

$$\sigma^2 = \exp(w \cdot x)$$

$$\mu = w \cdot x$$

$$\rightarrow p(y | \mu, \sigma^2)$$

$$\pi = \ell(w \cdot x) \rightarrow p(y | \pi)$$

$$\pi = p(y=1)$$

link function · Bernoulli

$$\begin{array}{l}
 2 \left\{ \begin{array}{l}
 \boxed{\text{NNet}(x)} \rightarrow \text{Salida} \\
 \text{-- } \boxed{l(\cdot)} \rightarrow \text{parámetros} \\
 \qquad \qquad \qquad \text{0,1} \qquad \qquad \text{p(y|x)}
 \end{array} \right. \\
 \text{p}(y^{\uparrow} | \text{NN}(x))
 \end{array}$$

$p(y|x) \rightarrow$ GAUSSIANO
 $y \in \mathbb{R}$

$p(y|x) \rightarrow$ Bernoulli
 $y = \{0, 1\}$

3 classes $\Rightarrow 0, 1, 2$

↑ CATEGORICAL ONE HOT CODING

$$[1, 0, 0] \Rightarrow 0$$

$$[0, 1, 0] \Rightarrow 1$$

$$[0, 0, 1] \Rightarrow 2$$

$$K \Rightarrow \pi_K \quad [0, 0, \dots, 1, \dots, 0]$$

π_K

$$\pi_K = P(Y=K) \quad \left\{ \begin{array}{l} \pi_1 \quad [1, 0, 0] \\ \pi_2 \quad [0, 1, 0] \\ \pi_3 \quad [0, 0, 1] \end{array} \right.$$

$$\text{Bern: } P(Y=K) = \pi_K \cdot (1-\pi)^{1-K}$$

$$\text{Gefahr: } P(Y) = \prod_{K=1}^3 \pi_K^{Y_K} \quad \cup$$

$$y_0 = [1, 0, 0]; \quad y_1 = [0, 1, 0]; \quad y_2 = [0, 0, 1]$$

$$\pi = (0, 4, 0, 5, 0, 1) \rightarrow \text{sum}$$

$$P(y) = \prod_{k=1}^K \pi_k^{y_k}$$

$$P(y=6) = 0,4^1 \cdot \cancel{0,5^0} \cdot \cancel{0,1^0} \cdot 1^1 \cdot 1^1$$

$$\pi = (0,4, 0,5, 0,1)$$

$$x \Rightarrow y = \uparrow (1, 0, 0)$$

$$p(y) = \prod_{k=0}^{K-1} \pi_k^{y_k}$$

$$p(y=0) = 0,4^1 \cdot \cancel{0,5^0} \cdot \cancel{0,1^0}$$

$$\prod_n p(y_n | x_n) = \prod_n \prod_k p(y_n = k) =$$

$$= \prod_n \prod_k \pi_k^{y_{nk}} \Rightarrow \sum_n \sum_k y_{nk} \log \pi_k =$$

$$\sum_n \sum_k y_{nk} \cdot \log \pi_k$$

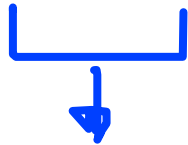
$$\sum_k y_{nk} \cdot \log \pi_{1k} \Rightarrow$$

$$y_{n0} \cdot \log \pi_0 + y_{n1} \cdot \log \pi_1 +$$

$$y_{n2} \cdot \log \pi_2 = \log \pi_0$$

$$y_{n0} = (1, 0, 0) \quad \pi_0 = (0, 1)$$

$$p(y|\pi) \rightarrow p(y|\pi(x))$$



$$w \cdot x$$

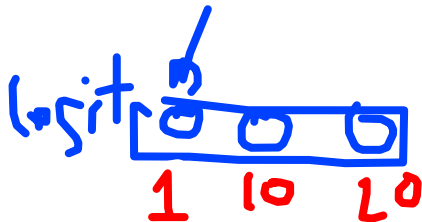
$$[R] \leftarrow \text{NNET}(x)$$

$$\pi_k \in [0, 1]^K$$

$$\sum \pi_k = 1 \rightarrow \text{SOFTMAX}$$

$$\pi_k = \frac{z_k}{\sum_k z_k}$$

$$z_k \propto \exp(-x)$$



$$\pi_1 = \frac{1}{31}$$

$$\pi_3 = \frac{20}{31}$$

$$\pi_2 = \frac{10}{31}$$

$$\boxed{\square} \rightarrow p(y=1)$$

$$\downarrow 1$$

$$\pi_k = \frac{\exp(z_k)}{\sum_k \exp(z_k)} \Rightarrow \text{SOFTMAX}$$

NNET()

CLASSIFIERS

MULTICLASS INJECTI

