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Latent Space Refinement for Deep Generative Models

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Deep generative models are becoming widely used across science and industry for a variety of purposes. A common challenge is achieving a precise implicit or explicit representation of the data probability density. Recent proposals have suggested using classifier weights to refine the learned density of deep generative models. We extend this idea to all types of generative models and show how latent space refinement via iterated generative modeling can circumvent topological obstructions and improve precision. This methodology also applies to cases where the target model is non-differentiable and has many internal latent dimensions which must be marginalized over before refinement. We demonstrate our Latent Space Refinement (LaSeR) protocol on a variety of examples, focusing on the combinations of Normalizing Flows and Generative Adversarial Networks.

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