Latent variables are high-level features

Data generation process $\quad P(x|z)$

$\Rightarrow$

$\rightarrow$ we want to model the inverse process

Figure out the latents $P(z|x)$

Hidden variable $\boxed{z}$ $\rightarrow$ $\boxed{x}$ observation

Latent variable model as a generation process

1. Generate z from $P(z)$ by sampling
2. Generate x by sampling from $P(x|z)$ given the sampled z.

$$P(z|x) = \frac{P(x|z) P(z)}{P(x)}$$

$P(x) \rightarrow$ Marginal

$$P(x) = \int P(x|z) P(z) \, dz \quad (\text{intractable})$$