Evaluation of Spectral Normalization for GANs using Inception Score

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April 15, 2018

Abstract

In this project, we will implement a number of different Generative Adversarial Networks (GANs) [GPAM+14] for image generation.

1 Models

We plan to at least implement DCGAN [RMC15] with the new Spectral Normalization [MKKY18]. On top of that and if time allows, we will also implement different losses such as LSGAN [MLX+17] or WGAN [ACB17], and various training improvement techniques such as mini-batch discrimination [SGZ+16]. We will use TensorFlow.

2 Evaluation

For evaluating the performance of these GANs, we will implement the inception score metric as described in [SGZ+16]. We already have made up a dataset of 30K animal pictures (mostly reptiles), fetched from the Flickr API. If that turns out to be too few or not suitable for any reason we will fall back to using CIFAR-100 or ImageNet (or a subset of these).

3 Summary

Here's an agile summary of our plan:

- implement DCGAN with original loss (priority 1)
- implement spectral normalization (priority 1)
- implement inception score metric (priority 1)
- evaluate all our GANs on our reptile dataset (priority 1)
- implement other losses (LSGAN, WGAN) (priority 2)
- evaluate all our GANs on CIFAR-100 (priority 2)
- implement mini-batch discrimination and other improvements (priority 3)

References

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