Image Generation

Face Generation using Deep Generative Models

LaTeX

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Outline

In this Project Generative models will be developed from scratch and their performance will be compaired. Main objective is to tune a Variational autoencoder and a Deep Convolutional GAN, models notorious for their training instability. Image generation was picked as results are easier to interpret and score.

Dataset

The Dataset that was used was the CelebA dataset of Kaggle. The dataset contains 202,599 face images of various celebrities with a suplementary feature vector of legth 40.

Sample:

Dataset constists of 128x128 images. A sample :

cVAE:

At first a conditional Variational Autoencoder with 4 convolutional blocks for the image and a shallow feedforward part for the features was used. A latent dimention of 200 was chosen and MSE + KL divergence as Loss. Results were blurry, something usual for VAE . Further tests will be performed with non symmetrical encoder-decoder schema and with the use of skip connections.

DCGAN:

A DCGAN was used to generate images from the images in the celeba dataset. Generator and Discriminator consist of 4 convolutional blocks. Images were a crispier compaired to the cVAE. Many of them were similar, so a problem of mode collapse is probably present. Further testing will be held with empowerment of the generator and the use of Wasserstein distance.