Painting Generating using Conditional Generative Adversarial Nets

G14 – Tensor Ninjas

Adeel Mufti, Biagio Antonelli, Julius Monello

Objectives

- Train a GAN conditioned on different attributes of paintings in order to generate novel paintings that have specified attributes of our choosing.
  - What's a GAN?
- Could have a number of very interesting applications in new and not heavily explored areas. (e.g. could be used by artists to aid in the idea generation process for new projects; generating synthetic data; etc.)
- Generative models: learn efficient, alternate representations of the data, often leading to a deeper understanding

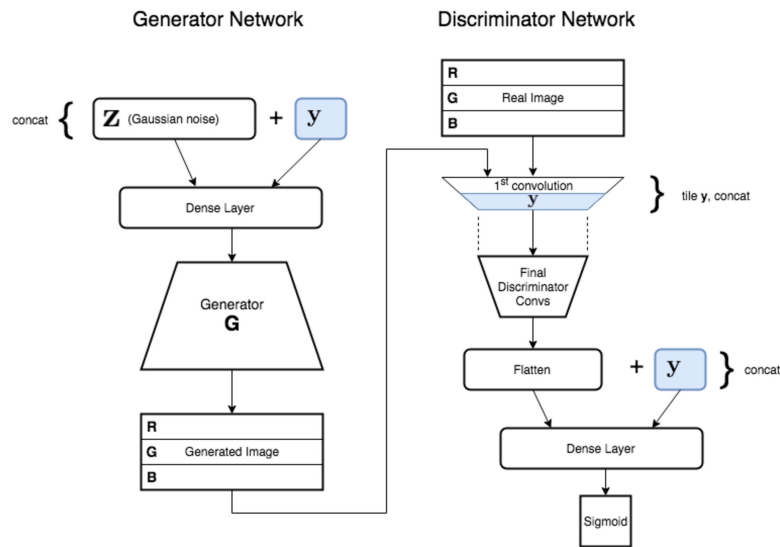*"What I cannot create, I do not understand."*

Details

Data acquisition and pre-processing

- Painter by Numbers + BAM dataset
- Open CV on faces
- Microsoft API for labels (emotions, genre, etc.)
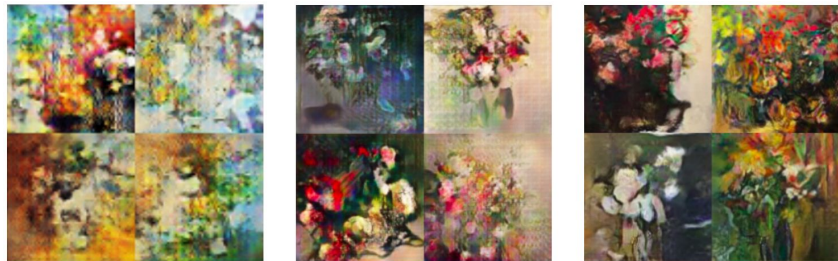
Methodology

- DC-GAN
  - Problems: mode collapse, vanishing grad
  - Solution: new distance measure (with constraints)
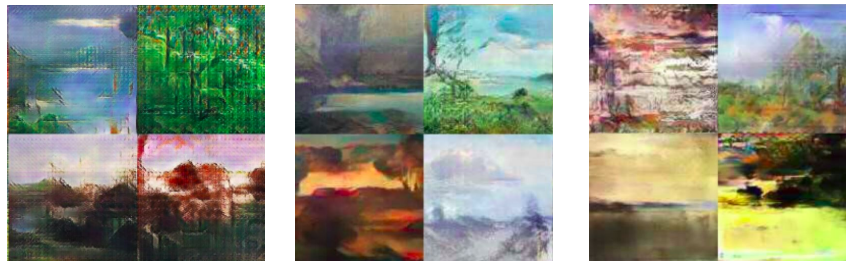- Spectral Normalization
- Gradient Penalty
- Conditioned SN-GAN

$$\min_{G} \max_{D} L(D, G) = \mathbb{E}_{x \sim p_r}[\log(D(x)] + \mathbb{E}_{x \sim p_g}[\log(1 - D(x))]$$

Results

Summary of results

Dataset	DC-GAN	SN	SNGP
landscapes	69.873	37.888	42.528
portraits	117.377	58.190	72.032
flowers	84.299	42.457	33.973
faces	67.308	35.779	42.724

Live Demo

http://adeel.io/sncgan/