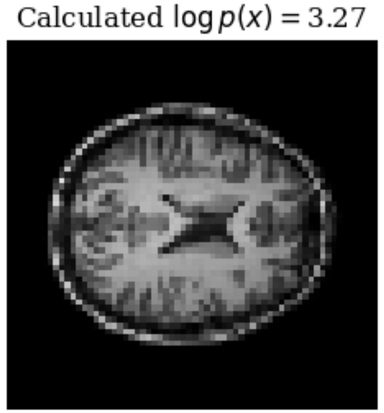
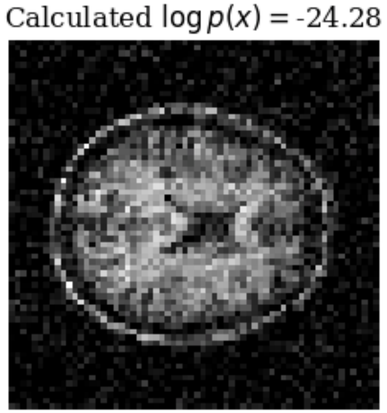
Normalizing Flow as a trained prior

Allow for exact likelihood evaluation

$$p_x(x = \text{  }) = 0.99$$

$$p_x(x = \text{  }) = 0.01$$





Train network and use as prior in bayesian formulation:

$$\underset{\mathbf{x}}{\text{argmax}} \; p(\mathbf{x}|\mathbf{y}) = \underset{\mathbf{x}}{\text{argmax}} \; \log \; p(\mathbf{y}|\mathbf{x}) + \log \; p(\mathbf{x})$$

MAP Optimization with NFs

$$\underset{\mathbf{x}}{\operatorname{argmin}} \ \frac{1}{2}\|A\mathbf{x}-\mathbf{d}\|_2^2 + \log R(\mathbf{x})$$

Reparametrize optimization with trained generative network $\mathbf{x} = G_\theta(\mathbf{z})$

Asim, Muhammad, et al. "Invertible generative models for inverse problems: mitigating representation error and dataset bias." International Conference on Machine Learning. PMLR, 2020.