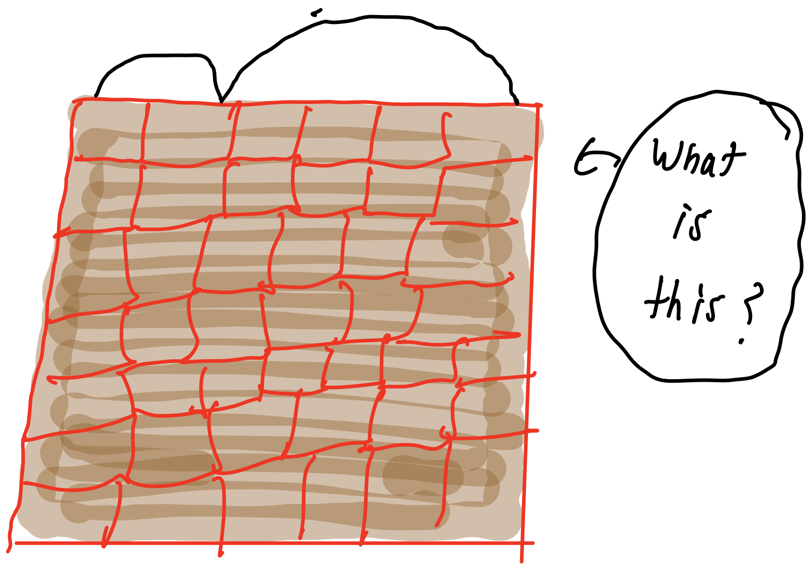
Will start at 9:05 PM



Logistic Regression

$\Downarrow$

2 case studies

1st $\Rightarrow$ Logistic Reg

$\Downarrow$

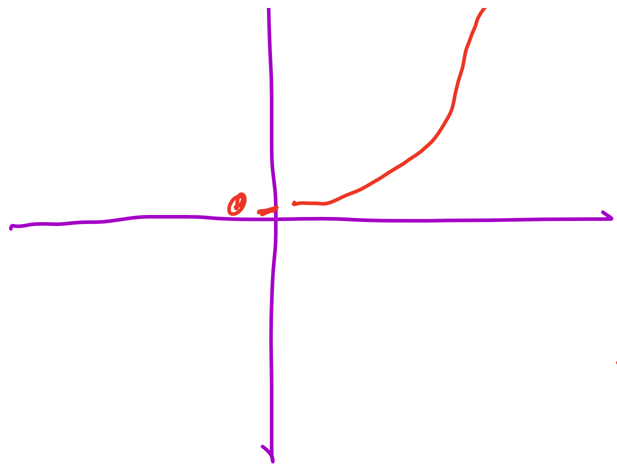
API ($\Rightarrow$ p-value

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

$$\frac{1}{1+e^{-z}}$$

$\Downarrow$

Regularisation



$\leq 0.5 \rightarrow 0$

$> 0.5 \rightarrow 1$

X	y	$\hat{y}$	y_pred
20	1	1	0.8
40	0	0	0.2
—	—	—	—
60	1	0	0.45

$100 \rightarrow$ 10 misclassified

$\frac{90}{100} \approx$ 90% Accuracy

R^2

500 dataset $\rightarrow$ 400 correct
$\rightarrow$ 100 wrong

$\approx$ 80% ← Accuracy

$\frac{400}{500} \approx 80\%$

Train , CV , test

data → 80% , 20% → test

80% → train , CV

x	y	$\hat{y}$
2	1	1
3	0	0
2	1	0
4	0	1
5	0	0

$$
\begin{array}{c|cc}
y \backslash \hat{y} & 0 & 1 \\
\hline
0 & 2 & 1 \\
1 & 1 & 1
\end{array}
$$

$$\frac{2+1}{2+1+1+1} =$$

M_1

y	$\hat{y}$ prob	
1	0.51	2.2
0	0.48	
1	0.70	
0	0.40	

Accuracy = 100%

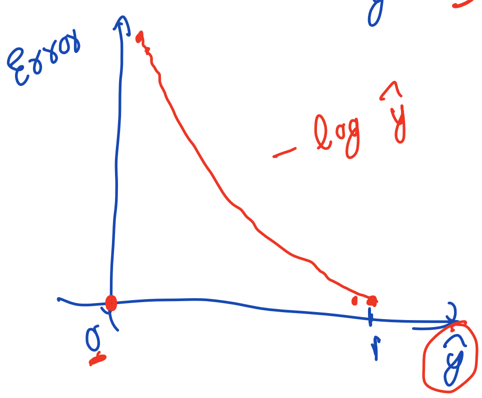
M^2

y	$\hat{y}$ prob	
1	0.99	0.02
0	0.01	0.04
1	0.97	0.02
0	0.02	0.04

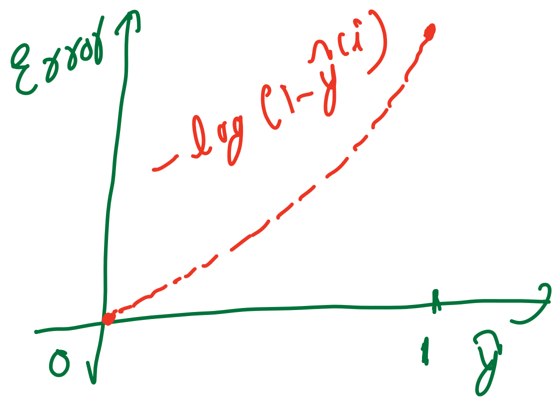
100%

Log Loss function

$y^{(i)} = 1$



$y^{(i)} = 0$



$$\text{Log Loss} \Rightarrow \begin{cases} -\log(\hat{y}^{(i)}) & \text{if } y^{(i)} = 1 \\ -\log(1-\hat{y}^{(i)}) & \text{if } y^{(i)} = 0 \end{cases}$$

$$\underset{(L)}{\text{Log-Loss}} \Rightarrow -y^{(i)} \cdot \log(\hat{y}^{(i)}) - (1-y^{(i)}) \log (1-y^{(i)})$$

$$\hat{y}^{(i)} = 1$$

$$-\log(\hat{y}^{(i)})$$

$$\min_{w_j} \sum_{1}^{n} L + \lambda \sum_{j=1}^{d} w_j^2$$

$$C = \frac{1}{\lambda}$$