class 0 / class 1

pass fail

$y = mx + c$ ✓

y' = predicted o/p

y

sigmoid

$\Rightarrow$ class

size = brightness * m + c

$y = mx + c$

no

big

small

$$S(z) = \frac{1}{1 + e^{-z}}$$

class 1 > decision boundary

class 0 < " "

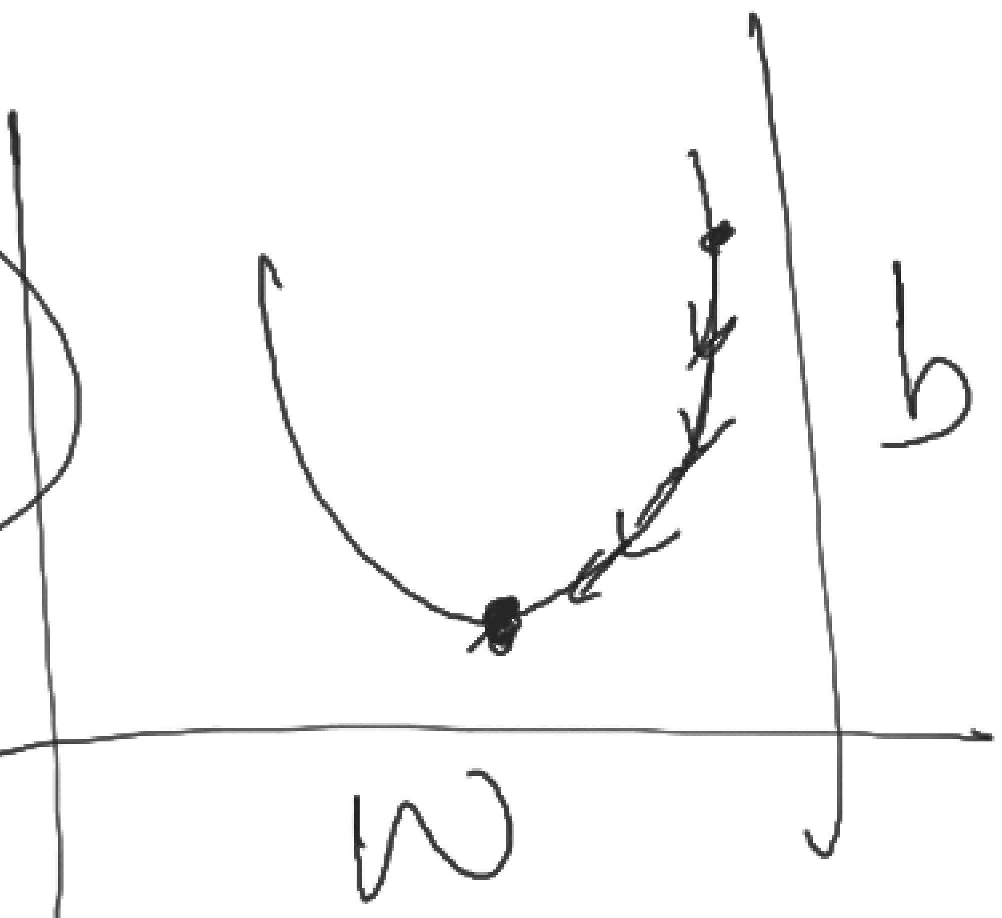
$J(\theta)$

cost

MSE loss

$$\sum (y - \hat{y})^2 / n$$

$$y = mx + c$$



LogLoss func^n

$$J(\theta) = \frac{1}{m} \sum_{i=1}^{m} \underline{\underline{\text{cost}}}(y_i', y_i)$$

$$y=1 \Rightarrow \text{cost}(y', y) = -\log(y_i')$$

$$y=0 \Rightarrow \text{cost}(y', y) = -\log(1 - y_i')$$

$$y=1 \Rightarrow \text{loss/cost} = -\log y' = \cancel{1} -\log(\text{sigmoid}(mx+c))$$

$$s(z) = \frac{(1)}{(1+e^{-z})}$$

$$\frac{ds(z)}{dz} = \frac{1}{1+e^{-z}} \cdot 1 + \frac{-1}{1+e^{-z}} \cdot \frac{1}{1+e^{-z}}$$

$$= s(z)\left(1 - s(z)\right)$$

$$\frac{d\left(\frac{v}{u}\right)}{} = \frac{u \cdot \frac{dv}{dx} - v \cdot \frac{du}{dx}}{u^2}$$

$$\frac{1}{1+e^{-z}} = \frac{(1+e^{-z}) \cdot +1 - 1 \cdot \left(\cancel{1+e^{-z}}\right)^{-1}}{(1+e^{-z})^2}$$

$$= \frac{1}{1+e^{-z}} - \frac{1}{(1+e^{-z})^2}$$

$$s(z)\left(1 - s(z)\right)$$

$$C' = x\left(s(z) - y\right)$$

cost

Log = Lin + Sigmoid
(0 - 1)

$> 0.5 \to 1$

$\leq 0.5 \to 0$