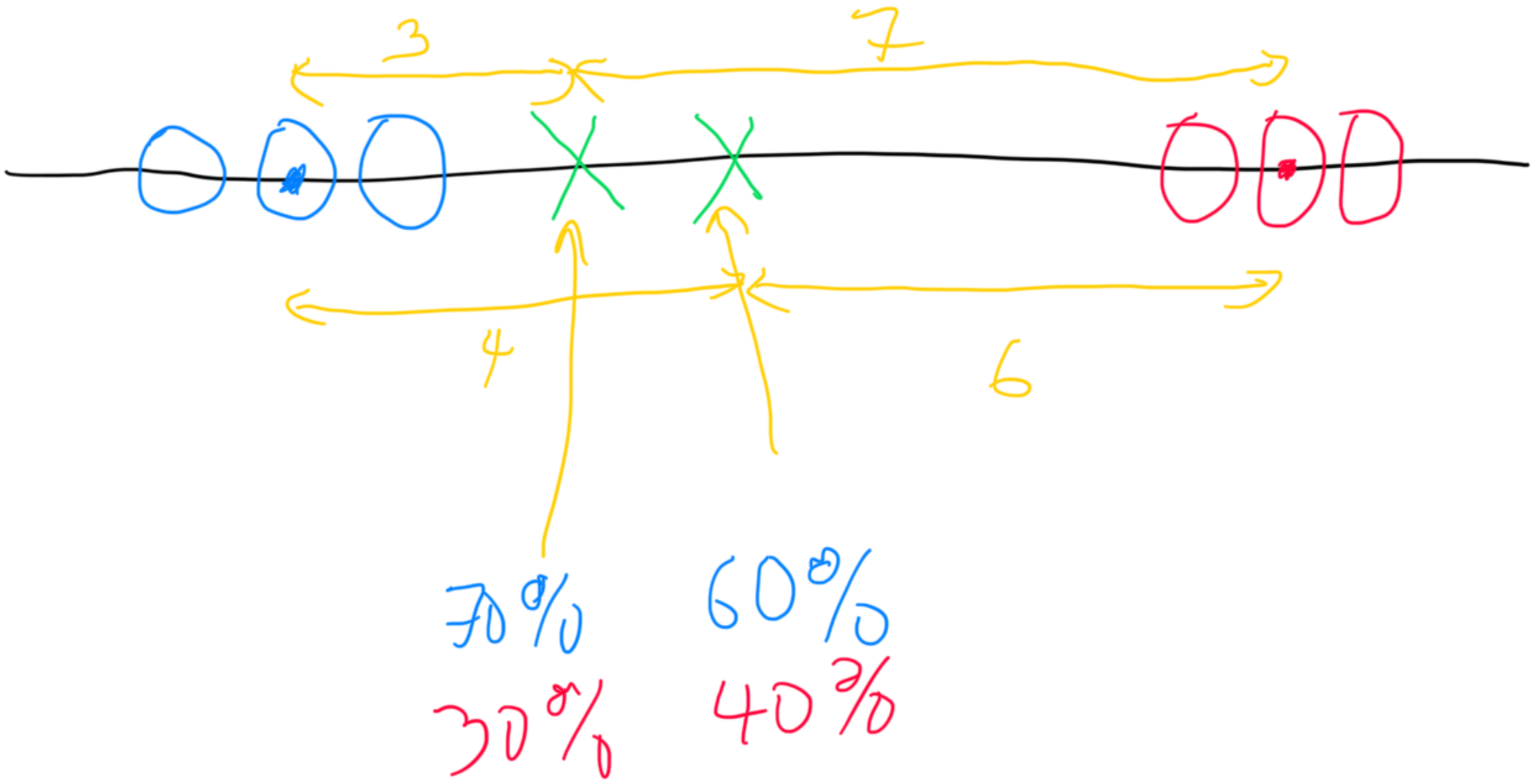
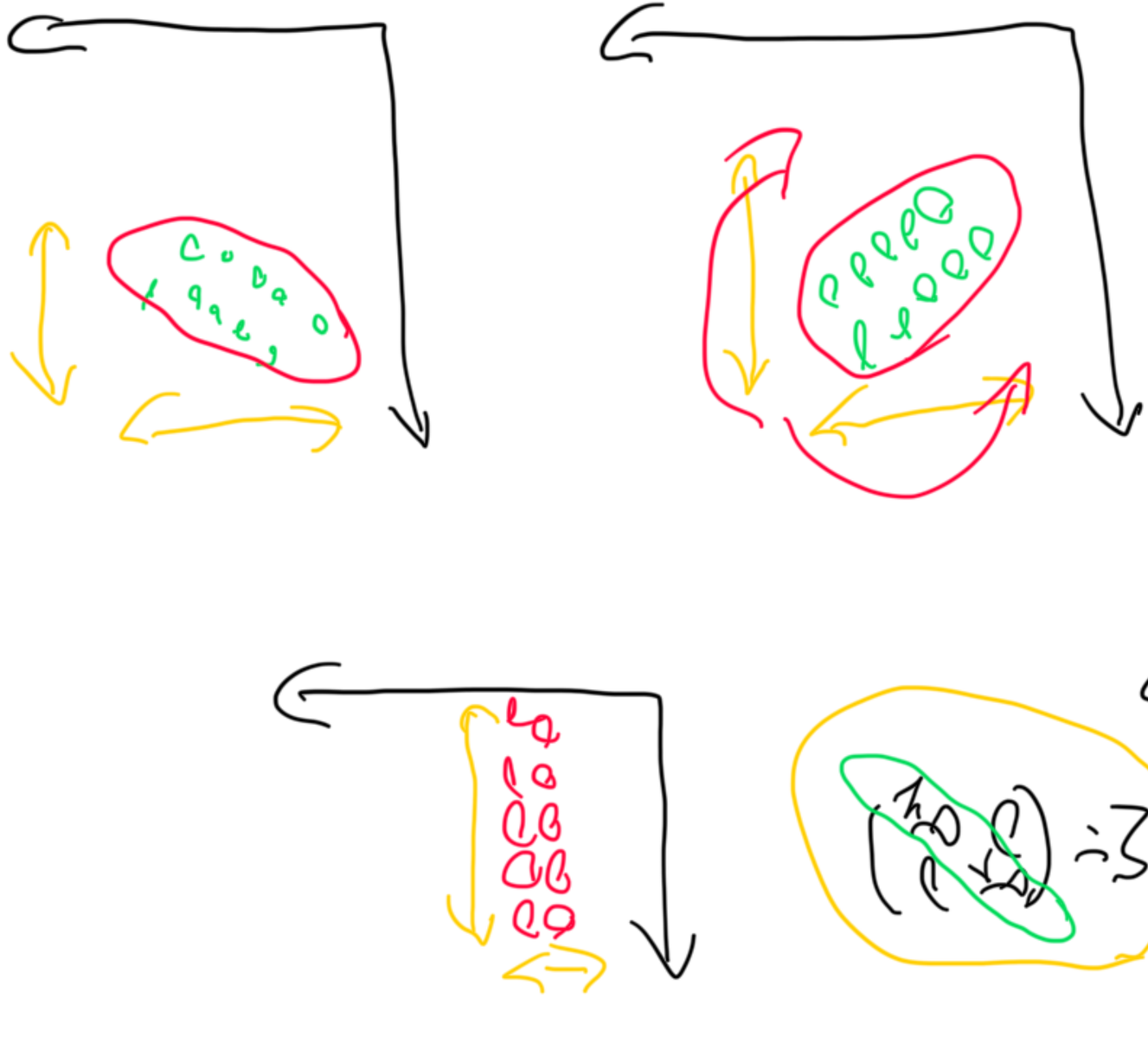
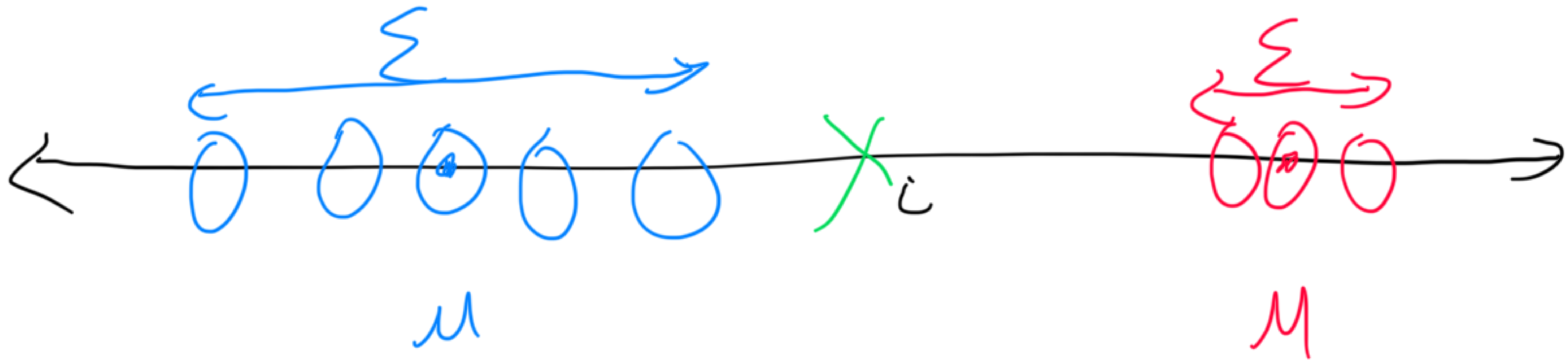

3
7
4
6
70%
30%
60%
40%





$$z_{i\overbrace{\mu_j\Sigma}^{j}} = \frac{1}{\sum_j z_{ij}} \|x_i, \mu\|_{\Sigma} \qquad (\forall i) \sum_j z_{ij} = 1$$

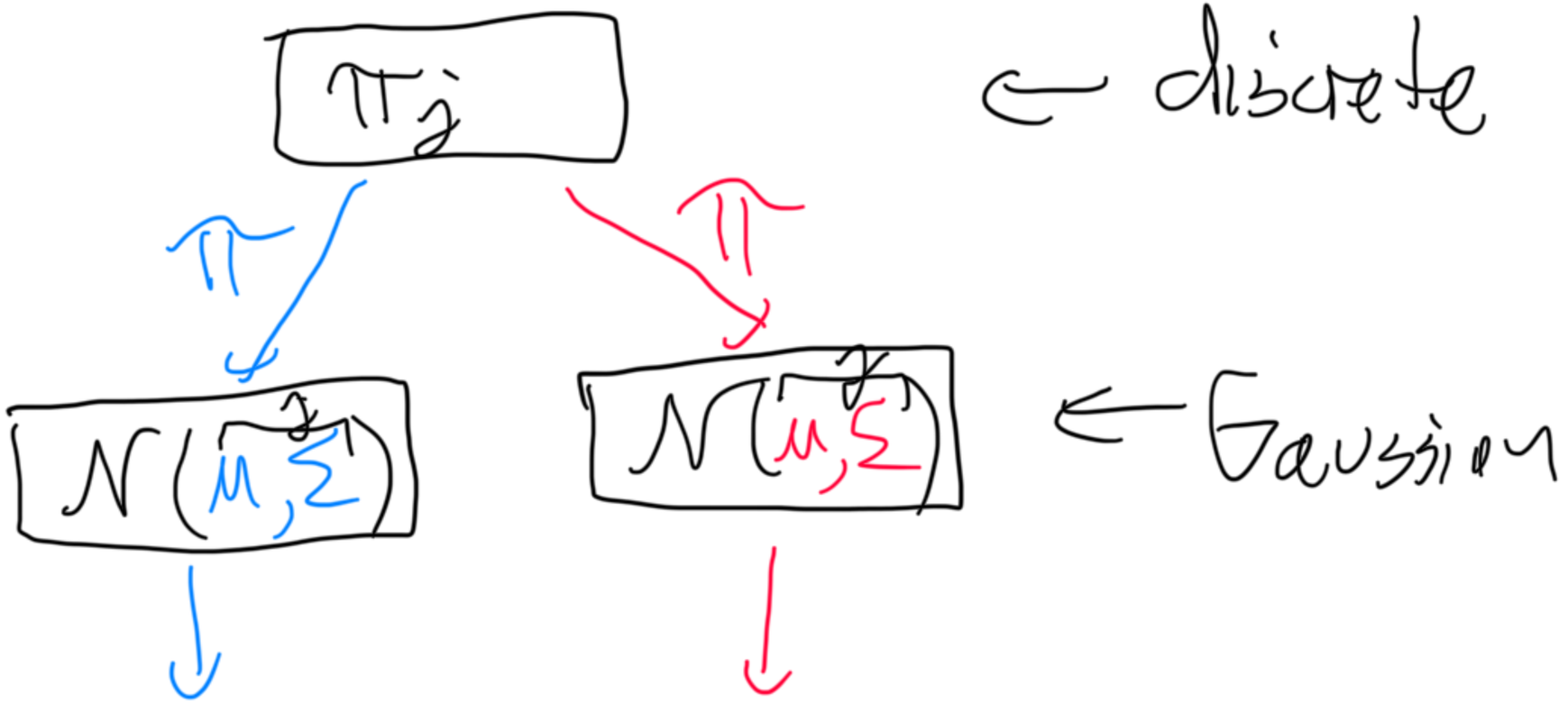
$$z_{i\overbrace{\mu_j\Sigma}^{j}} = \frac{1}{\sum_j z_{ij}} \|x_i, \mu\|_{\Sigma}$$

$$z_{ij} = \frac{1}{\sum_j z_{ij}} \|x_i, \mu_j\|_{\Sigma_j}$$

$$P(x \mid \mu, \Sigma) = c\, e^{-\frac{1}{2}\|x-\mu\|_\Sigma^2}$$

$$c = \frac{1}{(2\pi)^q |\Sigma|}$$

2 step generative process (model)



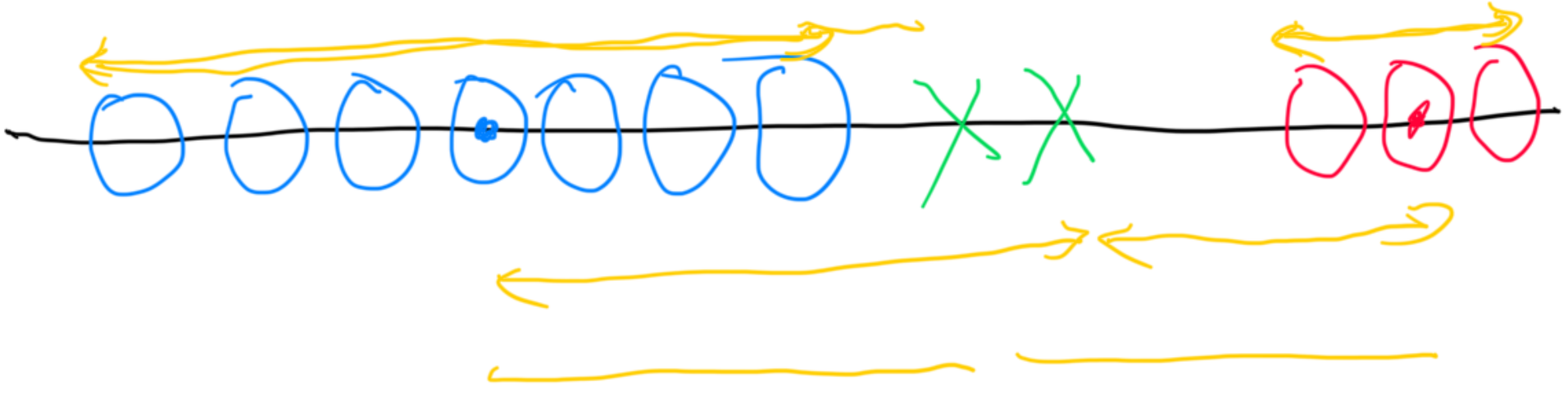
← discrete

← Gaussian

mixture model

mixture of Gaussians

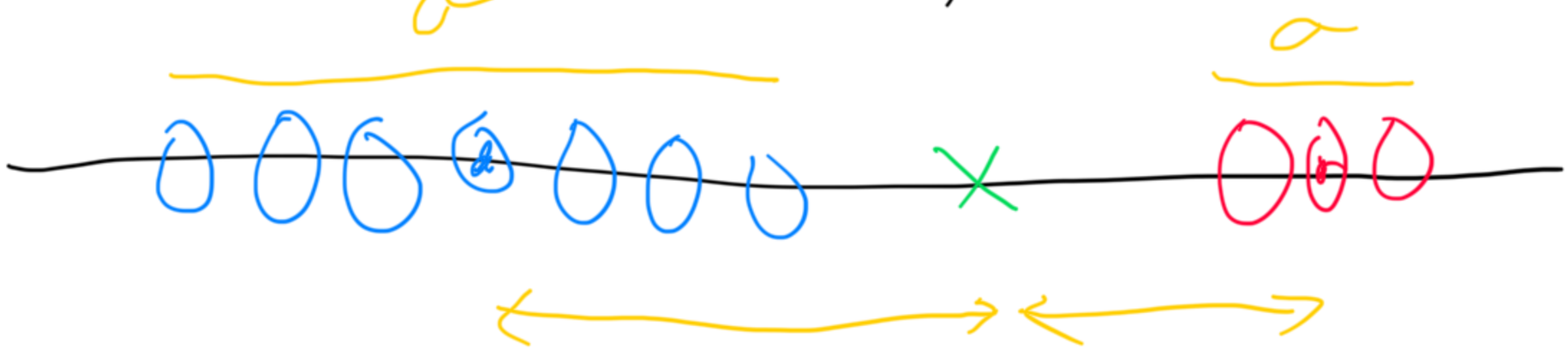
Gaussian mixture (model)



$$\|x,y\|_\alpha^2 = \frac{1}{\alpha}(x-y)\cdot(x-y)$$

$$x \cdot y = x^T y$$

$$= (x-y)\cdot\frac{1}{\alpha}(x-y)$$



$$= (x-y)^T \frac{1}{\alpha}(x-y)$$

$$\|x,y\|_\Sigma^2 = (x-y)^T \Sigma^{-1}(x-y)$$

$$\|x, y\|_{\Sigma}^2 = (x-y)^T \Sigma^{-1} (x-y)$$

Mahalobis
distance

model

π, μ, Σ

π', μ', Σ'

+

point/sample

x

→

classification

z

z

π_j, μ_j, Σ_j x_i

assignment z_{ij}

$z_{ij} \propto p(x_i \mid \text{model } j)$

$\propto \pi_j \mathcal{N}(x_i \mid \mu_j, \Sigma_j)$

j

$(\forall i) \sum_j z_{ij} = 1$