基于GAN的动漫/手绘头像生成

Motivation

- Transferring selfie to cartoon is very practical, profile in social networks
- The great progress in image stylization
- few techniques focus specifically on selfie cartoonization.

Dataset

Sources of Data

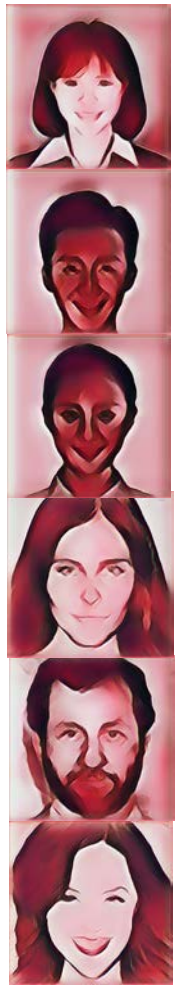
- •Baidu image
- •Google image
- •Taobao comments
- •celebA

Selfie	Numbers
celebA	350
identification photo	340

Style	Numers
Hand-painted	311

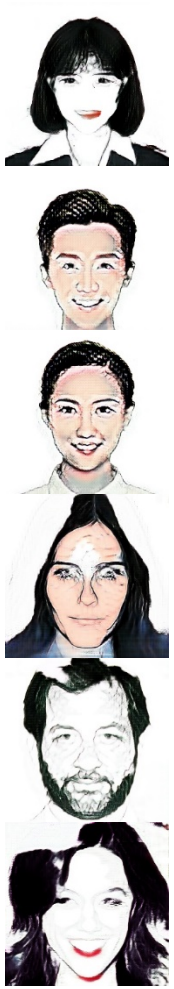
Results of Existing Methods

Input

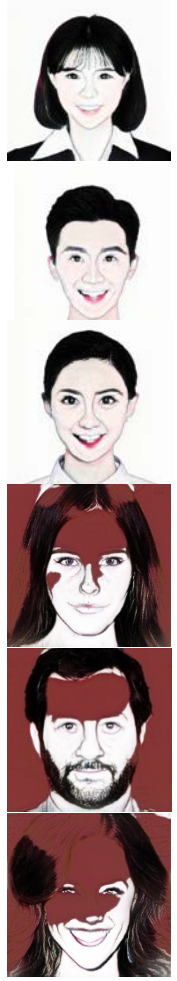


Nerual Style Tansfer

pix2pix



CycleGan



CartoonGan

Problems and Tactics

Neural Style Transfer(NST)

- Background belongs to style

- Background doesn't belong to style

CartoonGAN

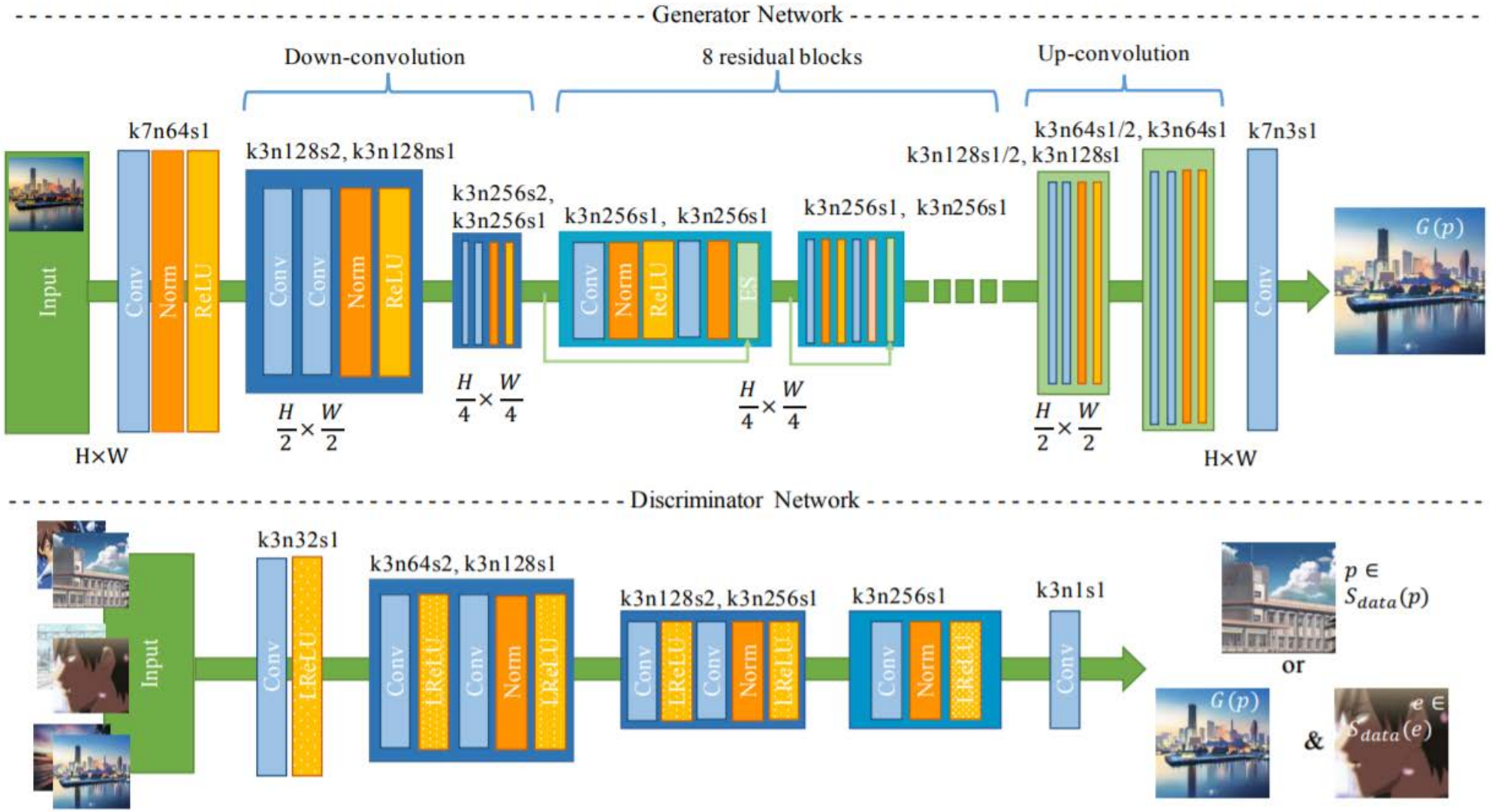
- Also sees the background as the component of style
- The all face will gradually filled with red background color

How to solve this problem?

- Expand the training set, using different backgrounds
- Change model

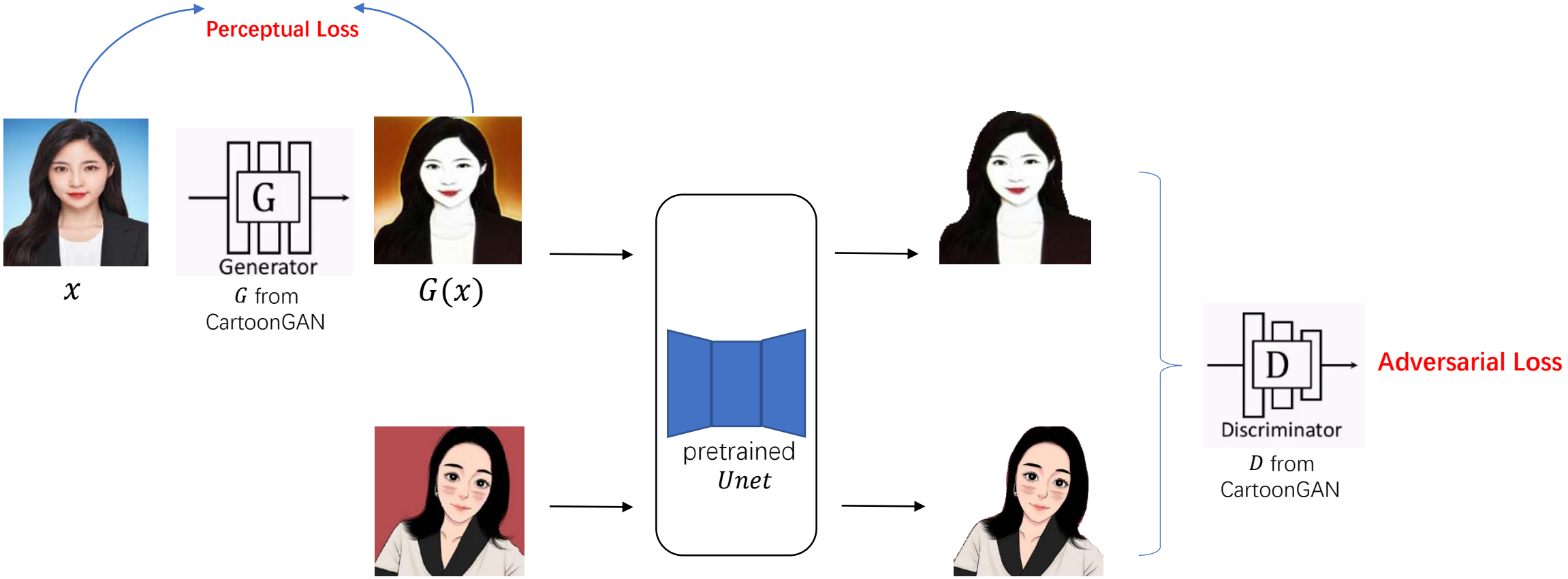
Our Model

Based on CartoonGAN



"Cartoongan: Generative adversarial networks for photo cartoonization."
Chen Yang, Yu-Kun Lai, and Yong-Jin Liu. **CVPR 2018**

Our Model


Perceptual Loss
G
Generator
G from CartoonGAN
x
$G(x)$
pretrained $Unet$
D
Discriminator
D from CartoonGAN
Adversarial Loss

Intution

- use Unet to train a mask model
- Let the discriminator never seen the background.
- If the face of generated image become red, the discriminator will see a incomplete face and judge it a fake image. It will guide the generator to generate good image.

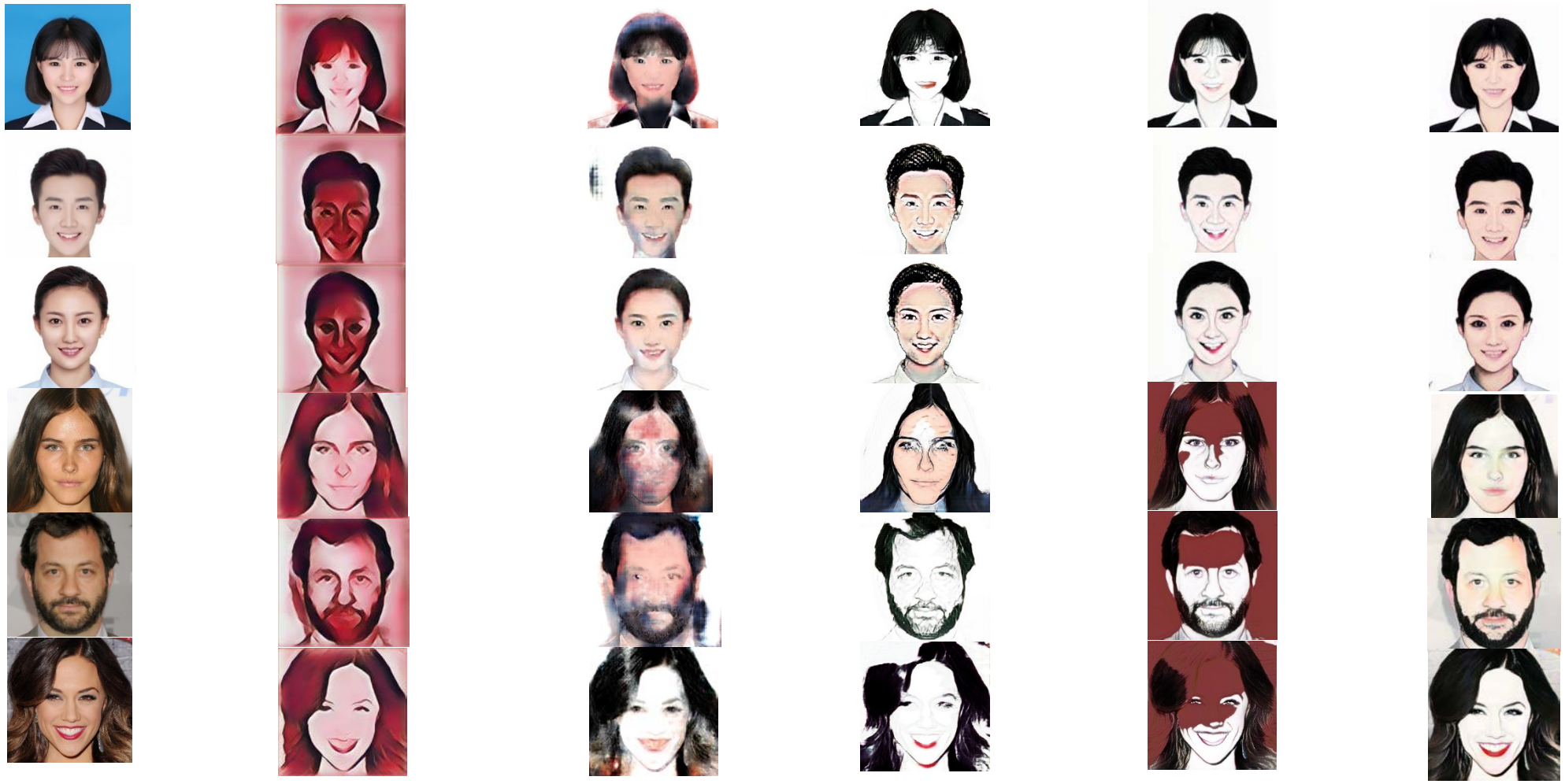
Loss

- perception loss --- learn content
- adversarial loss --- learn style
- binary_crossentropy loss --- learn mask, ignore background

1. train G with perception loss 1 epoch
2. train Unet with binary_crossentropy loss 20 epoch
3. train D and G with adversarial loss 20 epoch

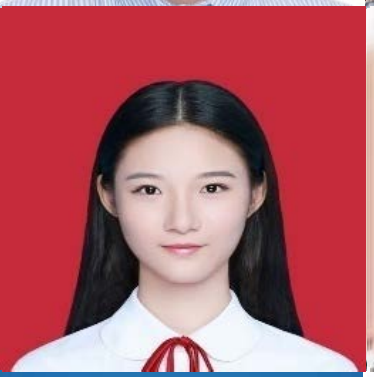
Learned Mask

Results



Input | Nerual Style Tansfer | pix2pix | CycleGan | CartoonGan | Our results

Examples



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Future Work

- Do more experiment to test our model
- make it to be more practical

References

- Chen, Yang, Yu-Kun Lai, and Yong-Jin Liu. "Cartoongan: Generative adversarial networks for photo cartoonization." *Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition*. 2018.
- Mejjati, Youssef Alami, et al. "Unsupervised Attention-guided Image-to-Image Translation." *Advances in Neural Information Processing Systems*. 2018.
- Li, Xinyu, et al. "Everyone is a Cartoonist: Selfie Cartoonization with Attentive Adversarial Networks." arXiv preprint arXiv:1904.12615 (2019).
- J.-Y. Zhu, T. Park, P. Isola, and A. A. Efros. Unpaired imageto-image translation using cycle-consistent adversarial networks. In International Conference on Computer Vision, 2017.