Normalizing Flows

Abdul Fatir Ansari¹, Devamanyu Hazarika¹, and Remmy A. M. Zen¹

National University of Singapore {abc,def,remmy}@u.nus.edu

Abstract. Keywords: Normalizing flows · .

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References

- Dillon, J.V., Langmore, I., Tran, D., Brevdo, E., Vasudevan, S., Moore, D., Patton, B., Alemi, A., Hoffman, M., Saurous, R.A.: Tensorflow distributions. arXiv preprint arXiv:1711.10604 (2017)
- 2. Kingma, D.P., Dhariwal, P.: Glow: Generative flow with invertible 1x1 convolutions. arXiv preprint arXiv:1807.03039 (2018)
- 3. Kingma, D.P., Salimans, T., Jozefowicz, R., Chen, X., Sutskever, I., Welling, M.: Improved variational inference with inverse autoregressive flow. In: Advances in Neural Information Processing Systems. pp. 4743–4751 (2016)
- 4. Oord, A.v.d., Kalchbrenner, N., Kavukcuoglu, K.: Pixel recurrent neural networks. arXiv preprint arXiv:1601.06759 (2016)
- 5. Van Den Oord, A., Dieleman, S., Zen, H., Simonyan, K., Vinyals, O., Graves, A., Kalchbrenner, N., Senior, A.W., Kavukcuoglu, K.: Wavenet: A generative model for raw audio. In: SSW. p. 125 (2016)