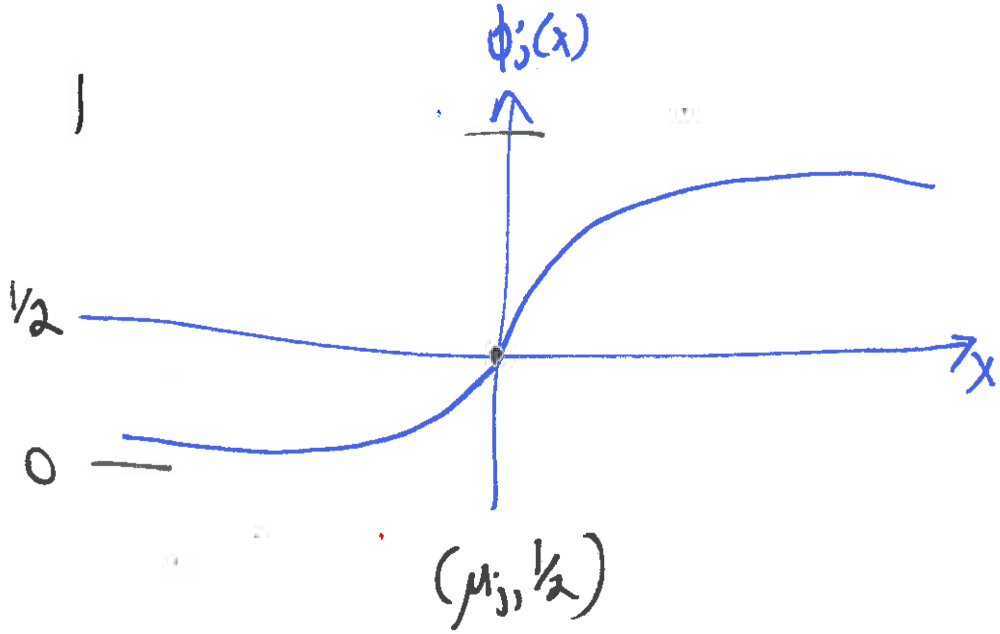


$$\phi_j(x) = \frac{1}{1 + e^{(\mu_j - x)/s}}$$

x is # grammar errors

$\phi_j(x)$

X is a project report

$$y(w, x) = w^T \phi(x)$$

$$\phi_0(x) = 1$$

$$\phi_1(x) = ?$$

$$\phi_2(x) = ?$$

$$\vdots$$

$$\phi_M(x) = ?$$

$$x \in \mathbb{R}$$

$$y(x, w) = w_0 + w_1 x + w_2 x^2 + w_3 x^3 + \dots + w_M x^M$$

$$\phi_i(x) = x^i$$

$$\phi_0(x) = 1$$

$$\phi_1(x) = x$$

$$\phi_2(x) = x^2$$

$$\phi_3(x) = x^3$$

$$\vdots$$

$$\phi_M(x) = x^M$$

$$y(x, w) = \vec{w}^T \vec{\phi}(\vec{x}) = w_0 \cdot \phi_0(x) + w_1 \phi_1(x) + \dots + w_M \phi_M(x)$$

$$E(w) = \frac{1}{2} \sum_{n=1}^{N} \left(t_n - w^T \phi(x_n)\right)^2 \qquad w = \begin{bmatrix} w_1 \\ w_2 \\ \vdots \\ w_M \end{bmatrix}$$

$$w_1 \phi_1(x_n) + w_2 \phi_2(x_n) + \dots + w_M \phi_M(x_n) \qquad \phi(x_n) = \begin{bmatrix} \phi_1(x_n) \\ \phi_2(x_n) \\ \vdots \\ \phi_M(x_n) \end{bmatrix}$$

$$\frac{\partial E(w)}{\partial w_i} = -\frac{2}{2} \sum_{n=1}^{N} \left(t_n - w^T \phi(x_n)\right) \phi_i(x_n)$$

$$\nabla E(w) \equiv \left[\frac{\partial E(w)}{\partial w_1}, \frac{\partial E(w)}{\partial w_2}, \dots, \frac{\partial E(w)}{\partial w_M} \right]$$

$$= - \sum_{n=1}^{N} \left(t_n - w^T \phi(x_n)\right) \phi^T(x_n)$$

$$\nabla E(w) = \vec{0}^T$$

$$\vec{0}^T = [0, 0, 0, \dots, 0]$$

$$\vec{0}^T = \sum_{n=1}^{N} t_n \phi(x_n)^T - \sum_{n=1}^{N} w^T \phi(x_n) \phi(x_n)^T$$

$$w^T \sum_{n=1}^{N} \phi(x_n) \phi(x_n)^T = \sum_{n=1}^{N} t_n \phi(x_n)^T$$

$$y(x, w) = w_0 + w_1 x_1 + \ldots + w_D x_D$$

$$= w_0 + w_1 \phi_1(x) + w_2 \phi_2(x) + \ldots + w_D \phi_D(x)$$

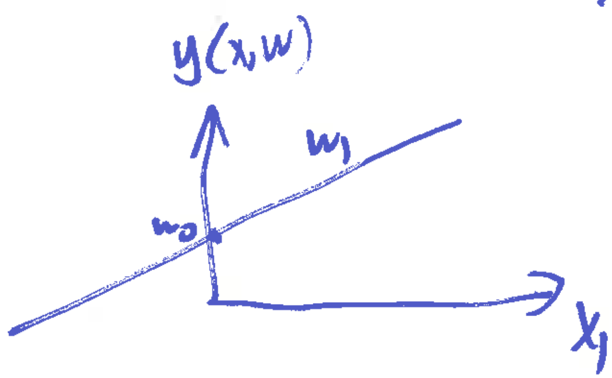
stock price

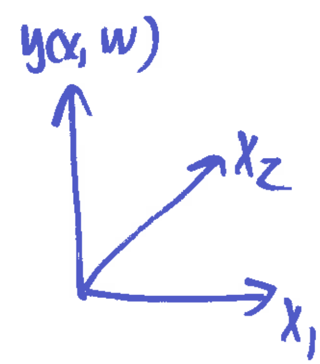
input

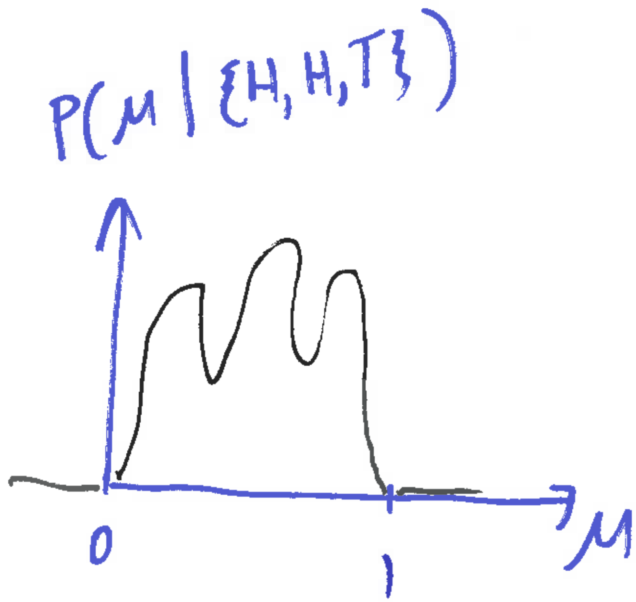
parameters

x_1 cash flow

x_2 gross sales







P(μ | {H, H, T})
0
1
μ

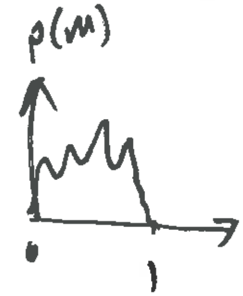
Bayes' Rule

$$p(\mu|\mathcal{D}) = \frac{p(\mathcal{D}|\mu)\,p(\mu)}{p(\mathcal{D})}$$

constant

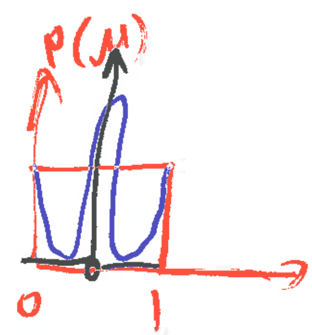
$p(\mu)$

prior



$$p(\mu|\mathcal{D}) \propto p(\mathcal{D}|\mu)\cdot p(\mu)$$

$$\arg\max_{\mu} p(\mu|\mathcal{D}) = \arg\max_{\mu} p(\mathcal{D}|\mu)\cdot p(\mu)$$



$$\frac{d}{d\mu} \sum_{n=1}^{N} \left[x_n \ln \mu + (1-x_n) \ln (1-\mu) \right]$$

$$= \sum_{n=1}^{N} \left[\frac{x_n}{\mu} - \frac{(1-x_n)}{(1-\mu)} \right]$$

$$= \sum_{n=1}^{N} \frac{x_n}{\mu} - \sum_{n=1}^{N} \frac{(1-x_n)}{(1-\mu)}$$

$$= \frac{h}{\mu} - \frac{t}{(1-\mu)}$$

$$\mu = \frac{h}{h+t}$$

$$\|\vec{w}\|^2 \equiv \vec{w}^T\vec{w} = \sum_{i=1}^{D} w_i \cdot w_i$$