AI Competition:

Portrait Sketch Generation Challenge

Challenge Motivation

Facial-sketch synthesis

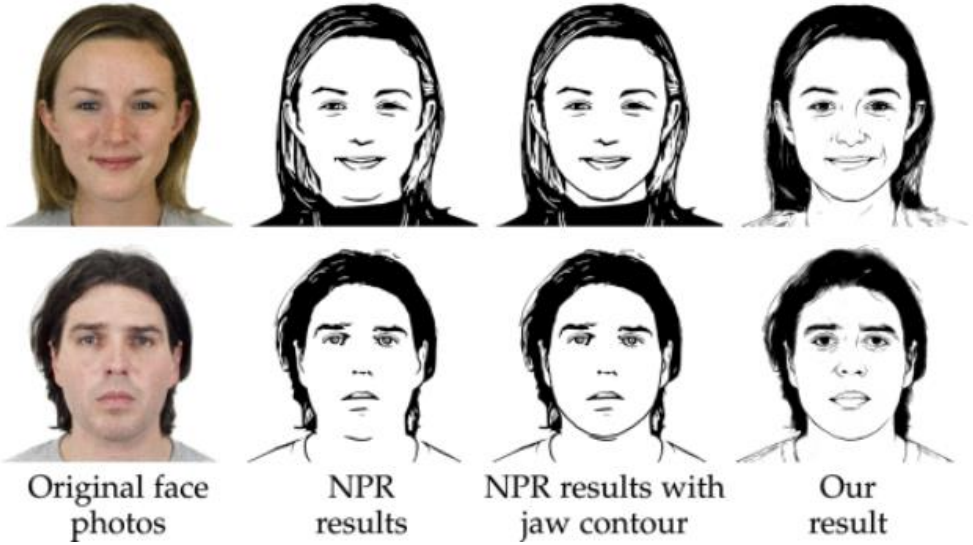
- Facial-sketch synthesis (FSS) aims to generate grayscale sketches from RGB images of human faces (imageto-sketch, I2S) or the other way around (sketch-to-image, S2I).

Facial-sketch synthesis

- FSS is commonly used by law enforcement or used in surveillance to assist in face recognition and retrieval, based on a sketch drawing from an eyewitness.
- Entertainment is also used in mobile apps, such as TikTok and Facebook.
- In addition, it is an attractive topic in digital entertainment.

Facial-sketch synthesis

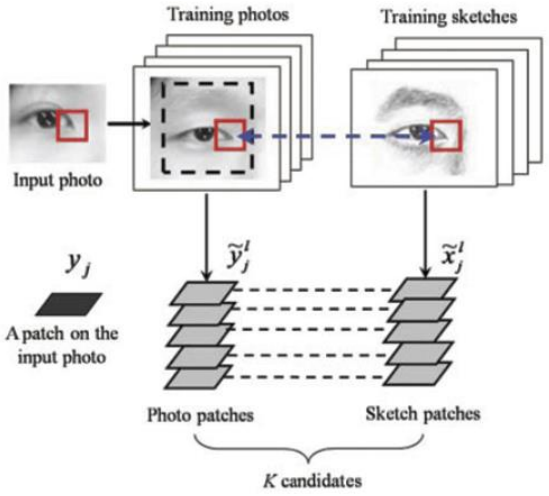
- Different from other face-related datasets, face sketch datasets are much more difficult to obtain because only professional artists can produce high-quality references.
- Due to the high cost of obtaining professional sketches, existing image-sketch datasets are relatively small with limited diversity. This dataset shortage has limited the development, especially for data-hungry deep learning models.

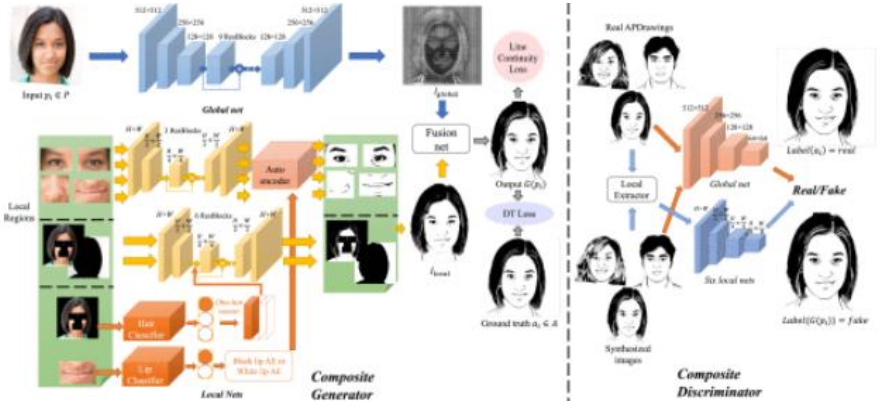


APDrawingGAN

Facial-sketch synthesis

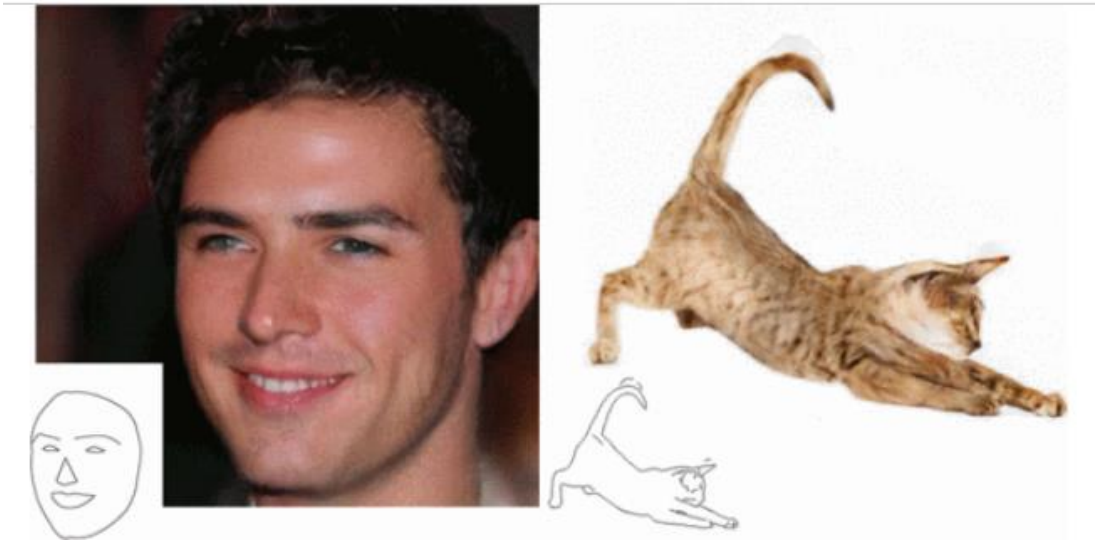
❖ Due to the lack of high-quality datasets and proper evaluation metrics, different FSS models are usually built and tested on diverse training datasets and with different evaluation methods. It is not easy to provide fair and comprehensive comparisons.





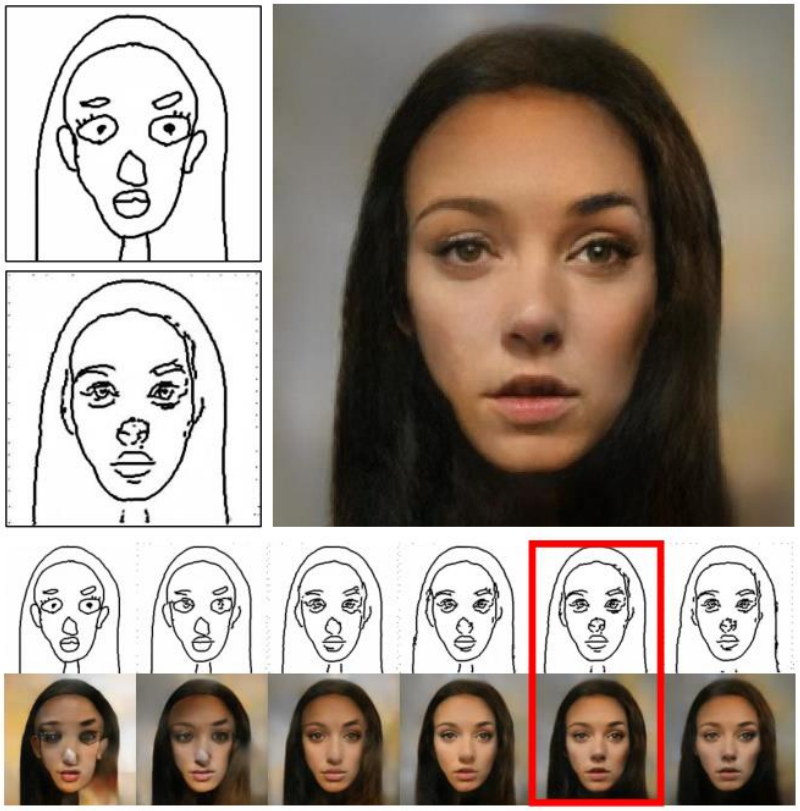
Facial-sketch synthesis

- Furthermore, many cutting-edge transformation models (e.g., CycleGAN, UNIT, Pix2pixHD, SPADE, DSMAP, NICE-GAN, and DRIT++) designed for related image-to-image transfer tasks could potentially be employed in FSS tasks.



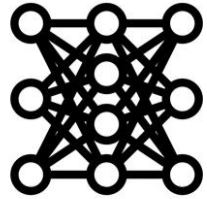
Deep Plastic Surgery: Robust and Controllable Image Editing with Human-Drawn Sketches

- Deep Plastic Surgery framework allows users to photos based on hand-drawn sketches.



Sketch Your Own GAN

- Sheng-Yu Wang et al. proposed in ICCV in 2021 the method of GAN Sketching, which can generate realistic photo images based on stick lines entered by the user.



Pre-trained Cat Model

AI Competition 1

Challenge Task and Dataset

Challenge Task

Challenge Introduction

Portrait sketching is an image in an art form that an artist paints for people. Unfortunately, an artist drawing heavidepends on the level of personal expertise, and each picture requires a lot of time and effort. Therefore, computer-generated portrait sketching becomes an efficient way to draw.

Most common portrait sketch image generation methods are based on the input of character photos to produce sketch pictures. In order to make it possible for ordinary users with limited drawing skills to draw a high-quality sketch at hand, we have organized a line generation sketch challenge. Our challenge is based on a professional portrait sketch drawing dataset. Using this dataset, various algorithms can test their performance and compare it fairly with other algorithms.

- **Task :** generate sketch-style portraits based on the lines entered.

Challenge Dataset

The total number of images is approximately 600. The total number of training images is approximately 420. The total number of test images is approximately 180.

Total Number	No. of Images Training	No. of Images Testing
600	420	180

- **Ranking method**
  - ➢FID: The smaller the value of the FID, the closer the two Gaussian distributions are, and the better the performance of the GAN. In practice, it is found that FID has relatively good robustness to noise, can have a good evaluation of the quality of the generated image, and the score given is more consistent with human visual judgment, and the computational complexity of FID is not high.
  - ➢FSIM: FSIM is a common metric used for full-reference image quality assessment, which captures similarities between low-level features of an image. It shows a higher consistency with human visual perception.

Challenge Dataset

■ CUFS

CUHK Face Sketch database (CUFS) is for research on face sketch synthesis and face sketch recognition. It includes 188 faces from the Chinese University of Hong Kong (CUHK) student database, 123 faces from the AR database [1], and 295 faces from the XM2VTS database [2]. There are 606 faces in total. For each face, there is a sketch drawn by an artist based on a photo taken in a frontal pose, under normal lighting condition, and with a neutral expression.

1. A. M. Martinez, and R. Benavente, “The AR Face Database,” CVC Technical Report #24, June 1998.
2. K. Messer, J. Matas, J. Kittler, J. Luettin, and G. Maitre, “XM2VTSDB: the Extended of M2VTS Database,” in Proceedings of International Conference on Audio- and Video-Based Person Authentication, pp. 72-77, 1999.

Challenge Dataset

■ CUFSF

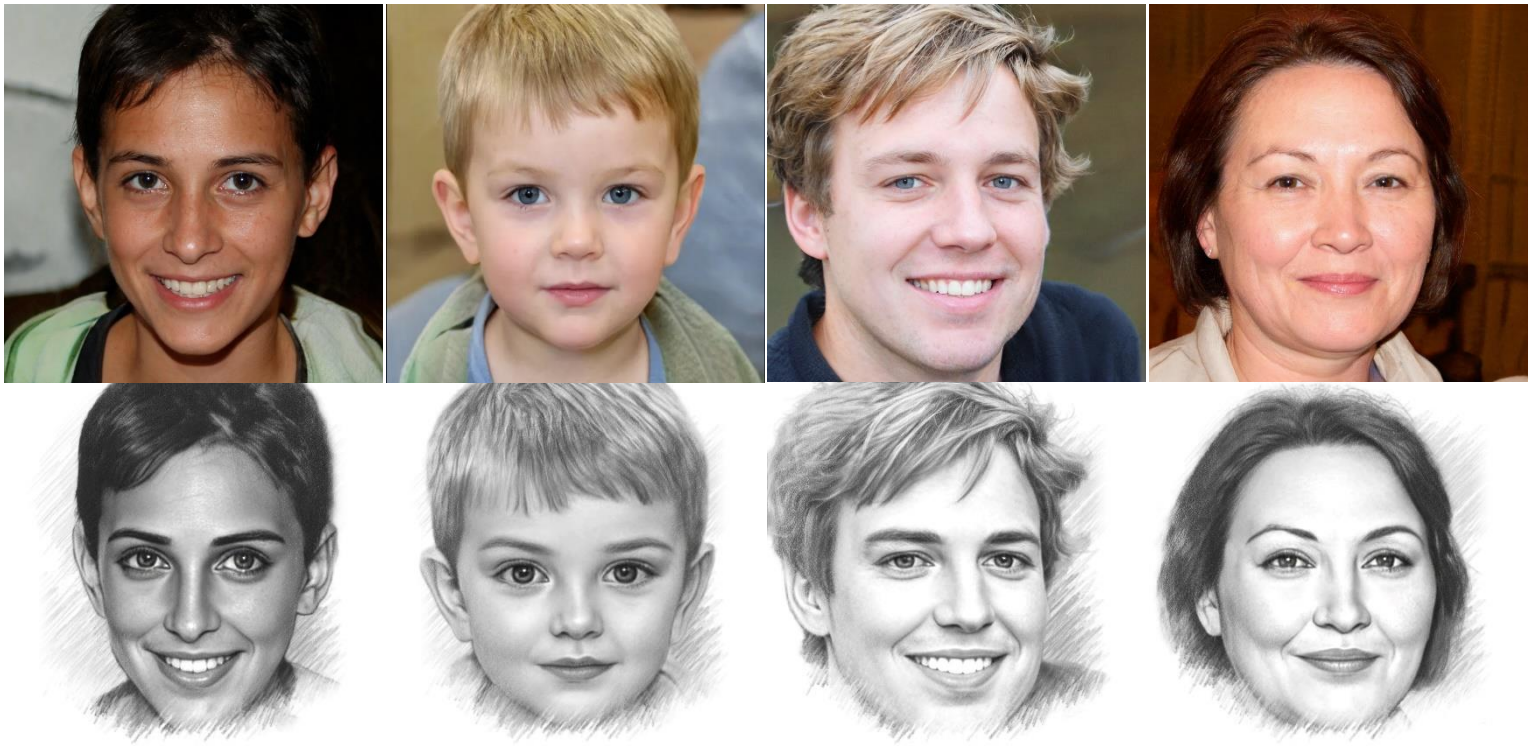
CUHK Face Sketch FERET Database (CUFSF) is for research on face sketch synthesis and face sketch recognition. It includes 1,194 persons from the FERET database. For each person, there are a face photo with lighting variation and a sketch with shape exaggeration drawn by an artist when viewing this photo.

Examples

Challenge Dataset

- **Ours**

A dataset of face sketches with different ages and characteristics. Photo from *this person does not exist*.



AI Competition 1

Result Submission

Result Submission

- **The project is Computer Graphics International's PSG Challenge, and information about the challenge will be announced when the contest website is built.**
  - The dataset acquisition, result submission format, and submission process are all explained in detail on the official website.

Result Submission

- **Project Requirements**
  - The methods used include but are not limited to deep learning methods.
  - The code is uploaded to GitHub with a link to the GitHub code in the summary of the big assignment report.

Thanks