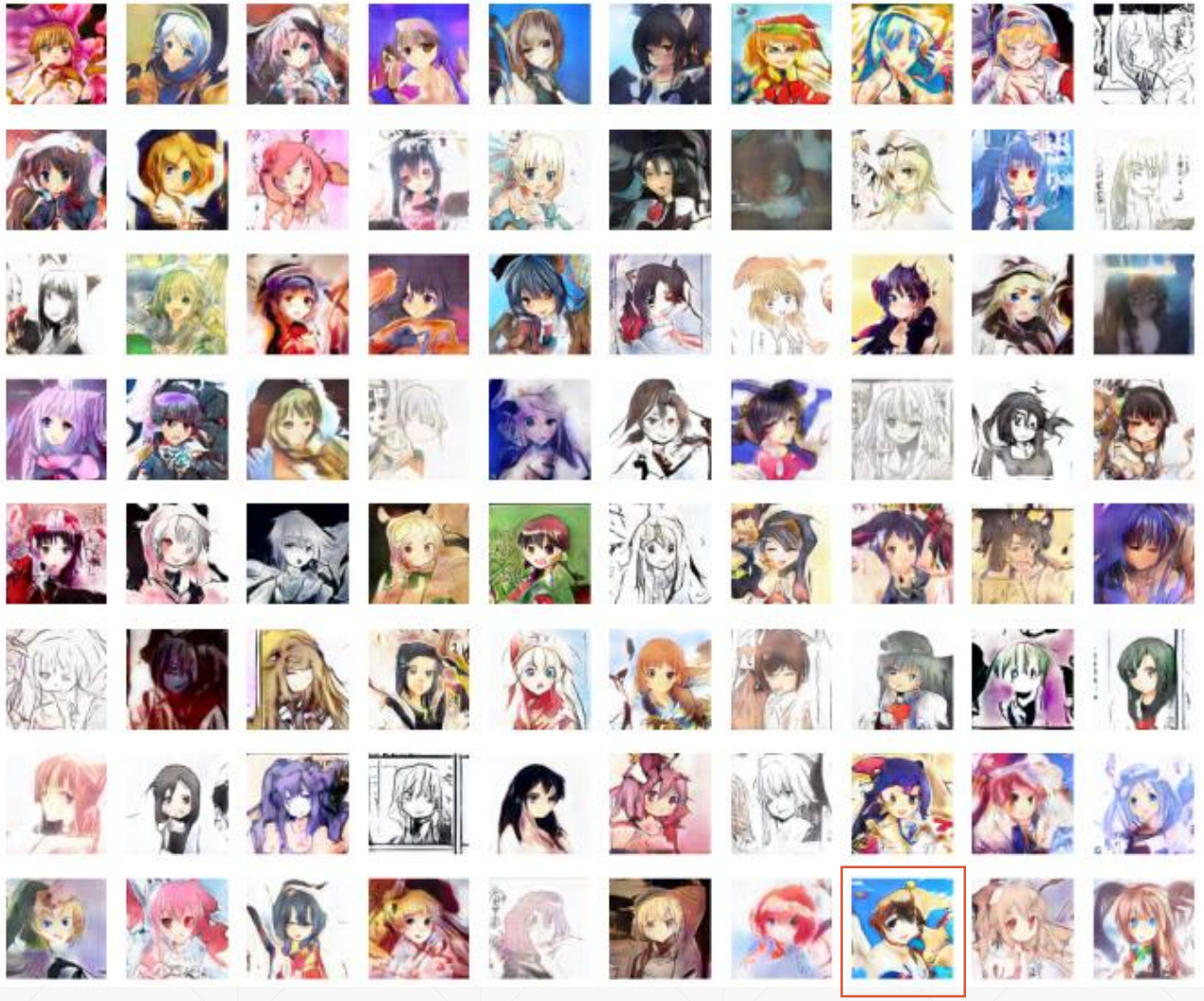
Outline

- Anime Dataset
- GAN
- WGAN-GP

Anime

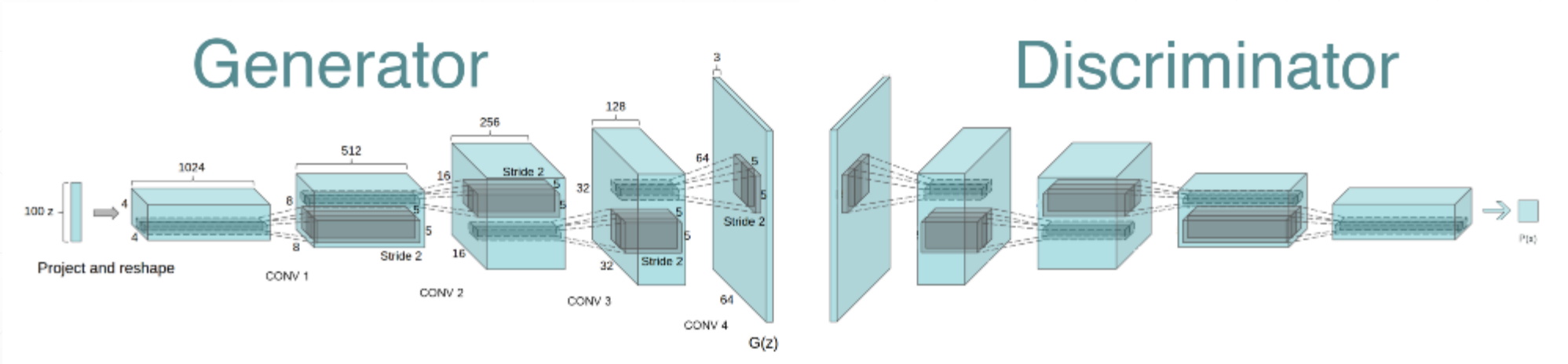


https://qiita.com/mattya/items/e5bfe5e04b9d2f0bbd47
https://zhuanlan.zhihu.com/p/24767059

Download

- dataset link: https://pan.baidu.com/s/1eSifHcA,
- 提取码: g5qa
- ~280MB

GAN



https://gluon.mxnet.io/chapter14_generative-adversarial-networks/dcgan.html

WGAN-GP

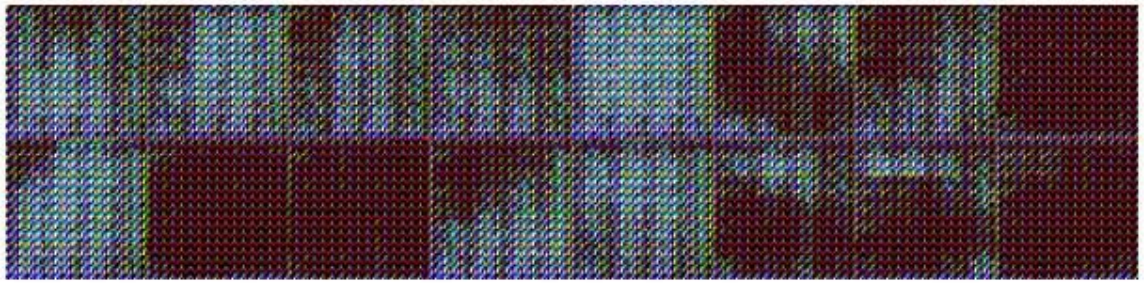
$$L = \underbrace{\underset{\tilde{\boldsymbol{x}}\sim\mathbb{P}_g}{\mathbb{E}}\left[D(\tilde{\boldsymbol{x}})\right] - \underset{\boldsymbol{x}\sim\mathbb{P}_r}{\mathbb{E}}\left[D(\boldsymbol{x})\right]}_{\text{Original critic loss}} + \underbrace{\lambda \underset{\hat{\boldsymbol{x}}\sim\mathbb{P}_{\hat{\boldsymbol{x}}}}{\mathbb{E}}\left[\left(\|\nabla_{\hat{\boldsymbol{x}}} D(\hat{\boldsymbol{x}})\|_2 - 1\right)^2\right]}_{\text{Our gradient penalty}}.$$

where $\hat{\boldsymbol{x}}$ *sampled from* $\tilde{\boldsymbol{x}}$ *and* $\boldsymbol{x}$ *with t uniformly sampled between 0 and 1*

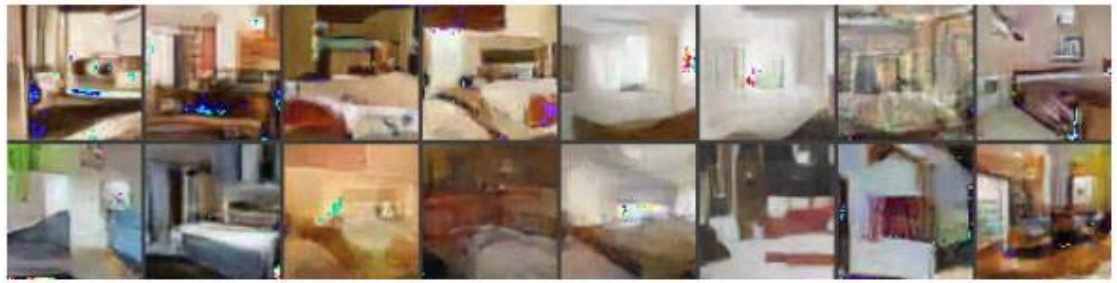
$$\hat{\boldsymbol{x}} = t\tilde{\boldsymbol{x}} + (1-t)\boldsymbol{x} \text{ with } 0 \le t \le 1$$

WGAN with DCGAN generator

GAN with DCGAN generator



Without batch normalization &
constant number of filters at each layer



Using a MLP as the generator

All critics and discriminators follow the same discriminator design in DCGAN