Unnormalized distribution

$$p^*(z) = p(z|X) = \frac{p(X|z)p(z)}{p(X)} = \frac{\widehat{p}(z)}{Z}$$

Optimization:

$$\mathcal{KL}\left[q(z) \parallel \frac{\widehat{p}(z)}{Z}\right] = \int q(z) \log \frac{q(z)}{\widehat{p}(z)/Z} dz$$

$$= \int q(z) \log \frac{q(z)}{\widehat{p}(z)} dz + \int q(z) \log Z dz$$

$$= \mathcal{KL}\left[q(z) \parallel \widehat{p}(z)\right] + \log Z$$

$$\mathcal{KL}\left[q(z) \parallel \widehat{p}(z)\right] \to \min_z$$