Deep Learning: Project 3

Project plan

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Project topic

Image generation with generative adversarial networks

Description of the problem

We want to solve a task of generating new images from an existing dataset. We will use the "LSUN bedroom scene 20% sample" dataset, which consists of 303125 jpgs containing bedroom scenes.

Project goals

The purpose of this project is to solve the problem of generating new images using deep learning and generative adversarial networks (GANs). The goal is to test and compare the performances of different network architectures by conducting various experiments.

Expected results

- Project plan
- Report
- Application code
- PowerPoint Presentation

Tasks

1. Explore technical literature, theoretical background, pre-trained models, and related work
2. Familiarize with the dataset
3. Choose the technologies and network architectures to use (e.g., vanilla GAN with CNNs, DC-GAN, Wasserstein GAN etc.)
4. Calculate the Fréchet Inception Distance (FID) for our generated images and compare it to results from literature
5. Investigate the influence of parameters change on the obtained results
6. Find sets of hyperparameters which help in overcoming training collapse and mode collapse

7. Select two of the generated images as well as their latent vectors, interpolate linearly between the two latent vectors to generate 8 additional latent vectors and use them to generate images from the model
8. Present the 10 generated images (8 newly generated and 2 generated previously) and discuss the results
9. Analyse and compare the results
10. Discuss the findings and draw conclusions
11. Present the obtained results in a report and a PowerPoint presentation

Requirements

- At least one of the network architectures should converge to generate satisfactory images.

Deadline

The deadline to accomplish all project goals is 14th of June 2022.