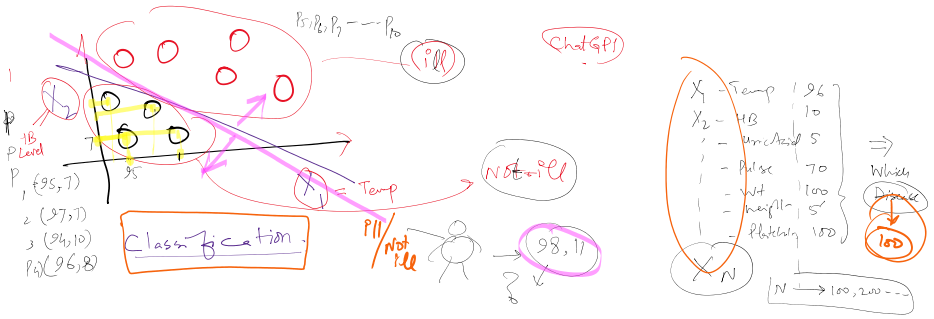
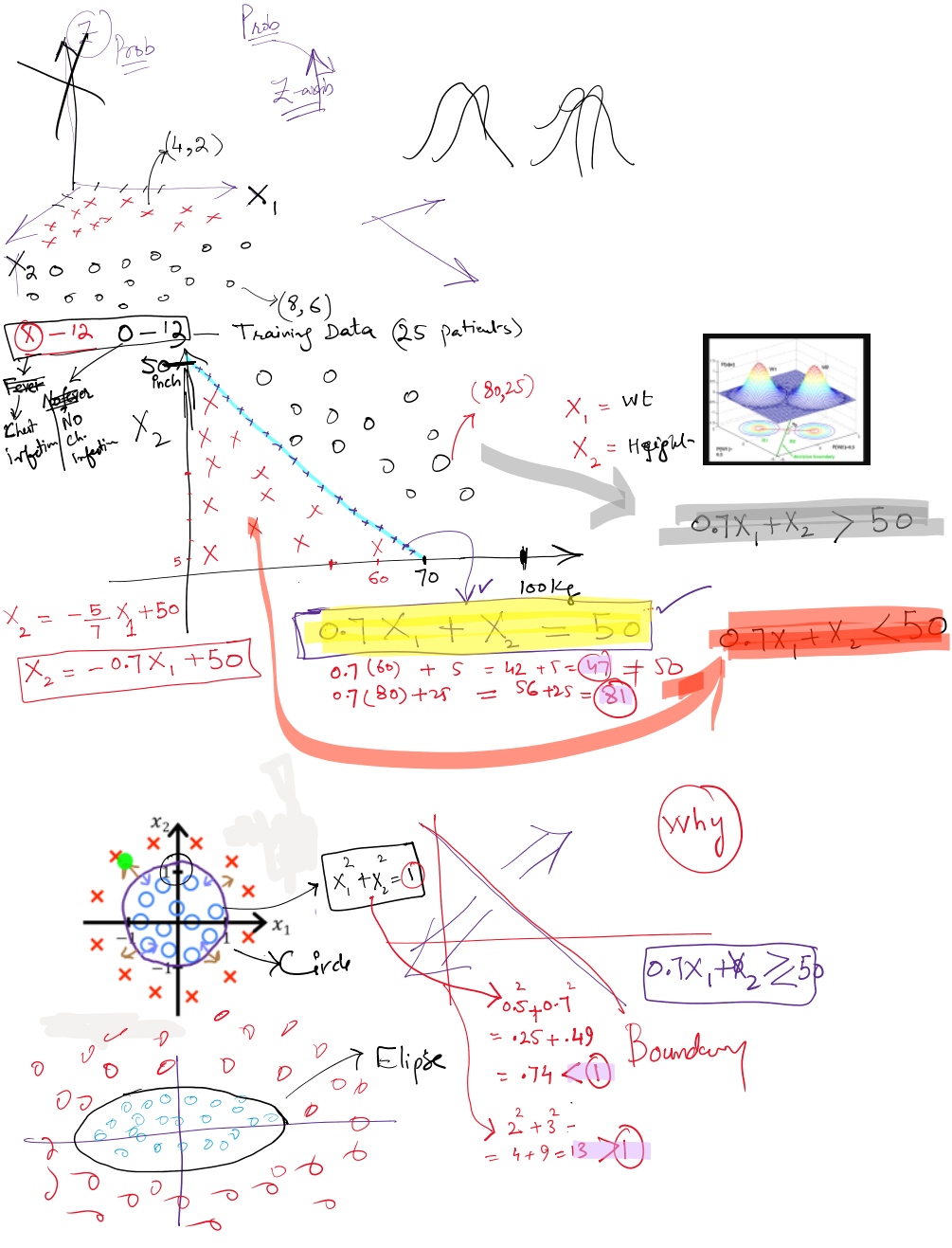
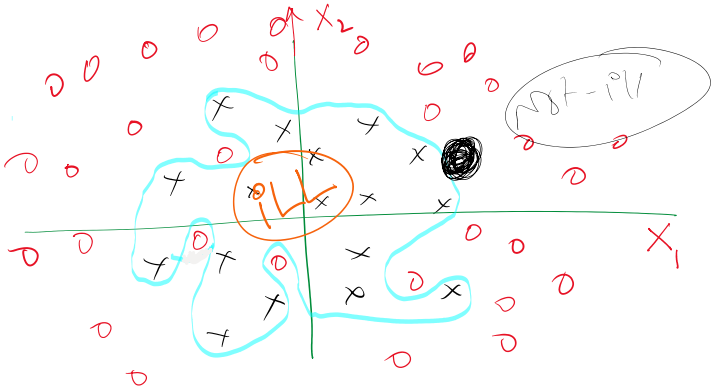
Motivation

Wednesday, March 26, 2025 2:08 PM







X_1, X_2, X_3, X_4

Wt Height Width Val

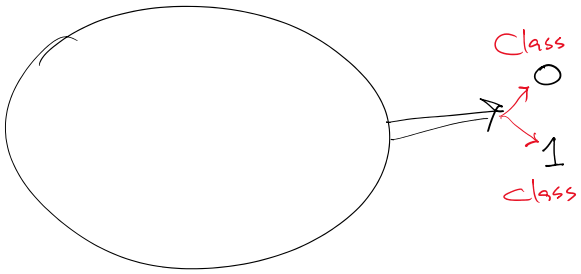
X_1, X_2, X_3

eq

Rule 1

Rule 2

Rule 3



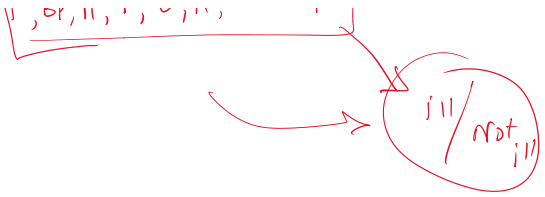
10 feat

Patient

1

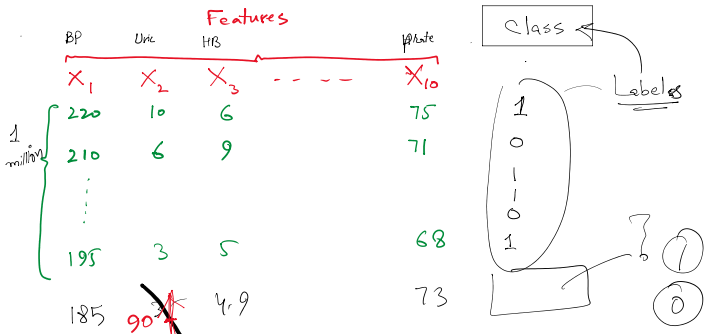
10-feature

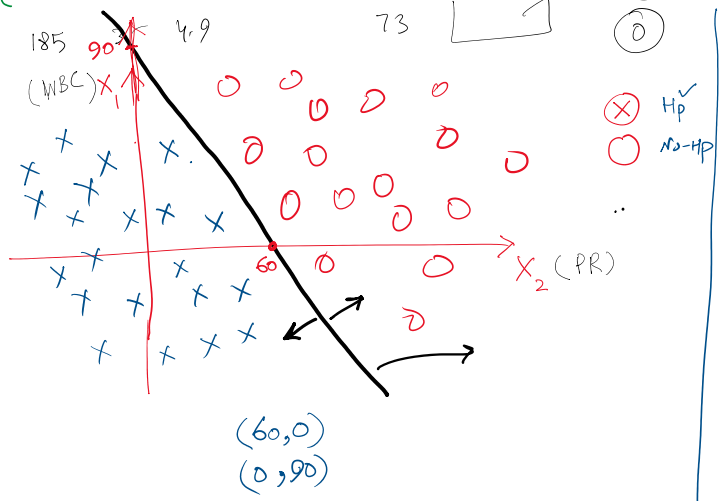
T, BP, H, P, U, H, - - - P



Monday, April 21, 2025
5:12 PM

· Hepatitus





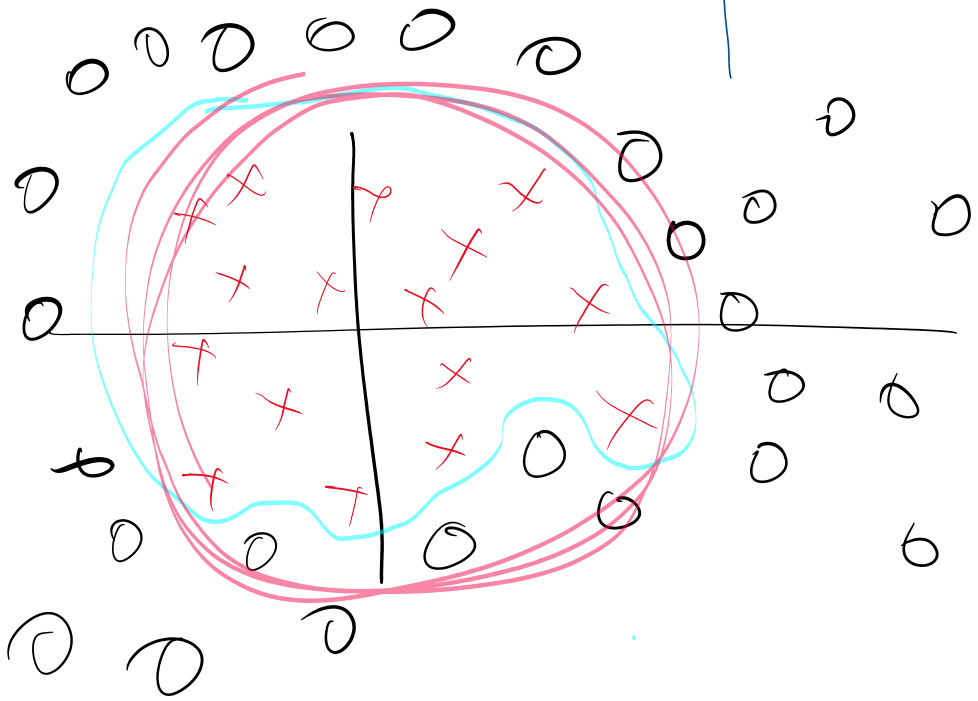
Two-point form

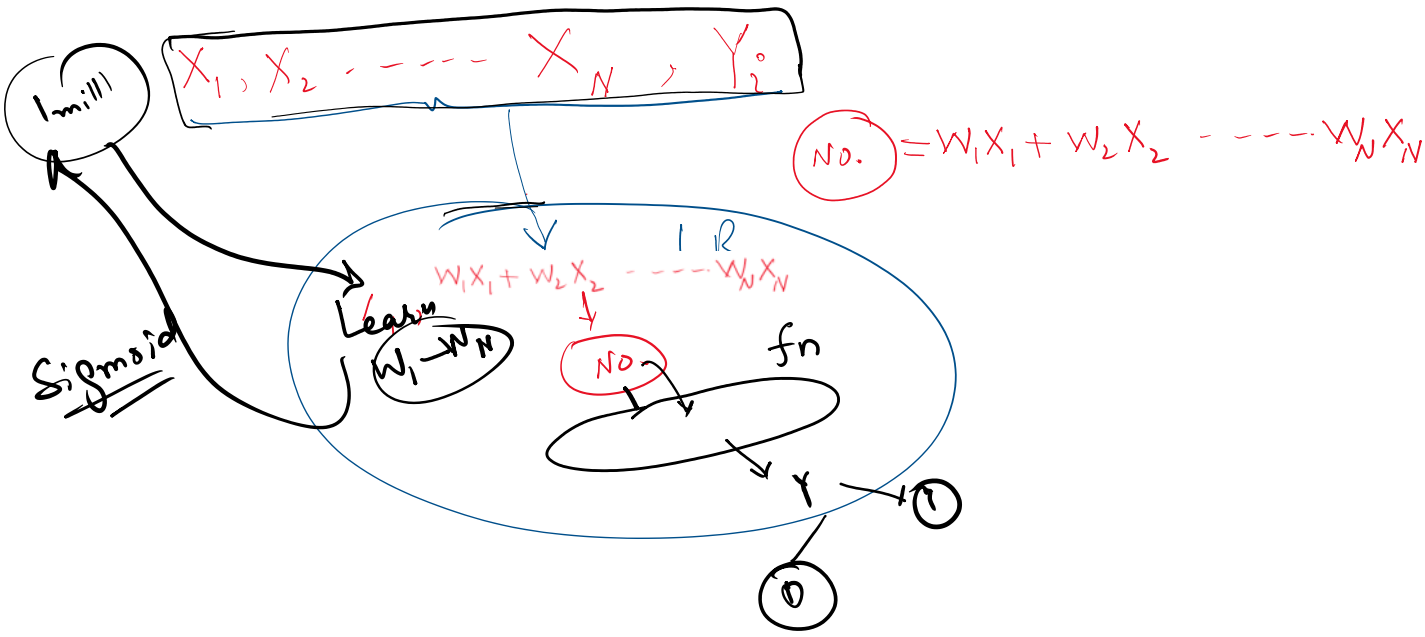
$$X_1 = -4X_2 + 90$$

$$X_1 + 4X_2 - 90 = 0$$

$X_1 - 100$
$X_2 - 75$ } (75, 100)

$100 + 4(75) - 90 =$
$310 > 0$



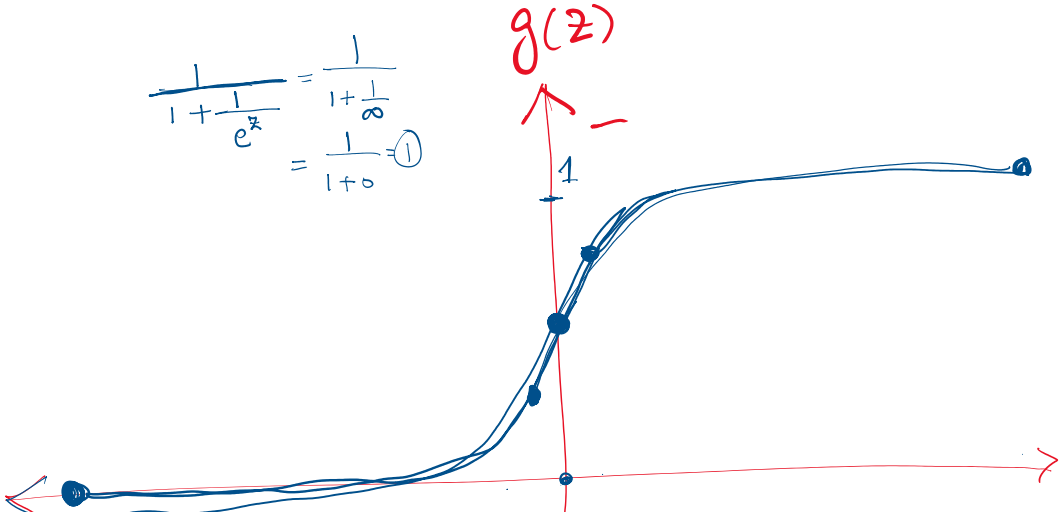


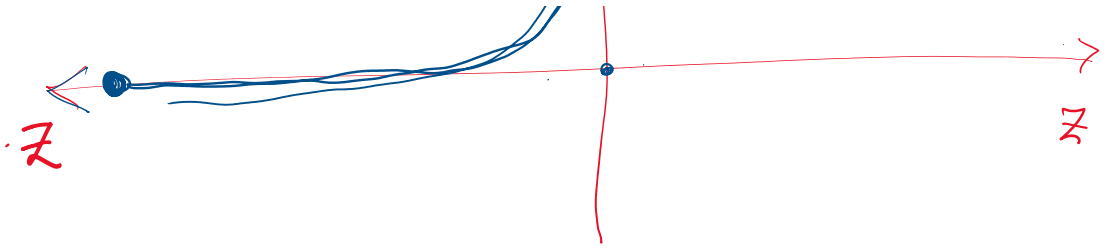
$$g(z) = \frac{1}{1+e^{-z}}$$

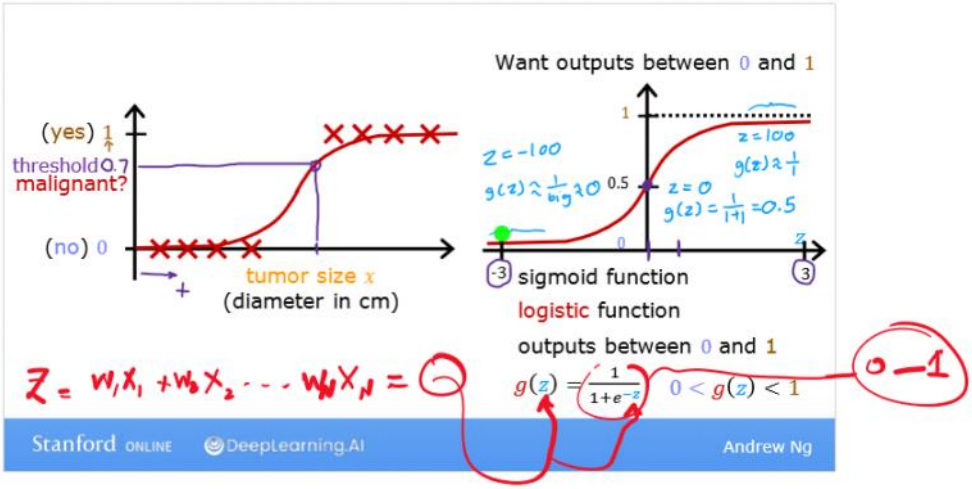
z	g(z)
0	0.5
$z >>> 0$	1
$z <<<< 0$	0
1	0.73
-1	0.26

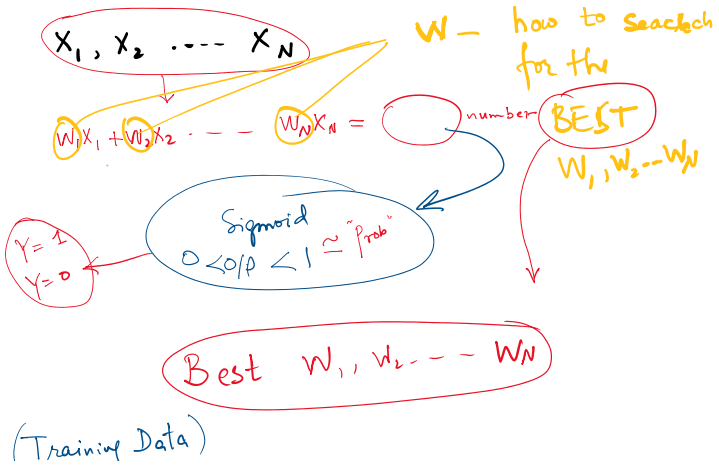
g // Variable = z

$$\frac{1}{1+\frac{1}{e^z}} = \frac{1}{1+\frac{1}{\infty}} = \frac{1}{1+0} = 1$$



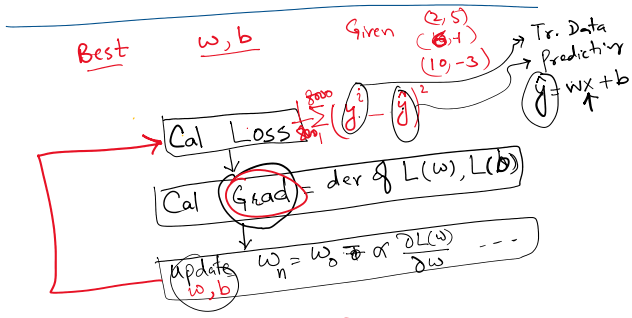

Z
Z


(yes) 1
threshold 0.7
malignant?
(no) 0
tumor size x
(diameter in cm)
Want outputs between 0 and 1
sigmoid function
logistic function
outputs between 0 and 1
$g(z) = \frac{1}{1+e^{-z}}$
$0 < g(z) < 1$
$z = w_1x_1 + w_2x_2 \cdots w_Nx_N =$
Stanford ONLINE
DeepLearning.AI
Andrew Ng


$X_1, X_2 \cdots X_N$
$W_1X_1 + W_2X_2 \cdots W_NX_N =$
number
BEST
$W_1, W_2 \cdots W_N$
Sigmoid
$0 < o/p < 1 \simeq$ "Prob"
$Y = 1$
$Y = 0$
Best $W_1, W_2 \cdots W_N$
(Training Data)

Best

(Training Data)



	X_1	X_2	----	X_N	Y
8000	23	6	----	4	1
	20	2	----	20	0
	6	5	----	-2	1
			⋮		
	10	2	----	25	0

Σ

$$= \prod_{1}^{8000} P(Y=1 \mid x_1, x_2, \cdots x_N)$$

Product of Small Numbers is

$$= \prod_{1}^{8000} P(Y^i \mid X^i)$$

Importance of Log

Sigmoid

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

$0 < g(z) < 1$

$X = \{x_1, x_2, \cdots x_N\}$

$\theta = \{\theta_1, \theta_2, \cdots \theta_N\}$

$\sum \theta^T x$

$$LL(\theta) = \sum_{i=0}^{n} y^{(i)} \log \sigma(\theta^T \mathbf{x}^{(i)}) + (1 - y^{(i)}) \log[1 - \sigma(\theta^T \mathbf{x}^{(i)})]$$

$$\prod_{1}^{8000} \left[[g(z)]^{y^i} * [1 - g(z)]^{1-y^i} \right]$$