Project Report

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Generative Adversarial Networks for Automatic Image Colorization

1 Objectives

Our objectives given in the project proposal are stated below.
(1) Implement the state of the art[1] for image colorization.
(2) Implement Deep Convolutional Generative Adversarial Networks (DCGANs)[3].
(3) Implement Energy-Based Generative Adversarial Networks (EBGANs).[2]
(4) Explore methods to pretrain the model used in 1 and fine tune it as a generator in 2 and 3.
(5) Time permitting, develop our own GAN architecture for comparison.

Jahidul: 1, 4, 5
Cameron: 2, 3, 5

We have implemented an adversarial network similar to the architecture used in [6]. Our model is capable of using a combination of multiple loss functions. These include the typical L1 and L2 losses, as well as various types of adversarial losses, such as the Wasserstein GAN [7] and the Least Squares GAN [8].

2 To Do

3 References

[1] Zhang, Richard, Phillip Isola, and Alexei A. Efros. "Colorful image colorization." European Conference on Computer Vision. Springer International Publishing, 2016.

[2] J. Zhao, M. Mathieu, and Y. LeCun. Energy-based Generative Adversarial Network. ArXiv e-prints, September 2016.

[3] Radford, Alec, Luke Metz, and Soumith Chintala. "Unsupervised representation learning with deep convolutional generative adversarial networks." arXiv preprint arXiv:1511.06434 (2015).

[4] Goodfellow, Ian, et al. "Generative adversarial nets." Advances in neural information processing systems. 2014.

[5] Liu, Ziwei, et al. "Deep learning face attributes in the wild." Proceedings of the IEEE International Conference on Computer Vision. 2015.

[6] Isola, Phillip, et al. "Image-to-image translation with conditional adversarial networks." arXiv preprint arXiv:1611.07004 (2016).

[7] Arjovsky, Martin, Soumith Chintala, and Lon Bottou. "Wasserstein gan." arXiv preprint arXiv:1701.07875 (2017).

[8] Mao, Xudong, et al. "Least Squares Generative Adversarial Networks." arXiv preprint arXiv:1611.04076 (2016).