ADRL 2023 - Assignment 2

Prathosh A. P.

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1. **Problem 1:** Train a DC GAN on the given data with the usual GAN loss. Plot the loss curves for the Generator and Discriminator networks. Plot a 10 by 10 grid of images for generated images. Vary the number of times the generator and discriminator are trained and document the changes in the behaviour. Compute FID between 1000 real and generated images.

2. **Problem 2:** Train a conditional Wasserstein GAN on the given data with class-wise conditioning. Plot the loss curves for the Generator and Critic networks. Plot a 10 by 10 grid of images for generated images for each class. Compute the class conditional FID for all three classes taking 1000 real and generated images. Plot the generated images obtained via linear interpolation of between a pair of latent vectors.

3. **Problem 3:** Implement a Bi-GAN on the given dataset. Plot 10 by 10 grids of generated images. Perform posterior inference using the trained generator on the real data and use the inferred latent in a linear and SVM classifier, to classify between the three classes of the data.

General Instructions:

1. We use only one dataset for this assignment.

2. The animal face dataset can be found here - data

3. The dataset consists of 16,130 images of 3 animal faces at 512×512 resolution.

4. You need to downsize all images to 128x128 pixels before implementing.

5. Use Google collab with Jupiter notebook for all the computing.

6. You are supposed to submit a single Jupiter notebook with all the solutions made into separate blocks.

7. Use Pytorch for building neural networks. You are supposed to directly use the off-the-shelf functions for the models asked.

8. A report has to be submitted that would list all the experiments, results, and observations. This should be embedded in the Jupiter notebook itself.

9. Use matplotlib for plotting.

10. The final evaluation **does not** depend on the accuracy metrics but is based on the **quality of your experiments and observations thereof**.

11. We will run a plagiarism check on the codes. Any suspicion of copying would lead to a harsh penalty from negative marks in the assignment to a failing grade in the course, depending upon the severity. Therefore, kindly refrain from copying others' codes and/or reports.