Evaluation of Spectral Normalization for GANs Using Inception Score

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Abstract. The abstract should summarize the contents of the paper. LNCS guidelines indicate it should be at least 70 and at most 150 words. It should be set in 9-point font size and should be inset 1.0 cm from the right and left margins. . . .

Keywords: Generative adversarial networks, generative models, image generation

1 Introduction

Motivate the problem you are trying to solve, attempt to make an intuitive description of the problem and also formally define the problem. (1-2 pages including title, authors and abstract)

In this project, we will implement a number of different Generative Adversarial Networks (GANs) [1] for image generation.

We plan to at least implement DCGAN [2] with the new Spectral Normalization [3]. On top of that and if time allows, we will also implement different losses such as LSGAN [4] or WGAN [5], and various training improvement techniques such as mini-batch discrimination [6].

For evaluating the performance of these GANs, we will implement the inception score metric as described in [6]. 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).

2 Background

Summarize a few notable approaches/papers tackling the same problem. The selection should cover different possible techniques that can be (have been) used for the same task with success. Also, it is good to mention other recognition/synthesis tasks that use the same deep learning technique as yours. (1-2 pages)

2.1   Generative Adversarial Networks

2.2   Inception Score

2.3   Spectral Normalization

3   Approach

Describe the final approach you are take for this problem. For instance, here you would describe the details of the networks architecture. What training parameters and techniques you have used. The computational complexity of your model. And similar questions. To help explain your approach please make figures to accompany your text description. (1-3 pages)

4   Experiments

In this section, you should present the results you achieved with various experiments. The results can be presented in tables, plots, etc.

5   Conclusions

Explain what conclusions you can draw from these set of experiments? The set of experiments and results reported here should justify some of the design choices described in the previous sections. (3-6 pages)

References

1. Goodfellow, I., Pouget-Abadie, J., Mirza, M., Xu, B., Warde-Farley, D., Ozair, S., Courville, A., Bengio, Y.: Generative adversarial nets. In: Advances in neural information processing systems. (2014) 2672–2680
2. Radford, A., Metz, L., Chintala, S.: Unsupervised representation learning with deep convolutional generative adversarial networks. CoRR **abs/1511.06434** (2015)
3. Miyato, T., Kataoka, T., Koyama, M., Yoshida, Y.: Spectral normalization for generative adversarial networks. arXiv preprint arXiv:1802.05957 (2018)
4. Mao, X., Li, Q., Xie, H., Lau, R.Y., Wang, Z., Smolley, S.P.: Least squares generative adversarial networks. In: 2017 IEEE International Conference on Computer Vision (ICCV), IEEE (2017) 2813–2821
5. Arjovsky, M., Chintala, S., Bottou, L.: Wasserstein gan. arXiv preprint arXiv:1701.07875 (2017)
6. Salimans, T., Goodfellow, I., Zaremba, W., Cheung, V., Radford, A., Chen, X.: Improved techniques for training gans. In: Advances in Neural Information Processing Systems. (2016) 2234–2242

A   Template examples

Table 1. Font sizes of headings. Table captions should always be positioned *above* the tables. The final sentence of a table caption should end without a full stop

Heading level	Example	Font size and style
Title (centered)	**Lecture Notes ...**	14 point, bold
1st-level heading	**1 Introduction**	12 point, bold
2nd-level heading	**2.1 Printing Area**	10 point, bold
3rd-level heading	**Headings.** Text follows ...	10 point, bold
4th-level heading	*Remark.* Text follows ...	10 point, italic

(Fig. 1 shows an example).

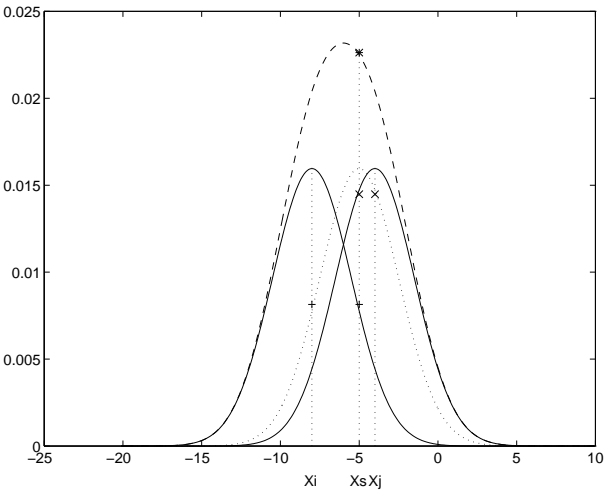**Fig. 1.** wuzup

$$\psi(u) = \int_0^T \left[\frac{1}{2} \left(\Lambda_0^{-1} u, u \right) + N^*(-u) \right] dt \tag{1}$$

$$= 0? \tag{2}$$

Please punctuate a displayed equation in the same way as ordinary text but with a small space before the end punctuation.