Classification Evaluation Metrics

25 February 2022 07:11

Log of Odds

ex Ind Vs Aus

10 games played

4 win →
6 lose

odds of winning → 4/6

probability = $\frac{4}{10}$

odds = $\frac{4}{6}$

probability = $\frac{4}{10}$

odds of winning = $\frac{4}{6}$ = 0.67

probability of win = $\frac{4}{10}$ = 0.4

probability of losing = $\frac{6}{10}$ = 0.6

(1 - probability of winning = (1-0.4) = 0.6)

$$\text{odds} = \frac{\text{probability of winning}}{\text{probability of losing}} = \frac{p}{1-p}$$

Total matches = 50

$$\text{odds of win} = \frac{4}{46} = 0.086$$

Total matches = 100

$$\text{odds of win} = \frac{4}{96} = 0.041$$

$\Rightarrow$ odds against wining. $\rightarrow$ 0 to 4

Total matches = 50

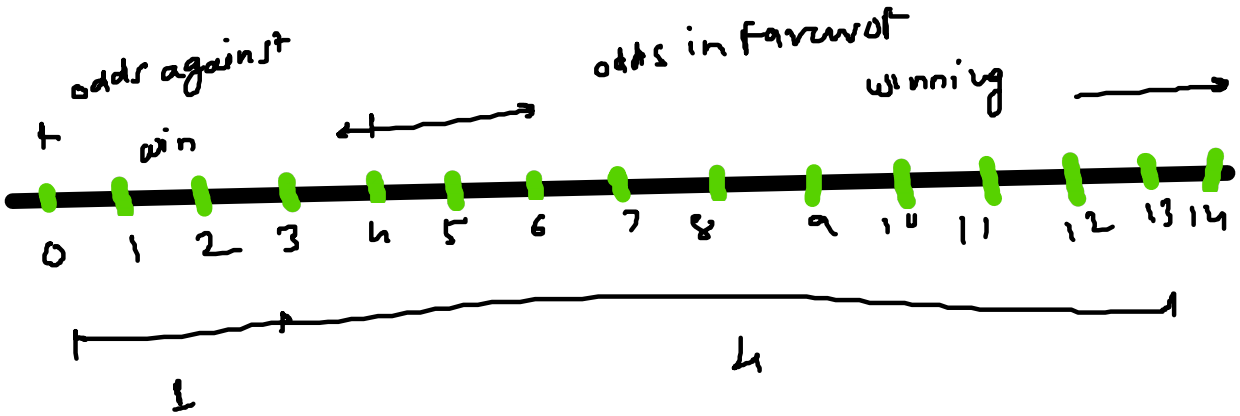
$$\text{Odds of winning} = \frac{44}{6} = 7.3$$

Total matches = 100

$$\text{odds of win} = \frac{94}{6} = 15.6$$

$\Rightarrow$ odds in favor of winning

4 to 00



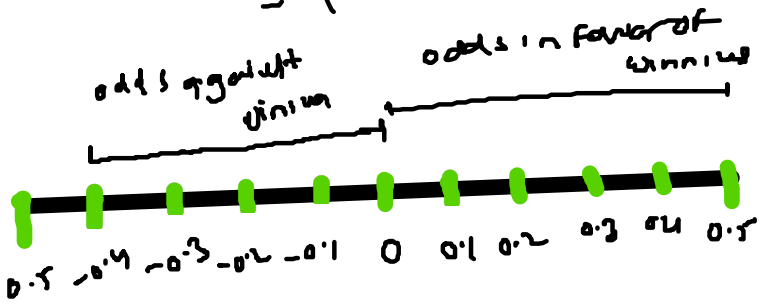
odd win = 4/6 = 0.66

log(odds of win) = log(0.66) = −0.41

odds of losing = 6/4 = 1.5

log(odds of losing) = log(1.5)

= > 0.40



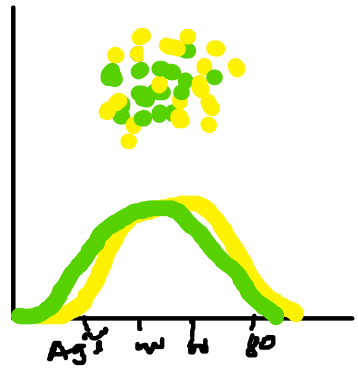
log (Odd) => log odds

>> log of odds.

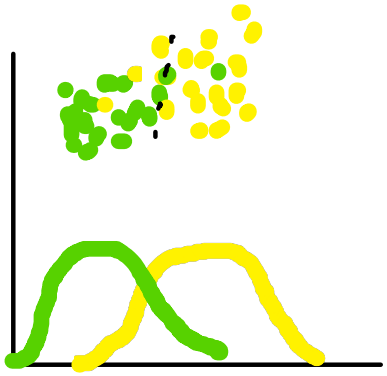
Logit function = $\log\left(\frac{p}{(1-p)}\right)$

Logistic unit

Linear Boundries



probability 50-50



p = 80-20

0.8-0.2

Age	Salary
20	10000
25	20000
30	25000
60	50000

Age	Salary	Low
20	2000	1
25	2000	0
30	2000	1
60	20000	0

Confusion Metrics

Confusion Matrix

pred values		Actual values: positive	Actual values: negative
positive	(1)	TP	FP
negative	(2)	FN	TN (3)

Tp = True positive
TN = True negative
FP = false positive
FN = false negative

TN	FP
FN	TP

for case (1)

pred	Actual: P low	Actual: N medium	Actual: N high
P low	Tp	FP	FP
N med	FN	TN	TN
N high	FN	TN	TN

(1) P low vs N med, high
(2) med vs low, high
(3) high vs low, med

Accuracy

$$\Rightarrow 100 \frac{TP+TN}{TP+TN+FP+FN} = \begin{array}{|c|c|}\hline 51 & 6 \\ \hline 5 & 38 \\ \hline \end{array}$$

$$\Rightarrow \frac{TP+TN}{TP+TN+FP+FN} = \begin{array}{|c|c|}\hline 51 & 6 \\ \hline 5 & 38 \\ \hline \end{array}$$

$$= \frac{51+38}{51+38+6+5} = \frac{89}{100} = 89\%$$

$$= \frac{\text{Correctly classified}}{\text{Total}}$$

Hi