$$P(z_i|x_i) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{\frac{(\bar{z} - z_{exp})^2}{2\sigma^2}}$$

$\bar{z}_1 = 1.5 \quad \bar{z}_2 = 7 \quad \bar{z}_3 = 5 \quad \bar{z}_4 = 8$

$$e^{(1.5-1)^2}$$

$$P(x_i|z_i) = \frac{P(z_i|x_i)P(x_i)}{P(z_i)}$$

$$= \frac{1}{P(z_i)} \cdot \frac{1}{\sqrt{2\pi\sigma^2}} P(x_i) e^{\frac{(----)}{2\sigma^2}} = \eta$$

$P(X_1|z_1) = 0.96$

$P(X_2|z_1 = 0.46$

$P(X_3|z_1) = 0.025$

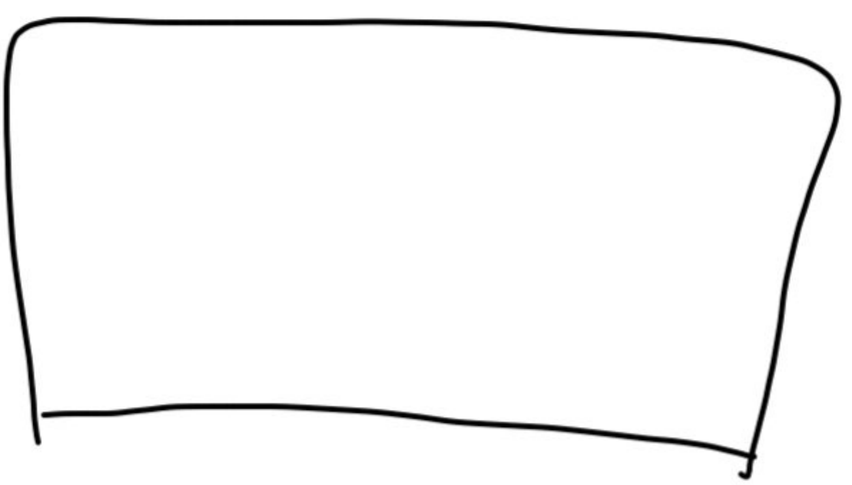
$P(X_4|z_1) = 1.196 * 10^{-4}$

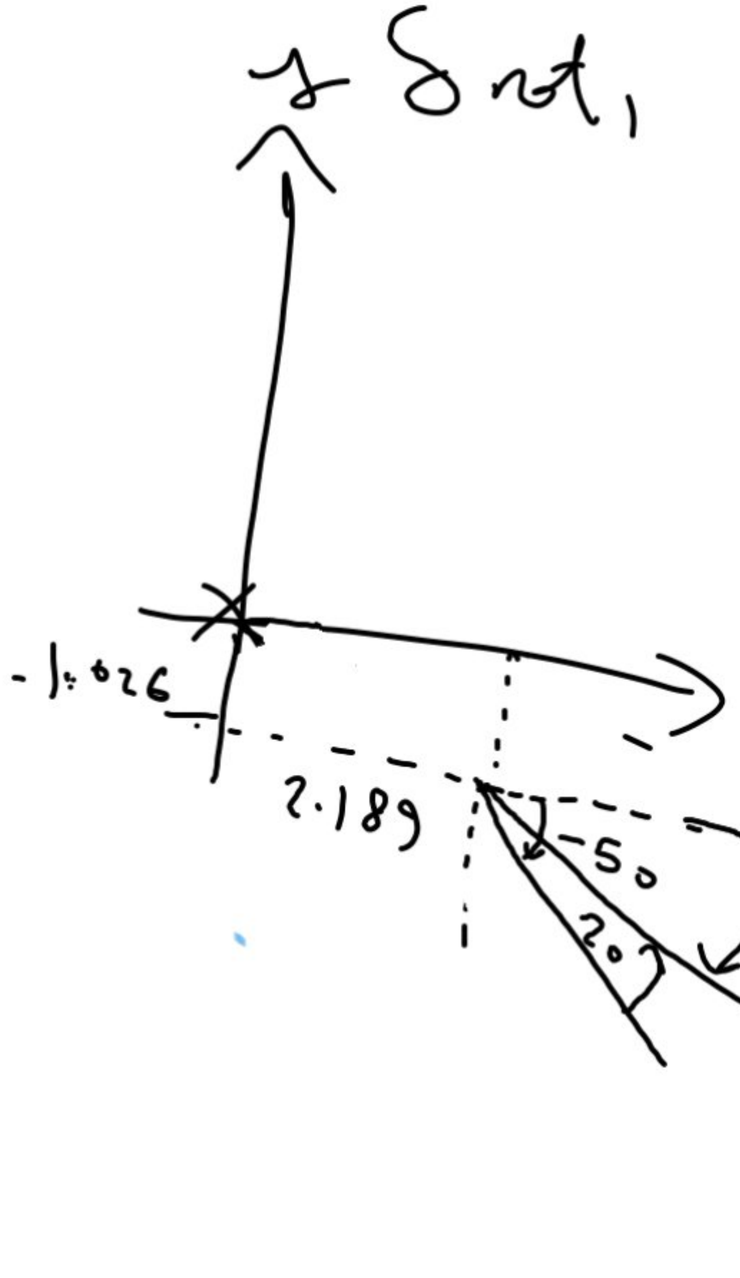
	z_1	z_2	z_3	z_4
X_1	0.665	$6.6)\times10^{-3}$	0.08	1.34×10^{-3}
X_2	0.319	0.196	0.59	0.08
X_3	0.016	0.6	0.76	0.51
X_4	8.3×10^{-5}	0.196	0.026	0.37

$X + 2X + 2X + X = 1$

$X = \frac{1}{6}$

	z_1
X_1	0.5
X_2	0.47
X_3	0.025
X_4	$6.196_{-5} * 10$





$x = 3\cos(-20) = 2.819$

$y' = 3\sin(-20) = -1.026$

$\theta_1 = -50$

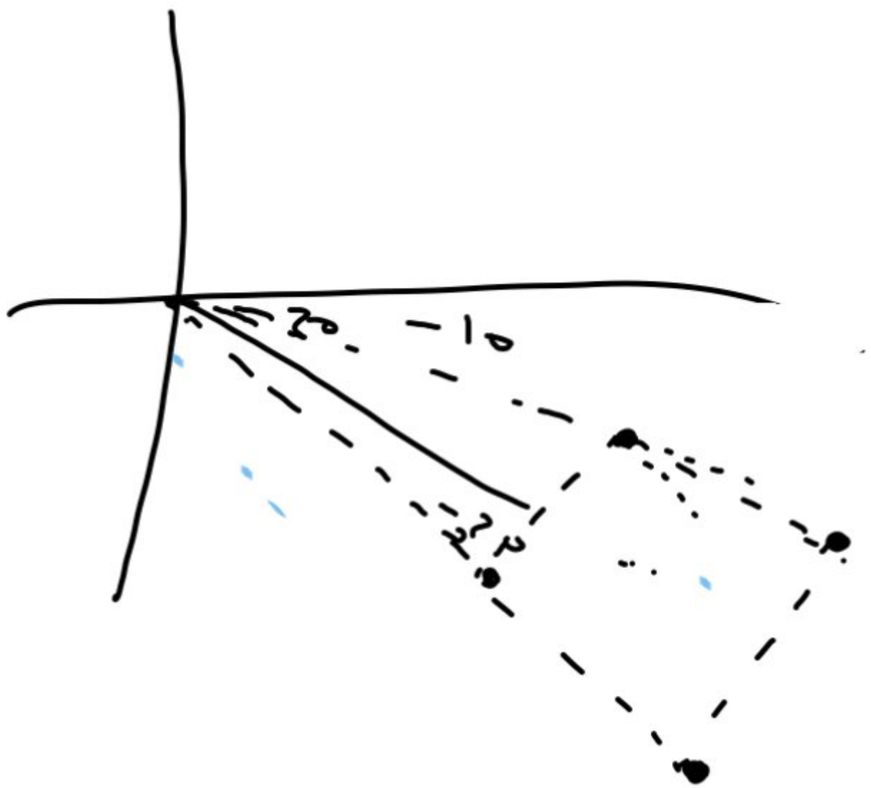
$\Delta x = 10\cos -30$

$\Delta y = 10\sin 30$

$x = 11.479$

$y = -6.026$

$\theta = -20$


20
10

$$P(c_1|d) = \frac{P(d|c_1)\,P(c_1)}{P(d)}$$

$$P(c_i|d) = P(d|c_i)\,P(c_i)$$

$x_1, x_2 \dots x_n$

$P(a,b) = P(x_1, x_2 \dots, x_n|c_i)\,P(c_i)$

$= P(a)P(b) = P(x_1|c_i)\,P(x_2|c_i) \dots P(x_n|c_i)\,P(c_i)$

→ prior prob

$P(pos) = 0.5$

$P(neg) = 0.5$

$P(d \mid Pos)$

I always

$P(doc \mid pos)$

$P(Pos|d) \propto P(Pos)(P(I|Pos)\,P(always|Pos)\,P(like|Pos)\,P(foreign|Pos)\,P(film$

$= 0.5 * 0.09 * 0.07 * 0.29 * 0.04 * 0.08$

$= \boxed{0.00000292}$

$P(neg|d) \propto 0.5 * 0.16 * 0.06 * 0.06 * 0.15 * 0.11$

$= \boxed{0.0000475}$

$P(\text{comedy}) = \frac{2}{5}$

$P(\text{action}) = \frac{3}{5}$

$|V| = 7$

$P(\text{fast}|\text{action}) = \frac{2+1}{11+7}$

(pos) $P(\text{couple}|\text{action}) = \frac{0+1}{11+7}$

$P(\text{shoot}|\text{action}) = \frac{4+1}{11+7}$

$P(\text{fly}|\text{action}) = \frac{1+1}{11+7}$

$P(\text{action}|d) \simeq 0.0001781$

$P(\text{comedy}|d) \simeq 0.000073$

$P(\text{fast}|\text{comedy}) = \frac{1+1}{9+7}$

$P(\text{couple}|\text{comedy}) = \frac{2+1}{9+7}$

$P(\text{shoot}|\text{comedy}) = \frac{0+1}{9+7}$

$P(\text{fly}|\text{comedy}) = \frac{1+1}{9+7}$

$P(pos) = \frac{2}{5}$, $P(neg) = \frac{3}{5}$

$P(good|pos) = \frac{3+1}{9+3}$

$P(poor|pos) = \frac{1+1}{9+3}$

$P(great|pos) = \frac{5+1}{9+3}$

30

$P(pos|d) \simeq (\frac{2}{5})(\frac{4}{12})^2(\frac{6}{12})(\frac{2}{12}) = 0.$

$P(neg|d) \simeq (\frac{3}{5})(\frac{3}{17})^2(\frac{11}{17})(\frac{3}{17}) = 0.00$

Pos

$P(good|neg) = \frac{2+1}{14+3}$

$P(poor|neg) = \frac{10+1}{14+3}$

$P(great|neg) = \frac{2+1}{14+3}$

0037
21

$P(Pos) = \frac{2}{5}$, $P(neg) = \frac{3}{5}$

$P(Pos|d) = \left(\frac{2}{5}\right)\left(\frac{2}{7}\right)\left(\frac{2}{7}\right)\left(\frac{3}{7}\right) = 0.0$

$P(neg|d) = \left(\frac{3}{5}\right)\left(\frac{3}{9}\right)\left(\frac{4}{9}\right)\left(\frac{2}{9}\right) = 0.0$

$P(good|Pos) = \frac{1+1}{4+3}$

$P(good|neg) = \frac{2+1}{6+3}$ neg

$P(Poor|Pos) = \frac{1+1}{4+3}$

$P(Poor|neg) = \frac{3+1}{6+3}$

$P(great|Pos) = \frac{2+1}{4+3}$

$P(great|neg) = \frac{1+1}{6+3}$

0139

0197

Pred. \ True	P	N
P	TP	FP
N	FN	TN

$$Precision = \frac{TP}{TP+FP}$$

$$Recall = \frac{TP}{TP+FN}$$

3 5 Pos

5 9 Pos

$$F1\text{-}score = \frac{2 * Pr * R}{Pr + R}$$

$$accuracy = \frac{TP+TN}{TP+FP+TN+FN}$$

$$\text{Precision} = \frac{70}{70+30} = 0.7$$

$$\text{Recall} = \frac{70}{70+70} = 0.5$$

B

A 100

B 1

A Recall

B Precision

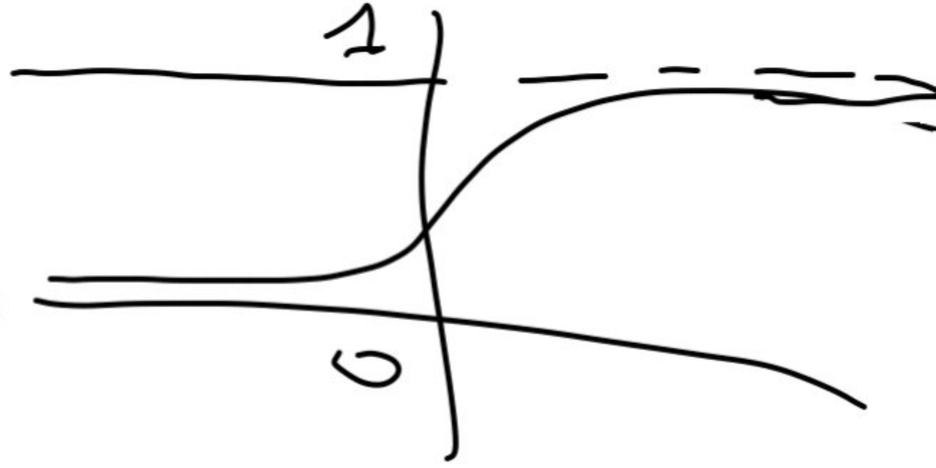
100 / 1 / 101

$$z = w^T x + b$$

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

$$w = [w_1\ w_2 \cdots w_n]$$

$$x = [x_1\ x_2 \cdots x_n]$$



$$\frac{1}{1+e^{-z}} > 0.5$$

$$2 > 1+e^{-z}$$

$$e^{-z} < 1$$

$$\ln(e^{-z}) < \ln(1)$$

$$-z < 0$$

$$z > 0$$

$$\boxed{w^T x + b > 0}$$

a) $a(x) = \dfrac{1}{1+e^{-(w_1x_1+w_2x_2+b)}}$ $\begin{cases} \\ \\ \end{cases}$ $\begin{matrix} >0.5 \\ \\ <0.5 \end{matrix}$

b) $d_0 c_1$: $\begin{cases} \rightarrow x_1 = 0 \\ \rightarrow x_2 = 0 \end{cases}$ $0.5 > 0$ 9

$d_0 c_2$ $\begin{cases} \rightarrow x_1 = 1 \\ \rightarrow x_2 = 1 \end{cases}$ >0 9

$d_0 c_3$ $\begin{cases} \rightarrow x_1 = 0 \\ \rightarrow x_2 = 1 \end{cases}$ $P_{01} > 0$ 9

Pred.		True	
		Q	S
	Q	2	1
	S	0	0

$$Prec. = \frac{2}{3}$$

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

$$F1\text{-}Score = \frac{2\left(\frac{2}{3}\right)(1)}{\left(\frac{2}{3}\right)+1}$$

$$Acc = \frac{2}{3}$$