

Project Proposal in ADLR

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We want to study Invertible Neural Networks [1] and compare them with other existing model architectures like conditional Variational Autoencoders (cVAE) [4] or conditional Generative Adversarial Networks (cGAN) [3].

After setting up the architectures we want to evaluate these models based on the simple 2D manipulator. Our ideas for possible future contributions are:

- scaling up the simple 2D manipulator example to 3D space and analyze the suitability of Maximum Mean Discrepancy (MMD) [2]
- replace MMD by other methods for comparing two probability distributions or by a trainable discriminator
- study more complex inverse problems from real-world data
- path planning ...

References

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- [2] Arthur Gretton, Karsten M. Borgwardt, Malte J. Rasch, Bernhard Schölkopf, and Alexander J. Smola. A kernel method for the two-sample problem. *CoRR*, abs/0805.2368, 2008.

- [3] Mehdi Mirza and Simon Osindero. Conditional generative adversarial nets. *CoRR*, abs/1411.1784, 2014.
- [4] Kihyuk Sohn, Honglak Lee, and Xinchen Yan. Learning structured output representation using deep conditional generative models. In C. Cortes, N. Lawrence, D. Lee, M. Sugiyama, and R. Garnett, editors, *Advances in Neural Information Processing Systems*, volume 28, pages 3483–3491. Curran Associates, Inc., 2015.