Sketch to Face

Pix2Pix in face generation from sketch

DATA PREPROCESSING

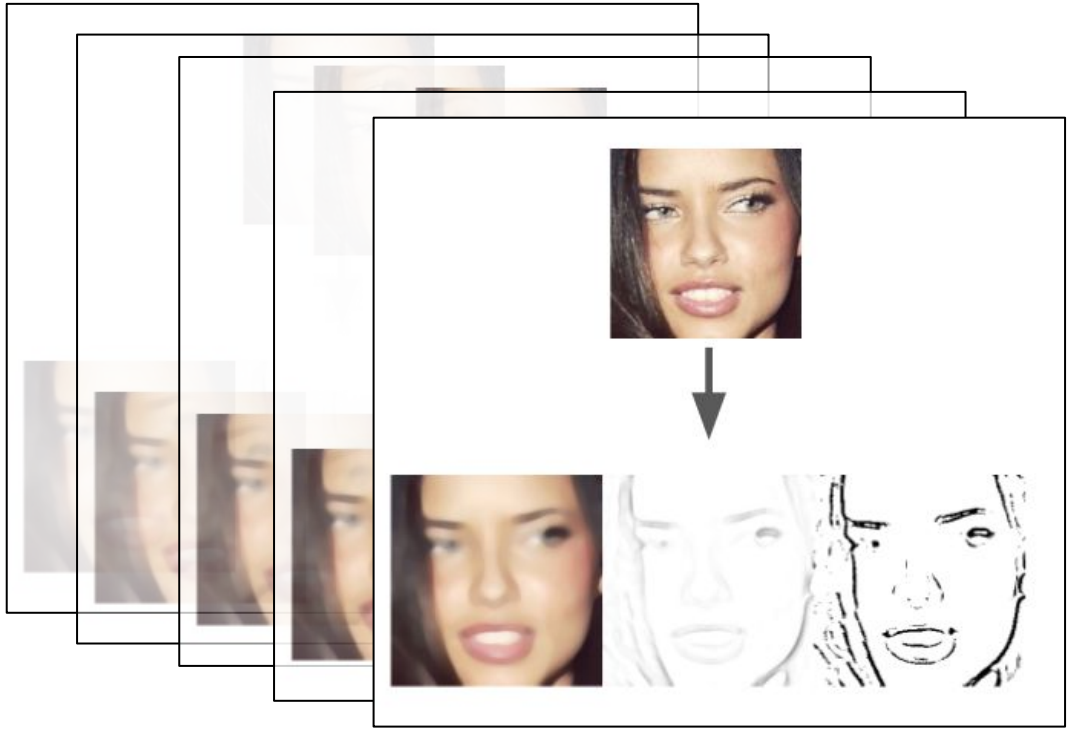
- Create sketch
- Pix2Pix format conversion
- Data augmentation

DATASET

- Sketch based on face mask: ***CelebAMask-HQ*** [1]

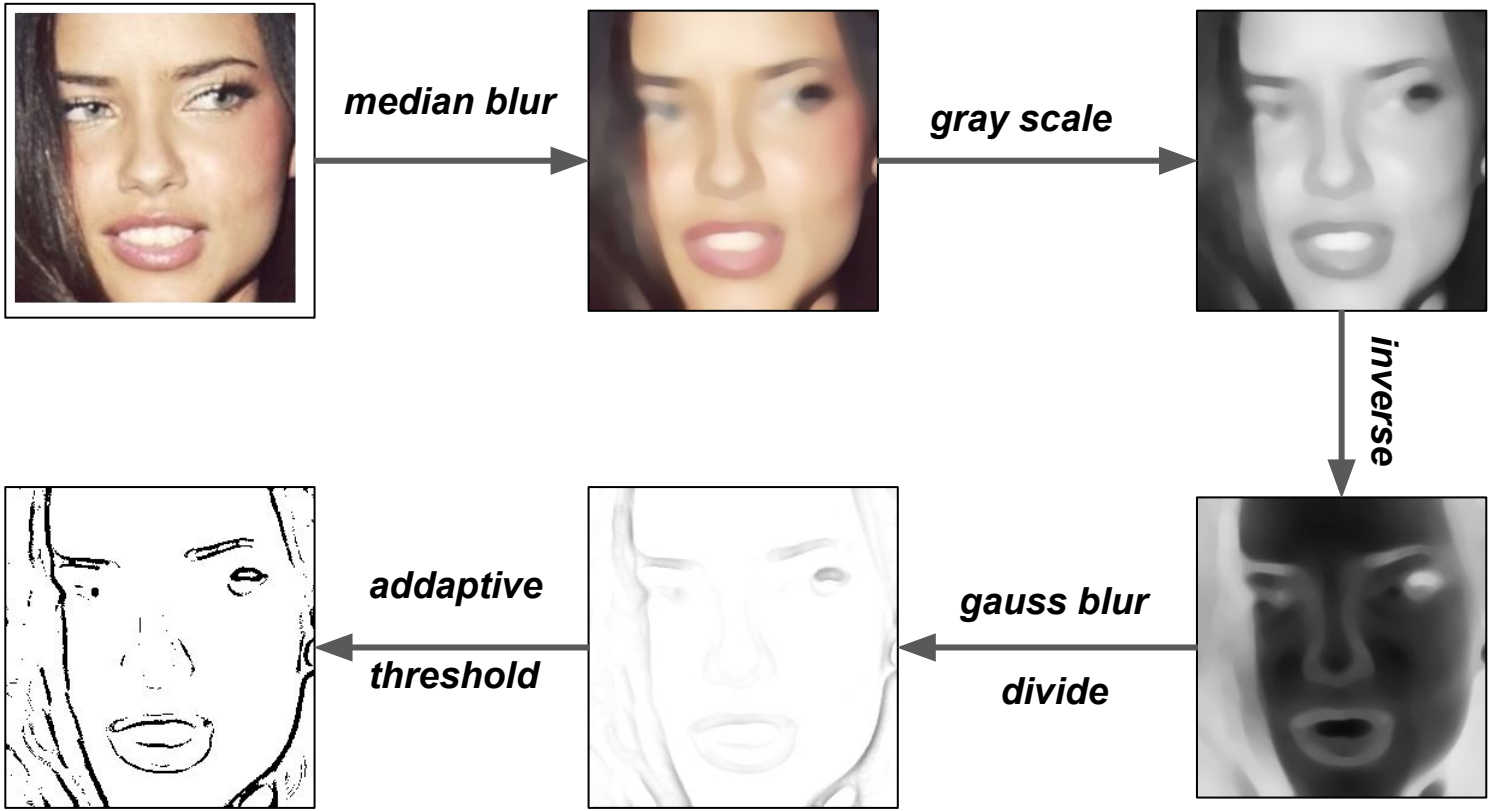
[1] Lee, Cheng-Han and Liu, Ziwei and Wu, Lingyun and Luo, Ping
, *MaskGAN: Towards Diverse and Interactive Facial Image Manipulation*, CVPR 2020. ROI: https://github.com/switchablenorms/CelebAMask-HQ

1. Create Sketch



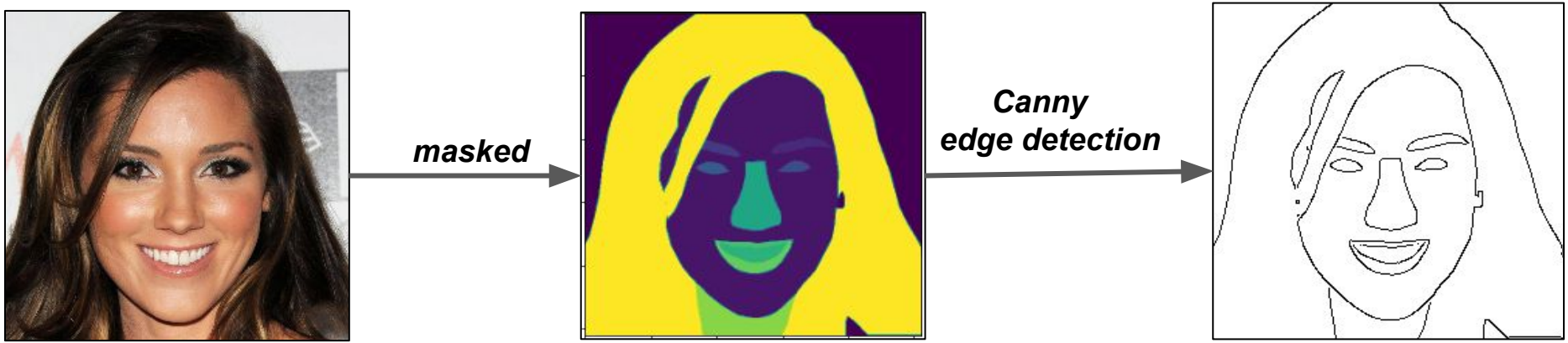
Custom sketch

Unclear sketch

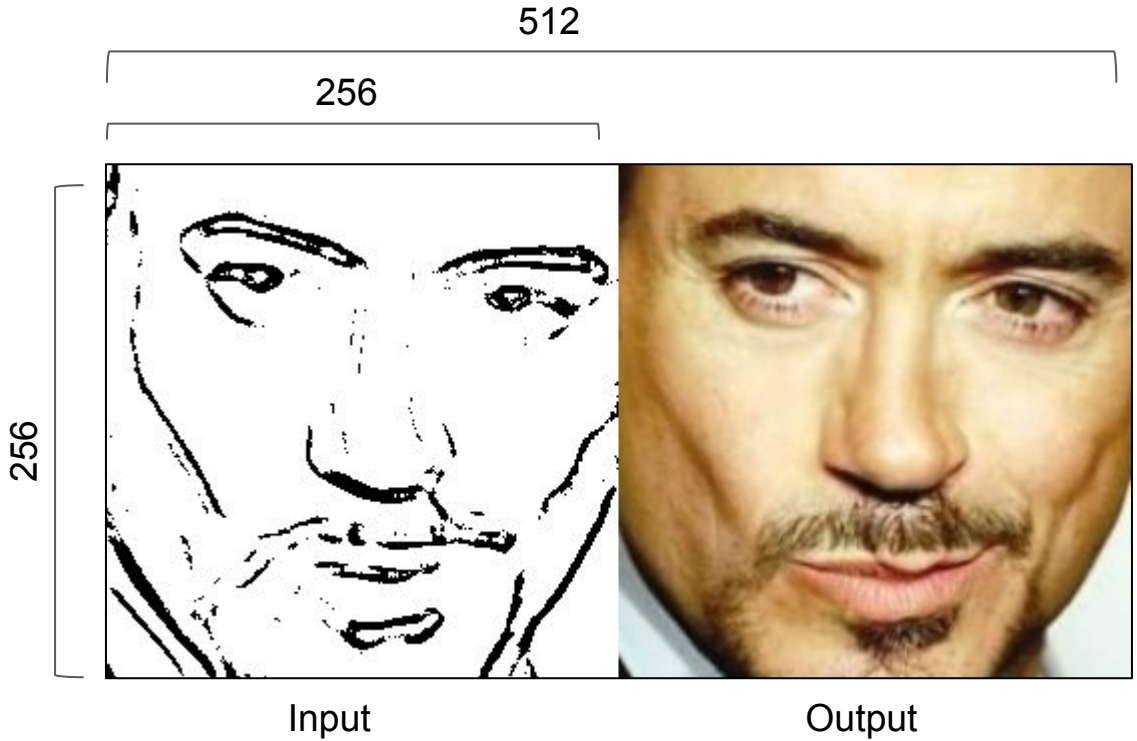


Sketch based on face mask

Full part sketch



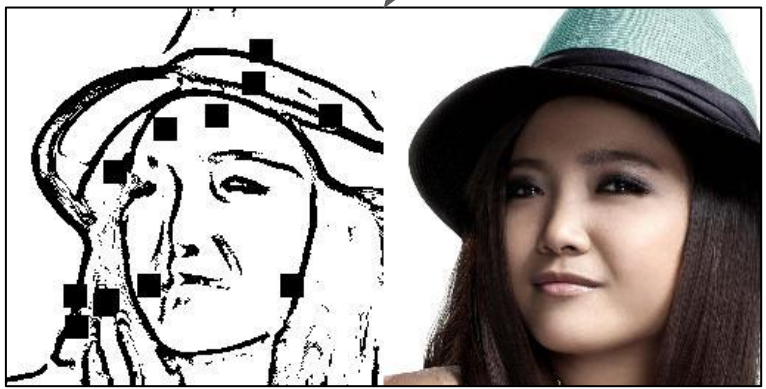
2. Pix2Pix format conversion

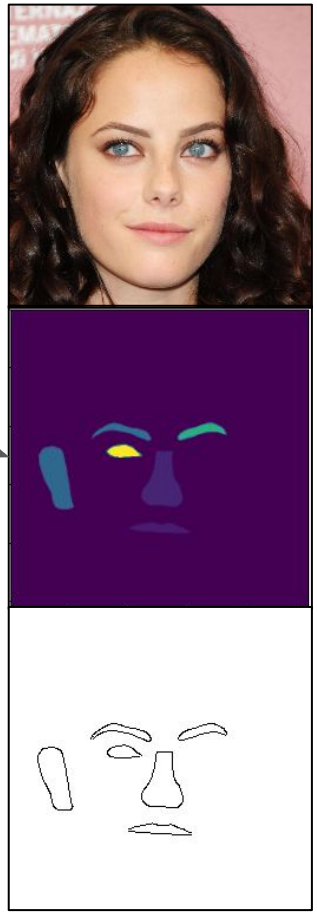


2. Data Augmentation

Random noise patches

Random miss facial parts





Randomly add 12 noise patches (16x16 pixel)

Randomly remove 3 parts on face - miss part sketch

MODEL ARCHITECTURE

- Pix2Pix model architecture
- Tutorial Pix2Pix with Tensorflow

1. Pix2Pix architecture

- G: Generator
- D: Discriminator

[2] Phillip Isola, Jun-Yan Zhu, Tinghui Zhou, Alexei A. Efros, *Image-to-Image Translation with Conditional Adversarial Networks,* CVPR 2017.

ROI: https://arxiv.org/abs/1611.07004v3

2. Tutorial Pix2Pix with Tensorflow

https://www.tensorflow.org/tutorials/generative/pix2pix

RESULT

- Size of training dataset
- Demo

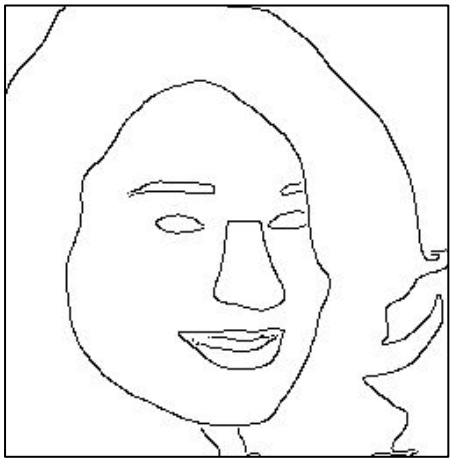
1. Size of training and testing Dataset

Dataset Sketch	***Num of images***	***Training***	***Testing***
Custom sketch	30 000	24 000	6000
Segment sketch	30 000	24 000	6000
Random noise patches	9600 *(20% of custom and segment sketch training set)*	9600	
Randomly missing facial parts	30.000	24 000	6000
	99 600	81 600	18 000

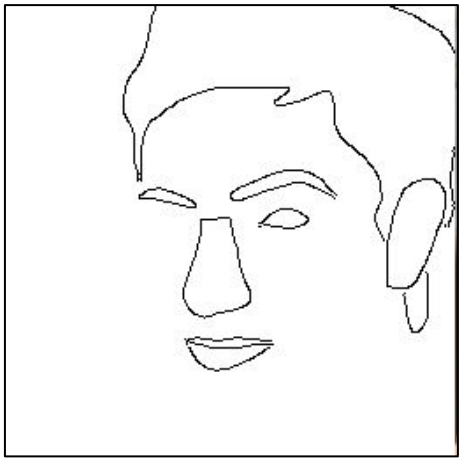
2. Result after 120K steps

Some test case in test dataset

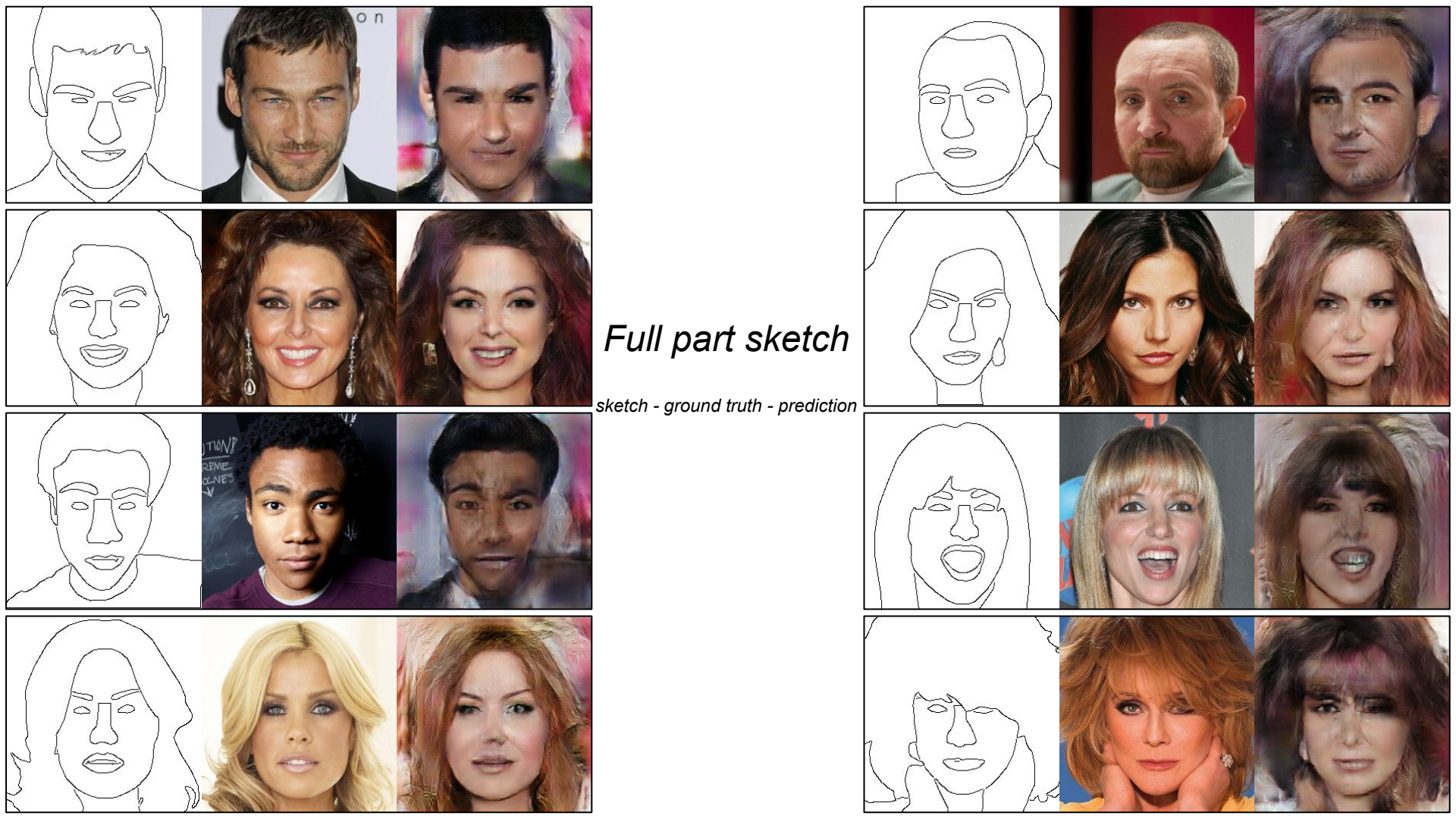
unclear



full part

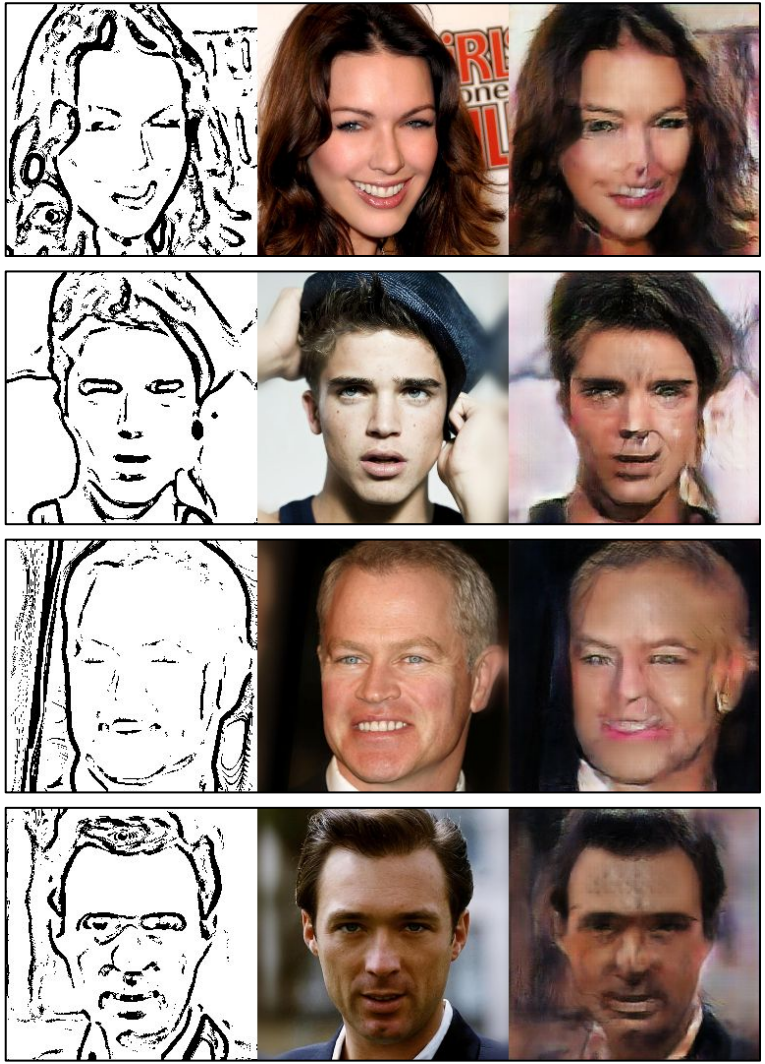


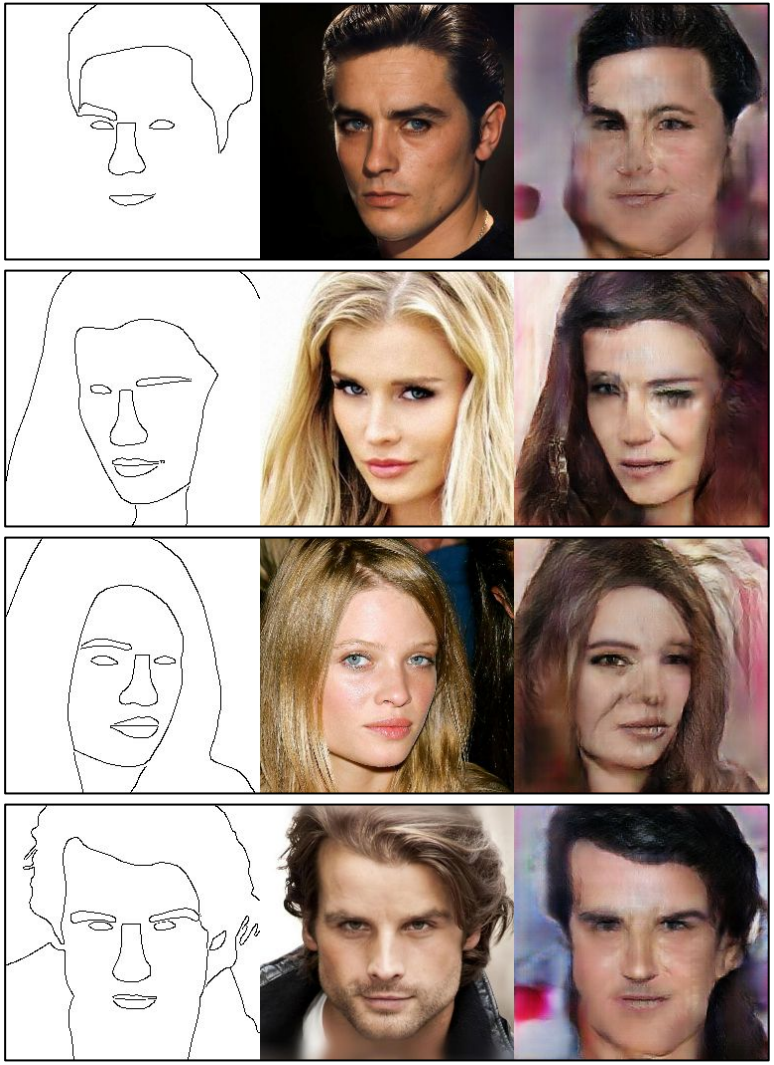
miss part


Full part sketch
sketch - ground truth - prediction

Unclear sketch

sketch - ground truth - prediction

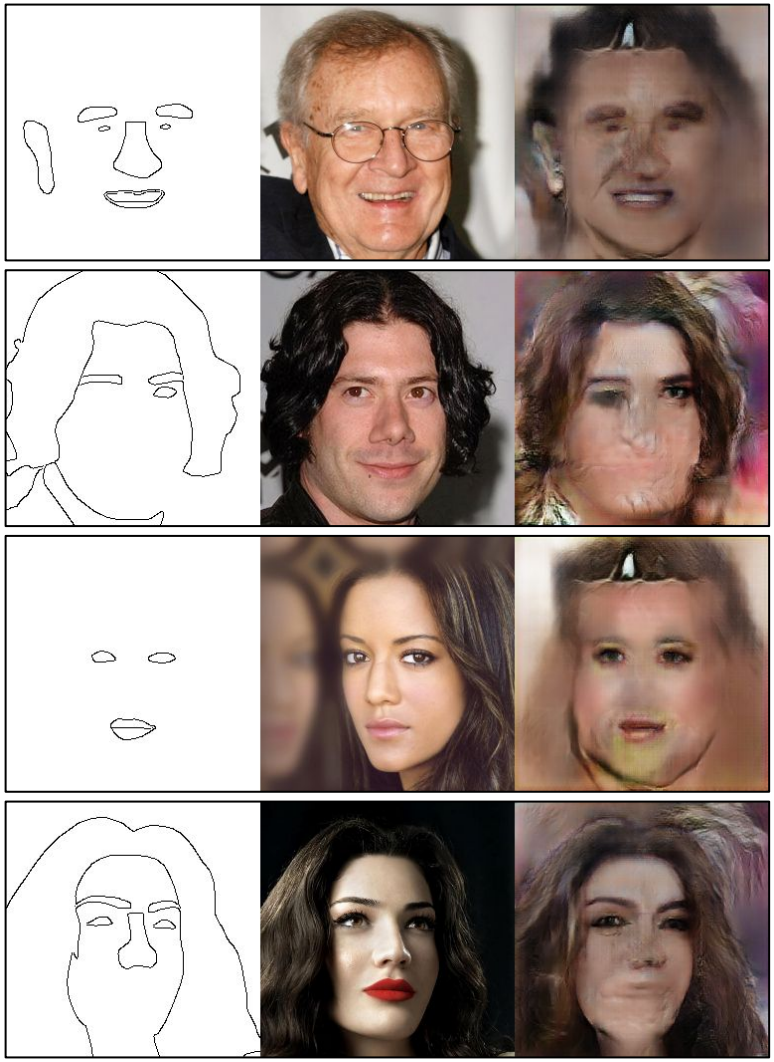




Miss part sketch

sketch - ground truth - prediction

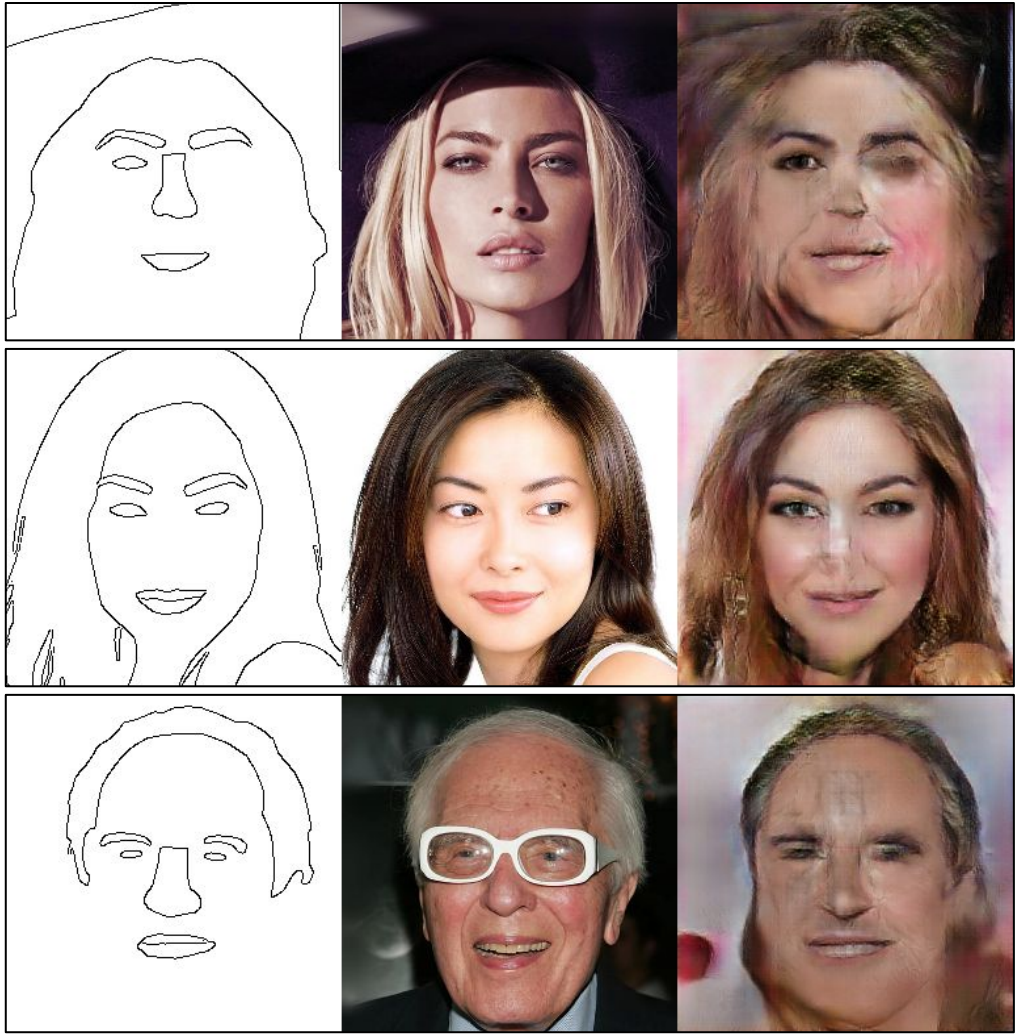
Right is more miss parts than left



Miss part sketch

sketch - ground truth - prediction

position prediction of miss part



Eyes - face shape - lips

Nose

Face shape

See more examples in test set with my Google Drive