CS 485 Deep Generative Networks Project Proposal

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1   Generation of Anime Faces Using StyleGAN

In our project, we are planning to improve and modify the StyleGAN algorithm [1] that we have discussed in class. We are planning to use a dataset that consists of various anime characters' faces [2]. By using this dataset along with StyleGAN and the style mixing feature, we are hoping to generate appealing visuals by the manipulation of the specific facial features and their backgrounds.

1.1   Background

Face generation of artificial characters has garnered significant interest recently because of various TV shows and games. Achieving adequate and exhaustive control over generating faces of these characters is a challenge. Our model can be used as an inspirational tool for designers and artists. Therefore, they can achieve the best fit for their use case by trying different variations of faces.

1.2   Dataset Description

The dataset that we have selected is titled "anime-faces" and it consists of 21551 different anime character faces. These images are samples from a website and they are cropped by using the anime face detection algorithm [3]. The images are ready for use, following the convention of 64x64 each, and in smooth condition.

We decided to use anime faces in our project since they can present relatively complex visuals compared to their pixel sizes. We anticipate that this decision will help to decrease computational load while providing satisfying results.

1.3   Algorithm Description

Generative Adversarial Networks (GANs) are generally used to generate synthetic data that is very similar to real data. StyleGAN is a variant of GAN, and it provides the facility to control the generated images to some extent (by style mixing). Since our main aim in this project is to control the generated images by their features, StyleGAN is very suitable for our use. We had the idea to use StyleGAN from a paper that we covered in class and found interesting. That paper is "A Style-Based Generator Architecture for Generative Adversarial Networks", which is published in 2019. We are planning to improve the architecture of this algorithm. Therefore, we are hoping to achieve a fine-tuned model for editing anime faces' features and their backgrounds.

Since we have not experienced any research in this field, at the moment we are not sure what exactly to improve in our selected algorithm's architecture. We will continue our research on what to improve in this setting, we are also eager to hear your suggestions.

References

[1] T. Karras, S. Laine and T. Aila, "A Style-Based Generator Architecture for Generative Adversarial Networks," 2019 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), Long Beach, CA, USA, 2019, pp. 4396-4405, doi: 10.1109/CVPR.2019.00453.

[2] Community, "Huggan/anime-faces · datasets at hugging face," huggan/anime-faces · Datasets at Hugging Face, https://huggingface.co/datasets/huggan/anime-faces (accessed Mar. 11, 2024).

[3] Nagadomi, "Nagadomi/lbpcascade_animeface: A face detector for anime/manga using OpenCV," GitHub, https://github.com/nagadomi/lbpcascade_animeface (accessed Mar. 11, 2024).