

Question 1 (a) P(w)= 1/4 P(wx/w1) = N(2,1) P(w2) = 3 P(2 1202) = N(51) M(a,b) = normal disterbusion with mean a and variance b. zero one loss. Jov $P(\omega_1|x) = P(\omega_2|x)$ P(xlos) P(ws) = P(xlos) P(ws) P(x/w) P(wx) = P(x/wz) P(wz) for Gaussian Distribution -1 (x-H) P(x/wi)= 1 have $\mu = mean$ ~ = valiance

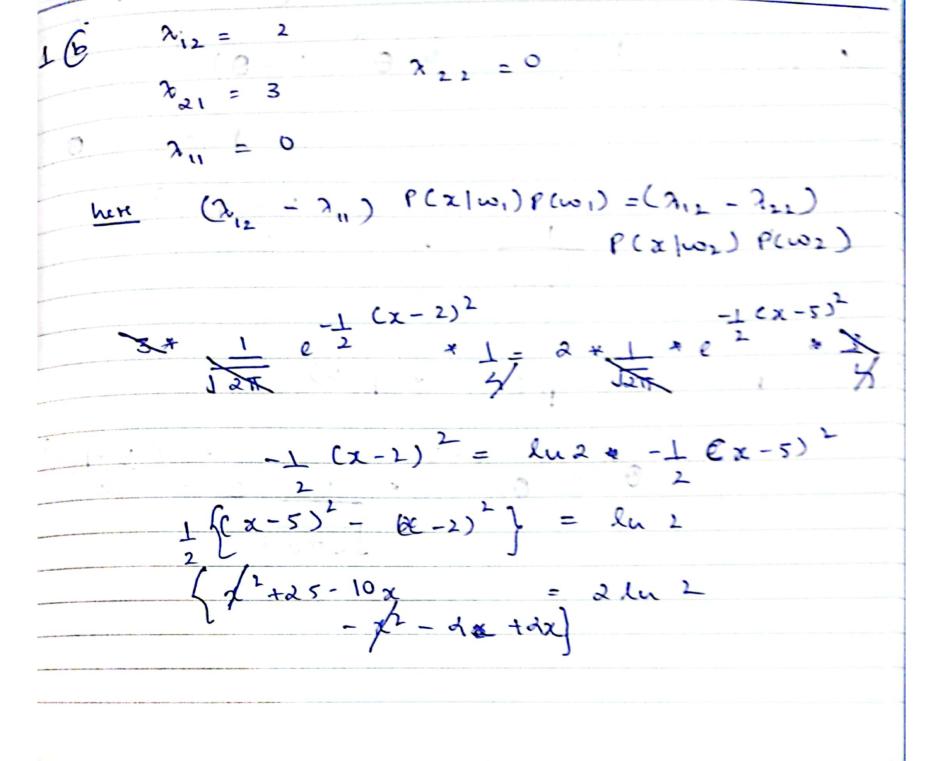
8 x ~ N (4, ~2) e = (x - 2) 2 P(x |wi) = 1 $\frac{1}{\sqrt{2\pi}} e^{-\frac{1}{2}(x-2)^2}$ -1 (x-5)2 1 P (2 | w2) = P(= x | w,) . P(w,) = P(x | w,) . P(w2) $\frac{-1}{2^{\frac{1}{12}}} (x-2)^{2} \qquad \frac{-1}{2} (x-5)^{2}$ $\frac{1}{2^{\frac{1}{12}}} e^{2} \qquad \frac{3}{2^{\frac{1}{12}}} \qquad \frac{3}{2^{\frac{1}{12}}}$ long on both sides $-1 (x-1)^2 = \log(3) - 1 (x-5)^2$ $\frac{1}{2} \left((2-5)^2 - (x-2)^2 \right) = \log(3)$ 1 (x+25-10x-x2-d+dx) = ly (x)

21 -6x = 2 log (x)

100

log 2x lu (3) 3.133

Scanned with CamScanner



alu 2 - 6 d 2 ln 1 3.2689

Scanned with CamScanner

= 8 0 (1-0) P(a) P(a=1)=0 P(b) J21102 p ca) * p(b) (1-0)

(b)
$$q(x) = M \pi p(xi)$$
.

$$= \frac{1}{1-1} \quad 0^{ni} \cdot (1-0)^{1-ni} \pi \frac{1}{1-ni} = \frac{-\frac{1}{2} \left(\frac{bi-H}{\sigma}\right)^2}{1-ni}$$

$$= \frac{1}{1-1} \quad \begin{cases} a_i \ln 0 + (1-a_i) \ln (1-0) \\ 1 - a_i \end{cases} \quad \begin{cases} a_i \ln 0 + (1-a_i) \ln (1-0) \\ 1 - a_i \end{cases}$$

$$= \frac{1}{1-1} \quad \begin{cases} a_i \ln 0 + (1-a_i) \ln (1-0) \\ 1 - a_i \end{cases} \quad \begin{cases} b_i - H \\ 1 - a_i \end{cases} \quad$$

Therefore we have

$$\frac{dN(z)}{d\theta} = 0$$
 $\frac{dN(z)}{d\theta} = 0$
 $\frac{dN($

$$P(\chi \mid \omega_i) = \frac{1}{T_b} \frac{1}{1 + (\alpha - \alpha_i)^2} i = 1, 2$$

$$\frac{1}{\pi_b} \frac{1}{\Delta + \left(\frac{x - q_i}{b}\right)^2} = \frac{1}{\pi_b} \frac{1}{1 + \left(\frac{x - q_i}{b}\right)^2}$$

$$(x-a_1)^2 = (x-a_2)^2$$

$$x^{2} + a_{1}^{2} - 2 \times a_{1} = x^{2} + a^{2} - 2 \times a_{2}$$

$$(a_1-a_2)(a_1+a_2) = \chi(2a_1-2a_2)$$

$$\chi = \left(a_1 + a_2\right)$$

$$f(emor) = \int_{-\infty}^{\infty} P(emor|x). P(x) dx$$

$$= \int_{-\infty}^{\infty} min \left[P(x|\omega_1), P(\omega_1), P(x|\omega_2), P(\omega_2) \right] dx$$

$$= \int_{-\infty}^{\infty} P(x|\omega_1). P(\omega_2). dx$$

$$= \int_{-\infty}^{\infty} P(x|\omega_1). P(\omega_2). dx$$

$$= \int_{-\infty}^{\infty} \frac{1}{\pi} \cdot \frac{1}{1+(x-5)^2} dx$$

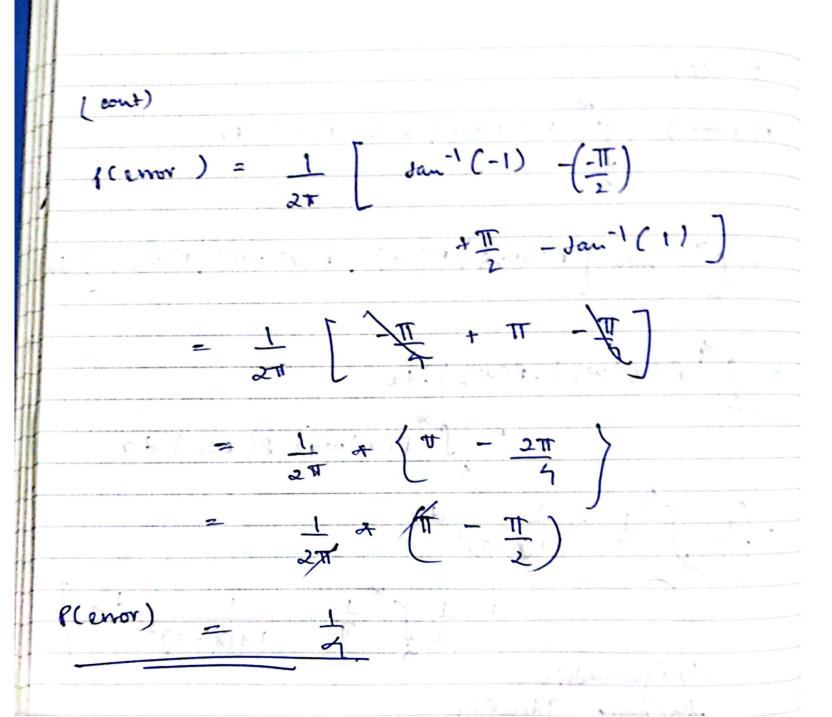
$$= \int_{-\infty}^{\infty} \frac{1}{\pi} \cdot \frac{1}{1+(x-3)^2} dx$$

$$= \int_{-\infty}^{\infty} \frac{1}{\pi} \cdot \frac{1}{1+(x-3)^2} dx$$

$$= \int_{-\infty}^{\infty} \frac{1}{\pi} \cdot \frac{1}{1+(x-3)^2} dx$$

$$= \int_{-\infty}^{\infty} \frac{1}{1+(x-5)^2} dx + \int_{-\infty}^{\infty} \frac{1}{1+(x-3)^2} dx$$

$$= \int_{-\infty}^{\infty} \frac{1}{1+(x-3)^2} dx + \int_{-\infty}^{\infty} \frac{1}{1$$



16) we No. we seen's hoold not choose to cise Zero-one loss for a soul world dataget like for example g conner Prédiction. is because for geal world case; deta is mbalaned

for example if someone trais cancer and it gives prediction as no (false negative).

This might be were and pose as a <u>risk</u>