Image Domain Transformation using Generative Adversarial Networks

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Problem

- Transforming images from one domain to another while retaining certain characteristics of of the original domain can have a wide range of applications.
- It is hard to find paired images across different domains.

- We aim to use unpaired images to perform cross domain transformation using GANs [1].
- For example, an image of a rose garden can be used to design floral fabrics. We train a model that can transform images of flowers to images of floral patterns.
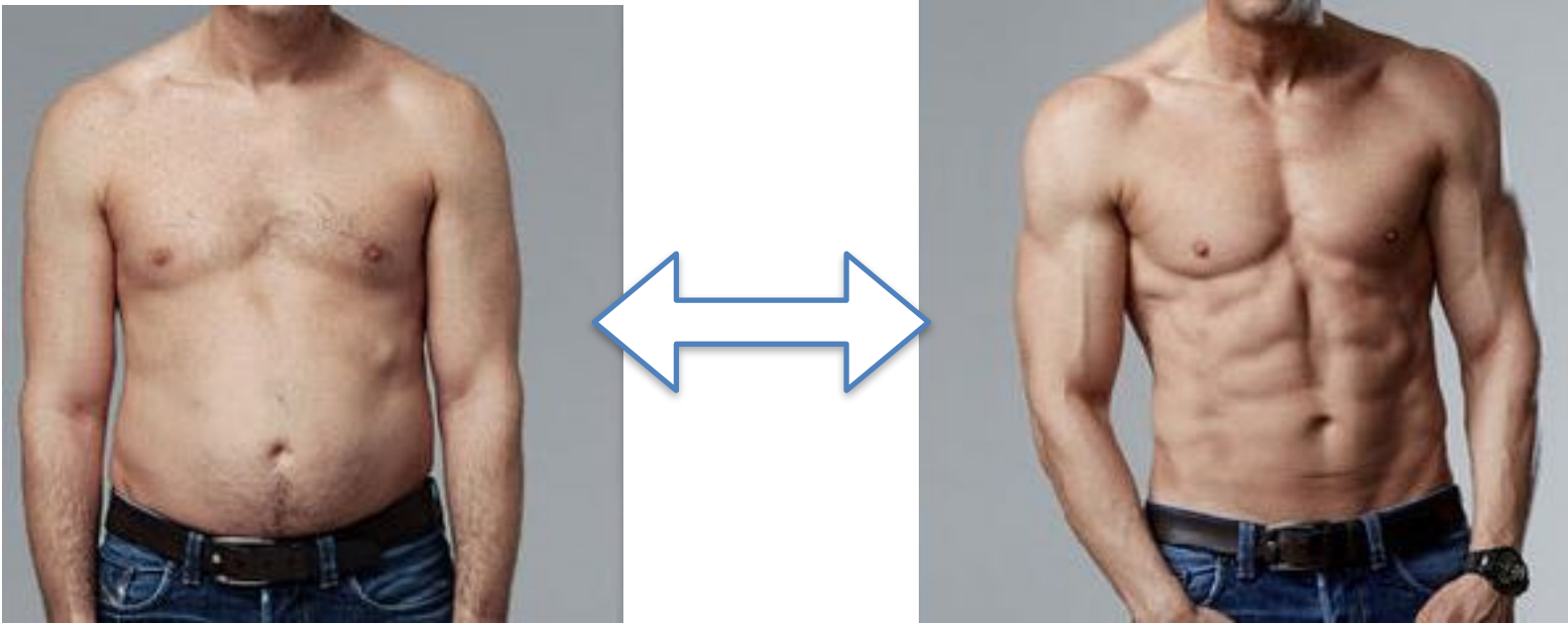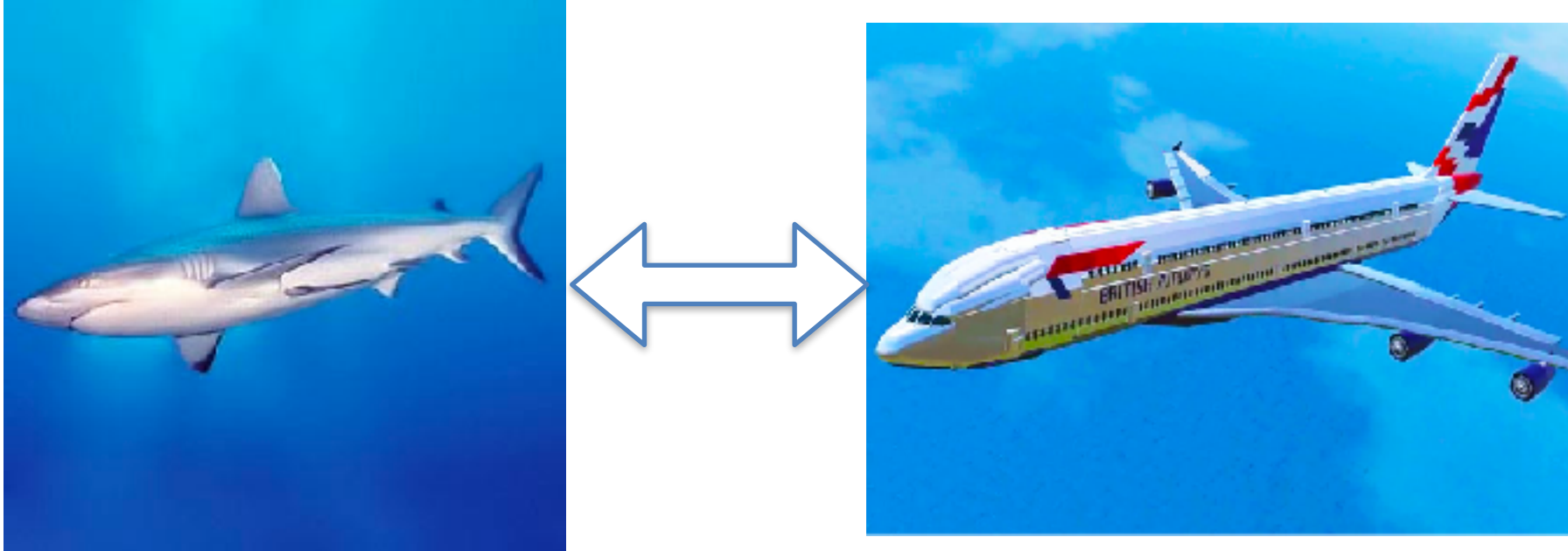
Datasets

Flower to Pattern

Fat to Fit

Shark to Plane
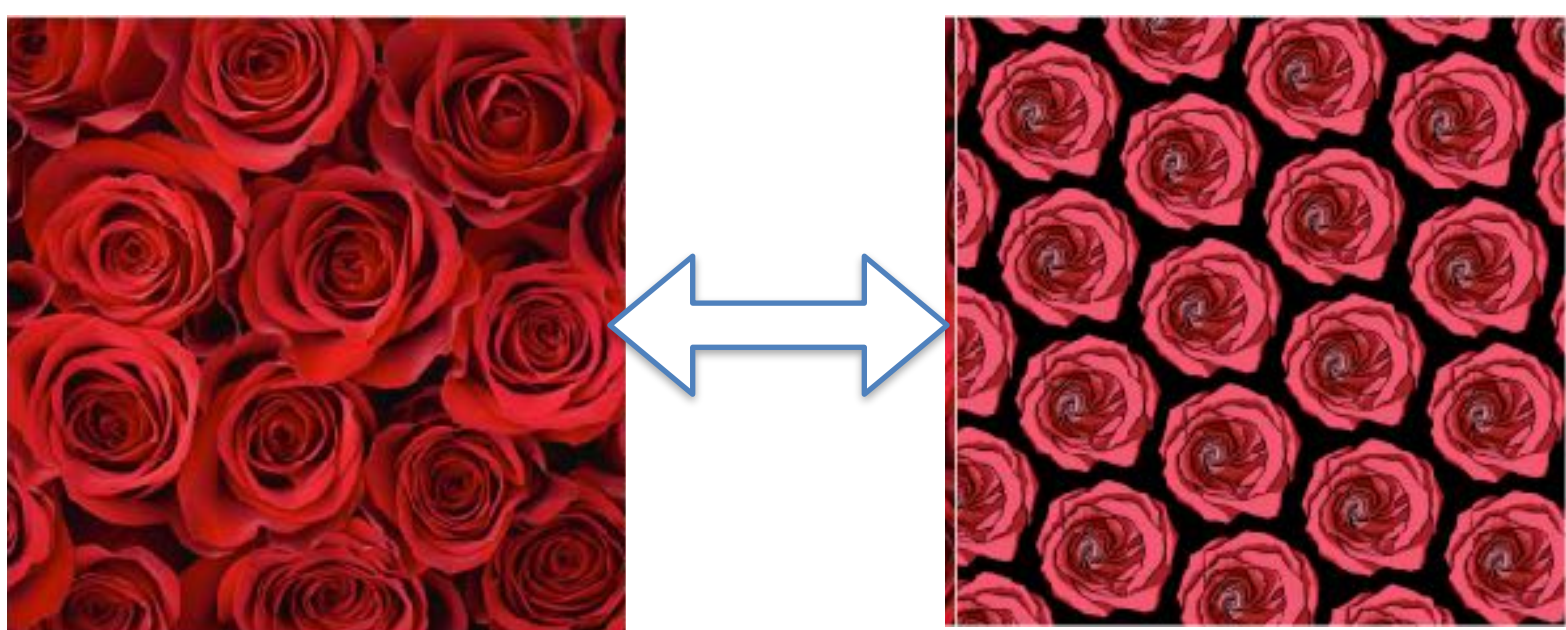
1200 flower images from ImageNet and 640 patterns scraped from Google Images.
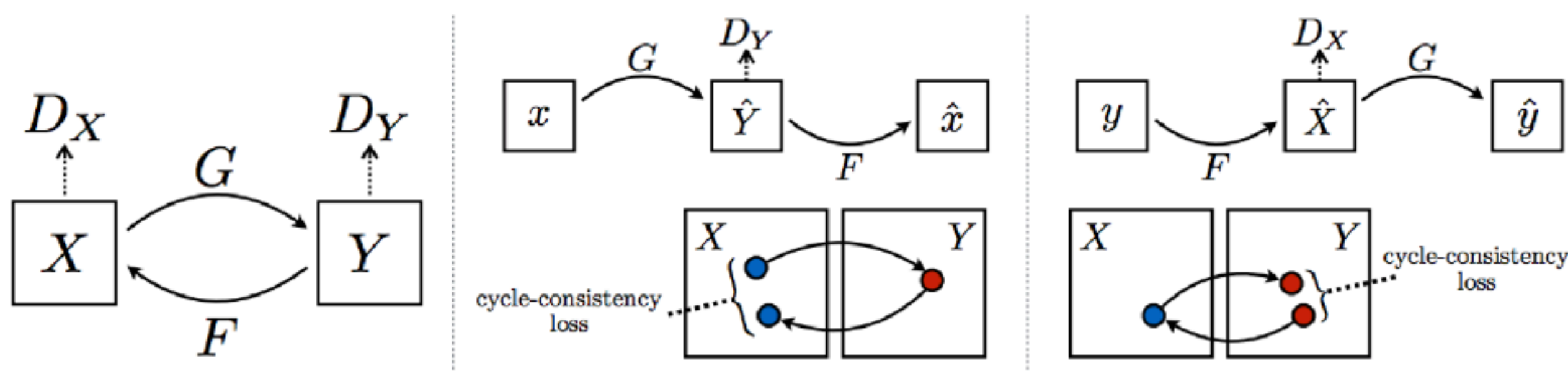Applications in the design industry.

1500 images scraped from Google Images using search term "male body transformation fat to fit".
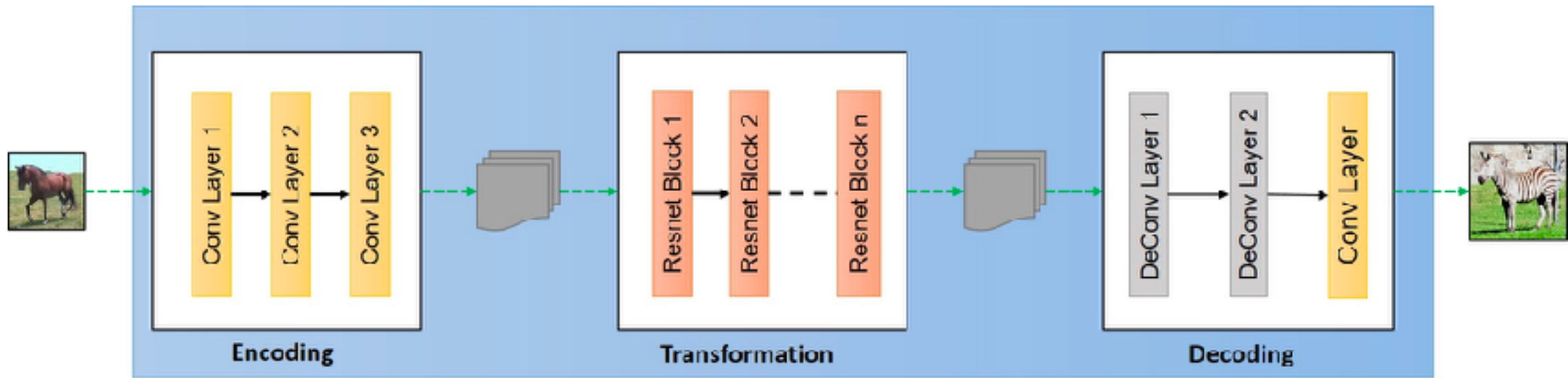Visualization tool for motivation.

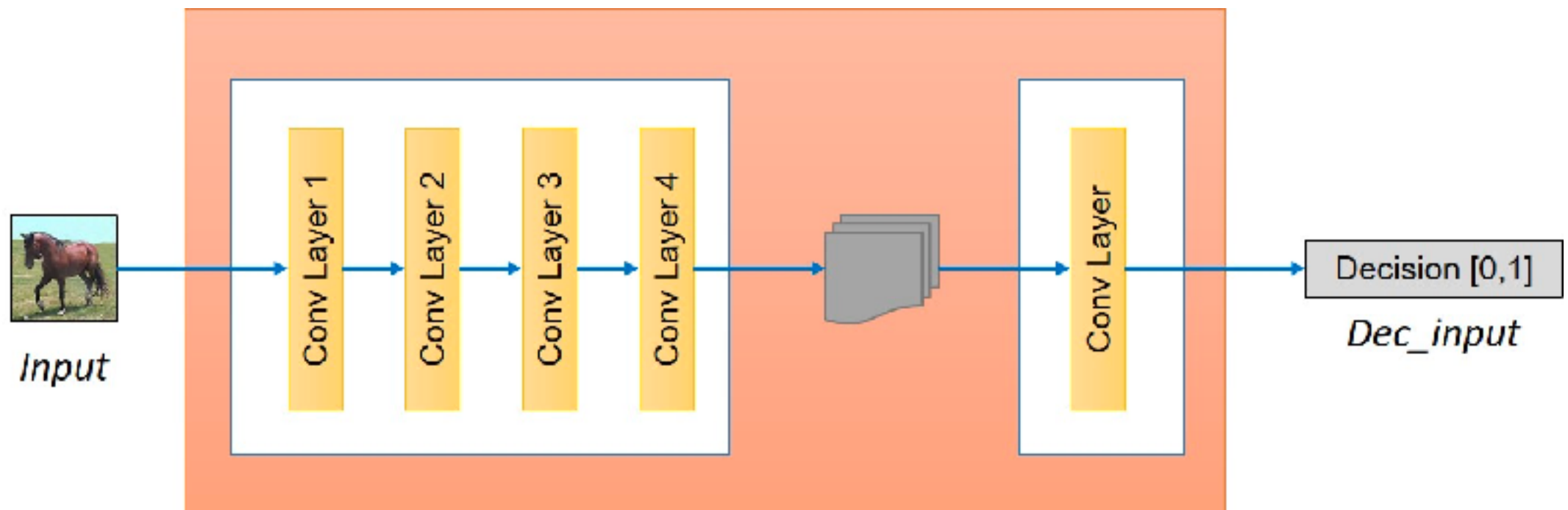750 shark images scraped from Google Images and 800 plane images from ImageNet.

Model

Generator G: X -> Y   Adversarial Discriminator Dx
Generator F: Y -> X   Adversarial Discriminator Dy

Generator

Transforms image from domain A to domain B in 3 phases: Encoding, Transformation and Decoding.
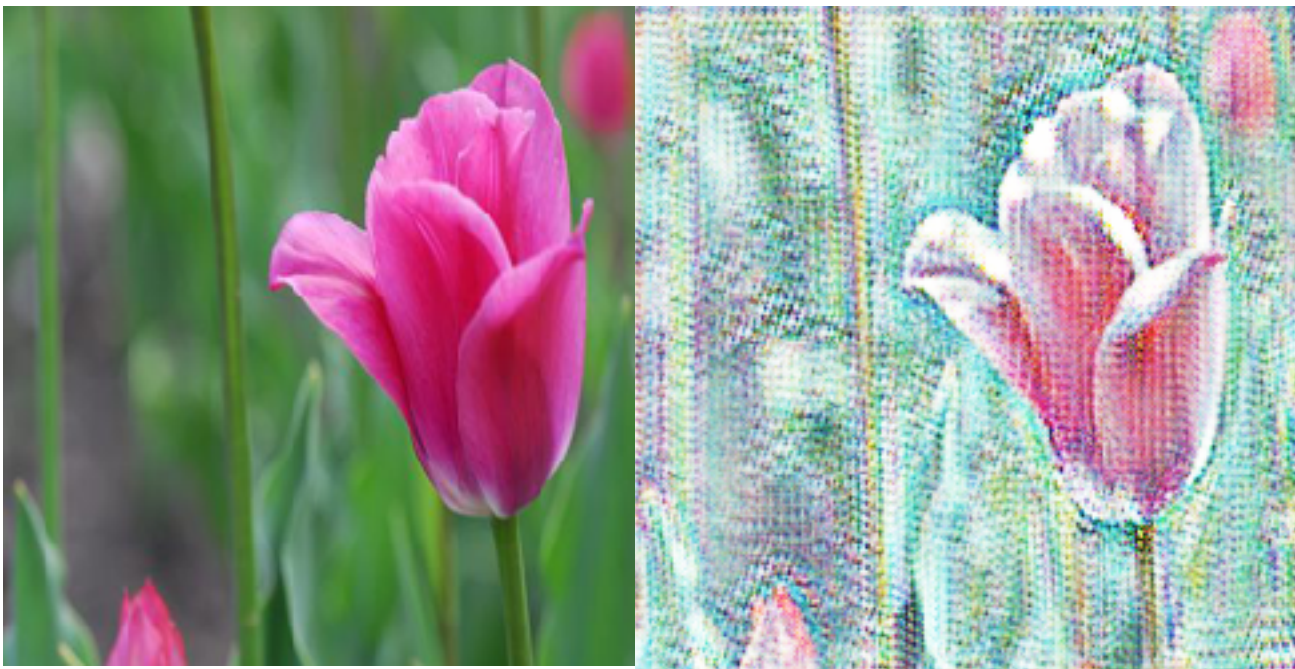
Discriminator
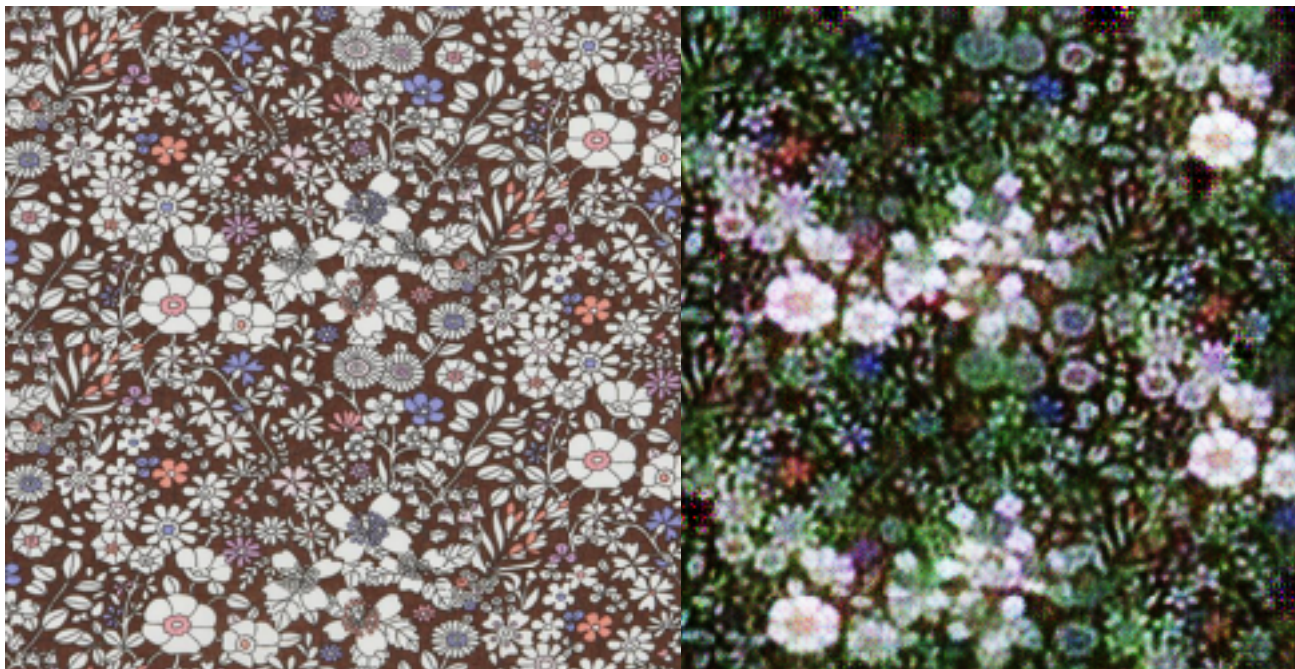

The discriminator would take an image as an input and try to predict if it is an original or a fake image (output from the generator).
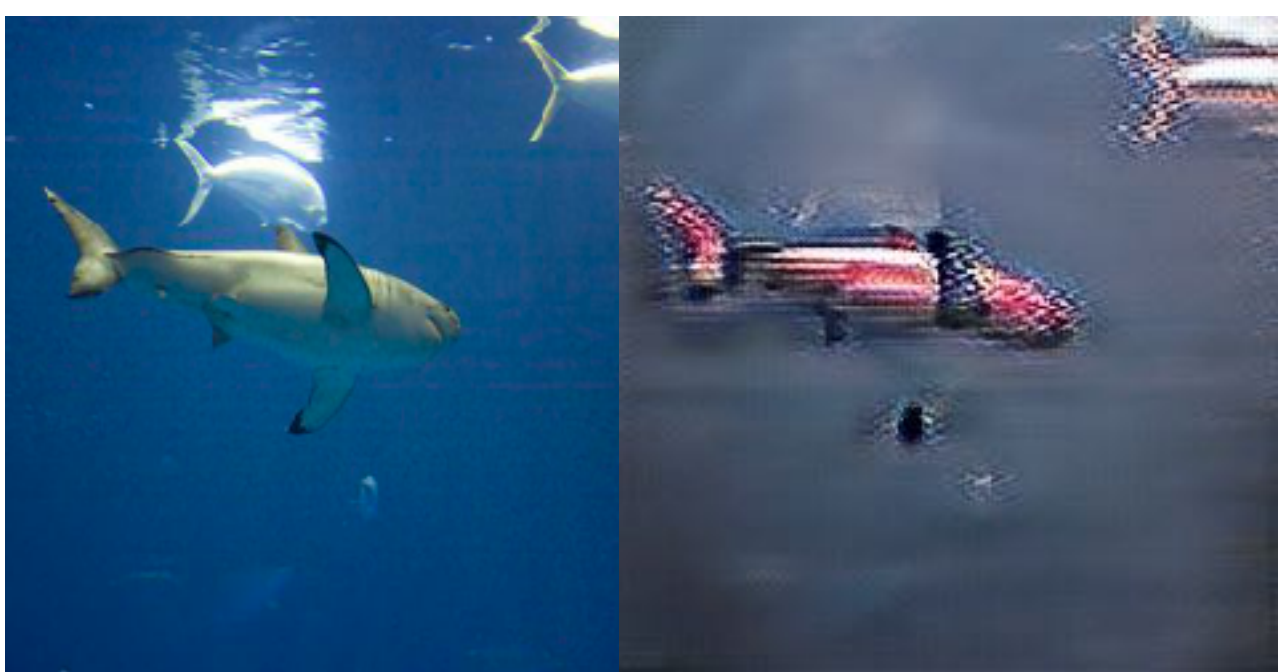
Results

Flower to Pattern

Pattern to Flower

Fat to Fit

Plane to Shark

Shark to Plane

References: [1] J. Zhu, T. Park, P. Isola, and A. A. Efros. Unpaired image-to-image translation using cycle-consistent adversarial networks. CoRR, abs/1703.10593, 2017.