

MAIS 202 – Deliverable 1: Data Selection Proposal

I. Dataset & Preprocessing

The dataset that will be used in this project is the [Large-scale CelebFaces Attributes \(CelebA\) Dataset](#) by the Multimedia Laboratory, from The Chinese University of Hong Kong¹. This dataset was chosen because it contains over 200,000 images with over 40 attributes per image. Not only that, each facial image is cropped and aligned for consistency and ease-of-use. This dataset should be sufficient for generating images of people using a Generative Adversarial Network.

The CelebA dataset is a large detailed dataset of images. Whilst it is an excellent dataset with well-organized features and aligned images, it may be too large for the scope of the project. Computation times over 200,000 of such large images may be slow. It may therefore be necessary to downscale the image to a smaller size. In addition, some features in the dataset appear to be unnecessary for the purpose of this project or subjective such the “Attractive” attribute. These features may also be eliminated during preprocessing to speed up the process.

II. Machine Learning Model

This project will be based on the Generative Adversarial Network (GAN) framework of machine learning. GANs are designed to learn from given data and generate new data based on what it learned. It is therefore perfect for the purpose of this project: generating images based on an image-dataset like CelebA. GANs are the industry standard for such generative tasks, and are known for their high accuracy.

III. Evaluation Metric

By the nature of image generation and GANs, it is quite difficult to create an evaluation metric which is objective. From research, it seems that Manual Image Inspection is a good method to start with for evaluation. From then on, quantitative metrics such as the Inception Score and Frechet Inception Distance may be used for a more objective method of evaluation².

IV. Final Conceptualization

For the final conceptualization, the intention is to create a basic webpage/webapp which would generate and display an image of a fake celebrity. If the model can generate images that are almost indistinguishable from real celebrities, an idea might be to load in a fixed number of images which are all real but one, and have the user try and guess the fake image. Another point to explore is to create a webapp where the users can tweak the facial features on a slider (eye distance, nose size, etc.) and generate their own custom celebrity.

¹ Liund Luo, Ping and Wang, Xiaogang and Tang, XiaoouZiwei. (2015, December). “Deep Learning Face Attributes in the Wild”. Large-scale CelebFaces Attributes (CelebA) Dataset. Retrieved from: <http://mmlab.ie.cuhk.edu.hk/projects/CelebA.html>

² Brownlee, J. (2019, August 16). *How to Evaluate Generative Adversarial Networks*. Retrieved from Machine Learning Mastery: <https://machinelearningmastery.com/how-to-evaluate-generative-adversarial-networks/>