How to model p(x)

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$$\log \widehat{p}(x) = \text{CNN}(x)$$

Infeasible

Use the chain rule

Cool, but slow to generate

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$$p(x_1, \ldots, x_d) = p(x_1) \ldots p(x_d)$$
 Too restrictive

Mixture of several Gaussians (GMM)
Still too restrictive