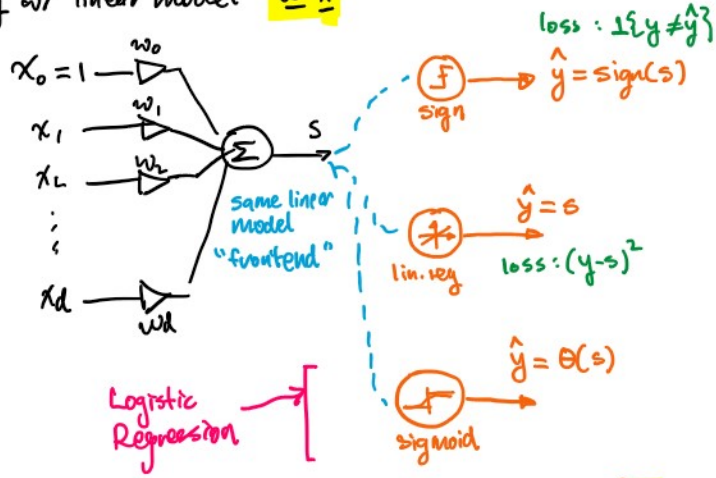
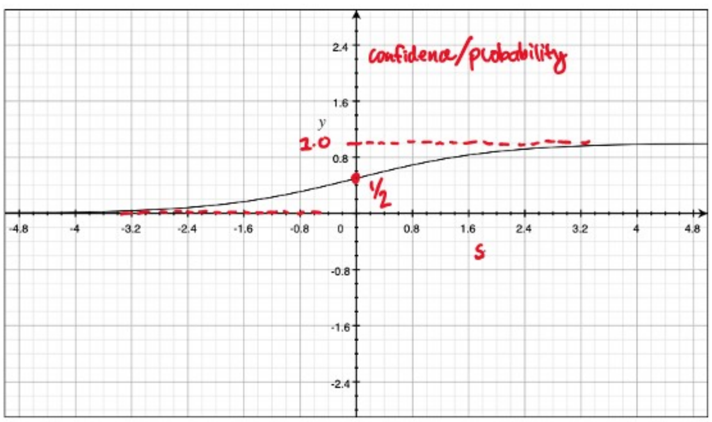
Logistic Regression

Tuesday, January 21, 2020 13:35

Still dealing w/ linear model $\underline{w}^T \underline{x}$



$$\theta = \frac{e^s}{1+e^s}$$



Interpretation:

$$\theta(s) = \mathbb{P}(y=1 \mid \underline{x})$$

or

probability estimate $\hat{P}_{\underline{w}}(y \mid \underline{x}) = \text{Bernouli}\left(y \mid \theta(\underline{w}^T\underline{x})\right)$

$$\hat{P}_{\underline{w}}(y=1 \mid \underline{x}) = \theta(\underline{w}^T\underline{x}) = \frac{e^{\underline{w}^T\underline{x}}}{1+e^{\underline{w}^T\underline{x}}}$$

$$\hat{P}_{\underline{w}}(y=-1 \mid \underline{x}) = 1-(\ldots) = \frac{e^{-\underline{w}^T\underline{x}}}{1+e^{-\underline{w}^T\underline{x}}}$$

compact ⇒ $\hat{P}_{\underline{w}}(y \mid \underline{x}) = \frac{e^{y\underline{w}^T\underline{x}}}{1+e^{y\underline{w}^T\underline{x}}}$

Log odds (Logit) function: $\log\left(\frac{\theta(s)}{1-\theta(s)}\right) = \underline{W}^T\underline{S}$