

# Gaussian Mixture Model connection

## E-step

**EM:** For each point compute

$$q(t_i) = p(t_i \mid x_i, \theta)$$

**GMM:** For each point compute

$$p(t_i \mid x_i, \theta)$$

## M-step

**EM:** Update parameters to maximize

$$\max_{\theta} \mathbb{E}_q \log p(X, T \mid \theta)$$

**GMM:** Update Gaussian parameters  
to fit points assigned to them

$$\mu_1 = \frac{\sum_i p(t_i = 1 \mid x_i, \theta) x_i}{\sum_i p(t_i = 1 \mid x_i, \theta)}$$