

Gaussian Mixture Models

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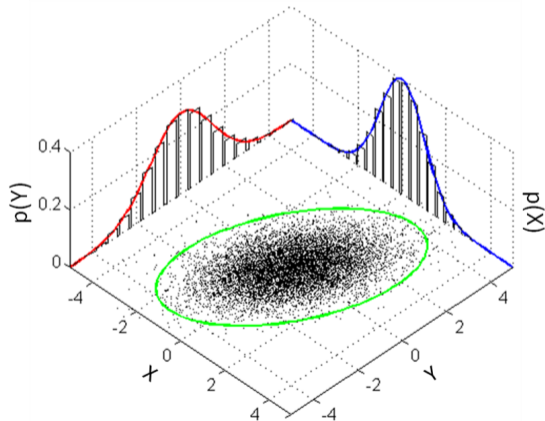
unless otherwise stated

Gaussian distribution and its multivariate generalization

Gaussian distribution with mean μ and variance σ^2 : $f(x) = \frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{1}{2} \frac{x-\mu}{\sigma}}$

Multivariate Gaussian distribution with mean $\vec{\mu}$ and covariance matrix Σ :

$$f(\vec{x}) = \frac{1}{\sqrt{\det(\Sigma)} \cdot \sqrt{(2\pi)^k}} e^{-\frac{1}{2}(\vec{x}-\vec{\mu})^\top \Sigma^{-1}(\vec{x}-\vec{\mu})}$$



Covariance matrix

$$\begin{aligned}\Sigma_{X_i, X_j} &= \text{cov}(X_i, X_j) \\ &= E((X_i - E(X_i))(X_j - E(X_j)))\end{aligned}$$

$$\Sigma_{X_i, X_i} = \text{var}(X_i) = E((X_i - E(X_i))^2)$$

