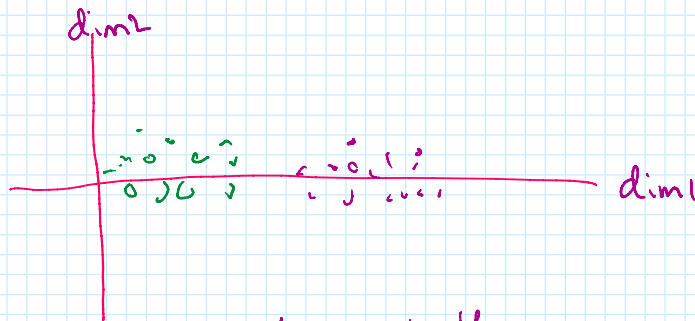


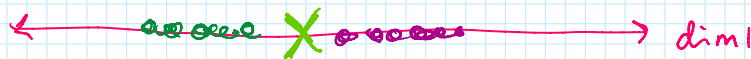
Martians

Earthlings



dim 1 valuable

dim2 useless



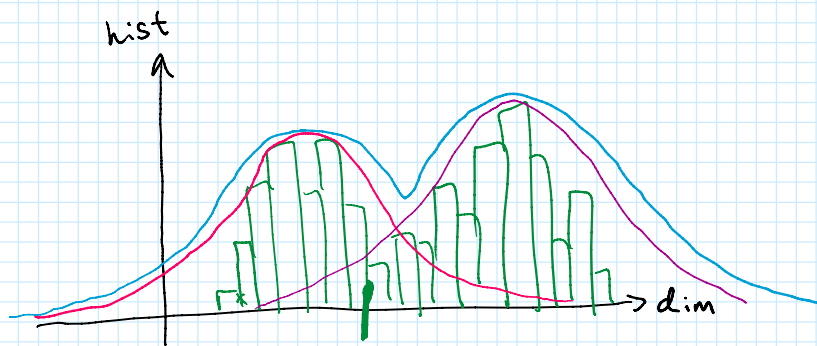
$$\text{Cov} \begin{bmatrix} \sigma_{\text{height}}^2 & \text{Cov}_{hw} \\ \text{Cov}_{hw} & \sigma_{\text{weight}}^2 \end{bmatrix}$$

$$\begin{bmatrix} 10 & 7 \\ 7 & 10 \end{bmatrix}$$

eigen vector values $\begin{Bmatrix} 10 & 7 \\ 7 & 10 \end{Bmatrix}$

Expectation Maximization

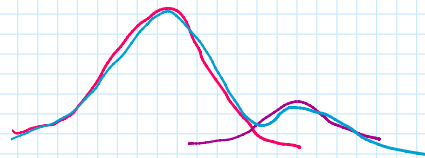
Gaussian Mixture Model



data modeled by ② gaussian curves

cluster 0 μ, σ^2, w

cluster 1 μ, σ^2, w



expectation given these values of μ, σ^2 , and w
how likely is each data point to have come from each cluster

maximization

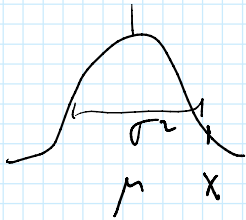
cluster p data avg according to weights (likelihood)
var

ten duck hunters

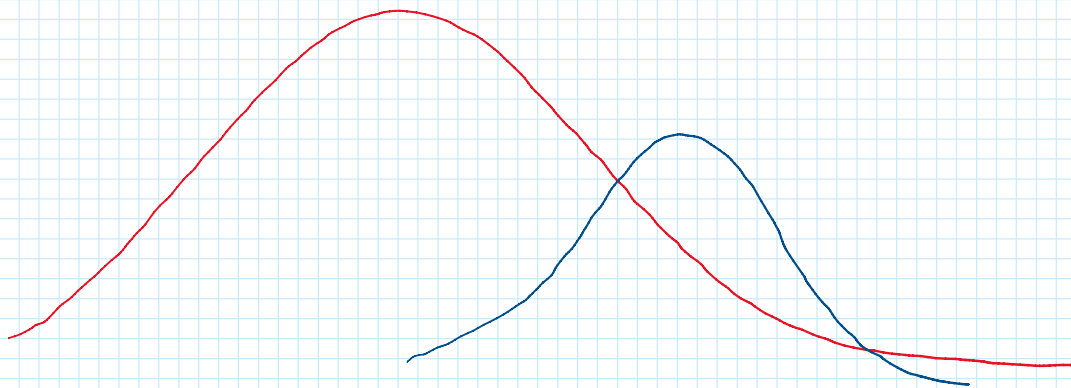
ten ducks fly overhead

each hunter is a perfect shot

how many ducks survive



$$\text{pdf}(x) = \frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2} \frac{(x-\mu)^2}{\sigma^2}} \quad ?$$



coins

$$p = 0.6$$

$$N = 5000$$

h : # heads

$$E(h) = Np = 3000$$

$$\text{Var}(h) = Np(1-p) = 1200$$

binomial

$$\text{pr}(h) = \binom{5000}{h} p^h (1-p)^{5000-h}$$

$$N(\mu = 3000, \sigma^2 = 1200)$$