Image Translation Problem with ModGAN

ModGAN: Project Presentation

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Motivation and Problem Statement

❏ Face generation using GANs or Generative Adversarial Networks is highly random, as every forward pass generates an image from a randomly sampled noise vector.

❏ Most GANs focus only on the resolution aspect, without paying much attention to facial attributes like skin color, hair color, etc.

❏ Thus we aim to control the generated output by providing auxiliary information in the form of an attribute vector or a rough sketch.

Motivation and Problem Statement

❏ The assumption is that attributes will serve as a guiding signal to the generative model and help it determine the corresponding output representation.

❏ The image translation problem, i.e. generation of realistic output images from rough images or outlines has been explored for paired and unpaired image data.
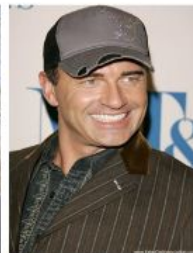
Dataset Description

- ❏ CelebA dataset is a large scale annotated faces dataset with more than 200K celebrity images, each annotated with a 40-attribute feature vector.

- ❏ The dataset is highly diverse, including 10,177 identities of various celebrities around the world.

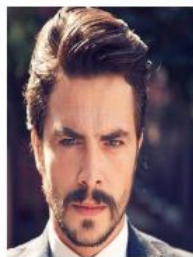- ❏ CelebA was used in approaches.

Dataset Images - CelebA

Methodology

- The feature attribute corresponding to each input image is fed as an auxiliary input to the generator and discriminator

- The discriminator in Conditional GAN changes from a simple classifier of real or fake images to an attribute based classifier which is able to identify whether the attribute labels are present or not.

- As mentioned earlier the model is able to generate faces, but fails to generate high quality images as the attribute vectors are not one hot vectors, and thus the discriminatory information provided is less.

Methodology

Conditional GAN with classifier module architecture
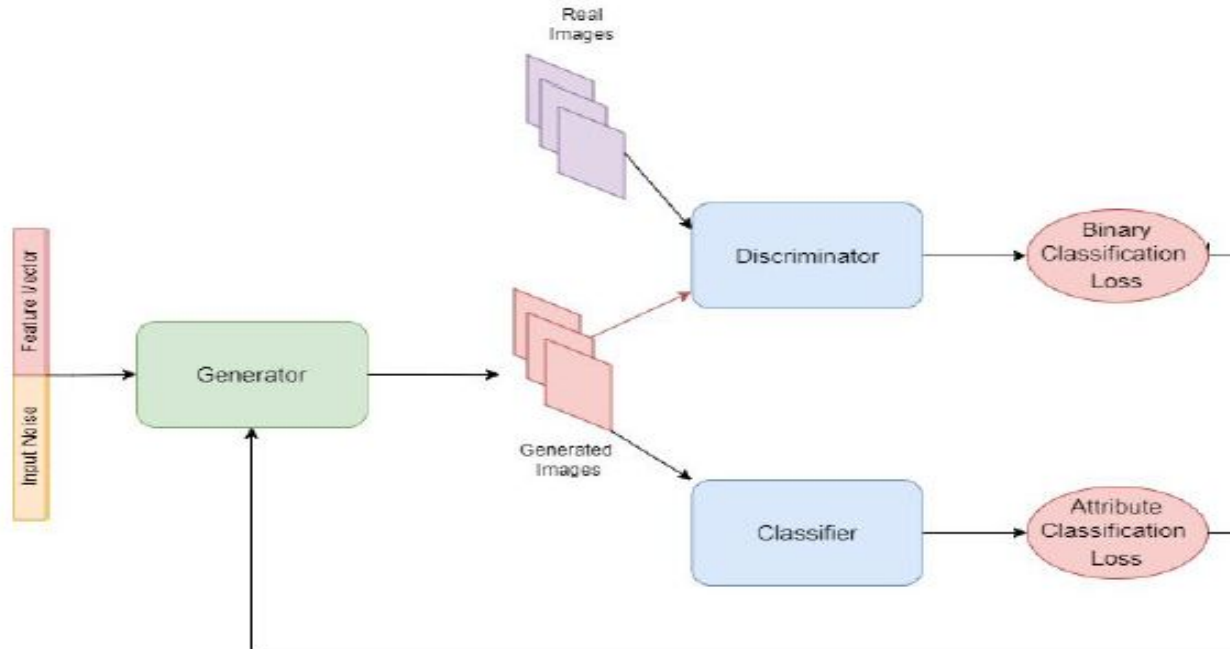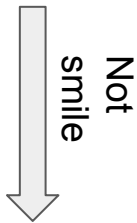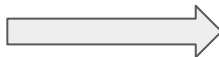
Results - Our Training

Sunglasses

Smile

Not smile

Blonde

Results - Analysis

- Not all samples generated have features corresponding to feature vector
  - Depends on Data Distribution of Dataset

- Entanglement of Features
  - Changing one feature leads to change in other features of the image

- Generation Quality

Male+Attractive (Entangled)

Male+Sunglasses+Attractive
(Lack of features)

Results - Plots