

# Introducing latent variable

$$p(x \mid \theta) = \pi_1 \mathcal{N}(x \mid \mu_1, \Sigma_1) + \pi_2 \mathcal{N}(x \mid \mu_2, \Sigma_2) \\ + \pi_3 \mathcal{N}(x \mid \mu_3, \Sigma_3)$$