

$x \rightarrow$ data sample
 $y \rightarrow$ class label

Two-class

$$P(y = g|x)$$

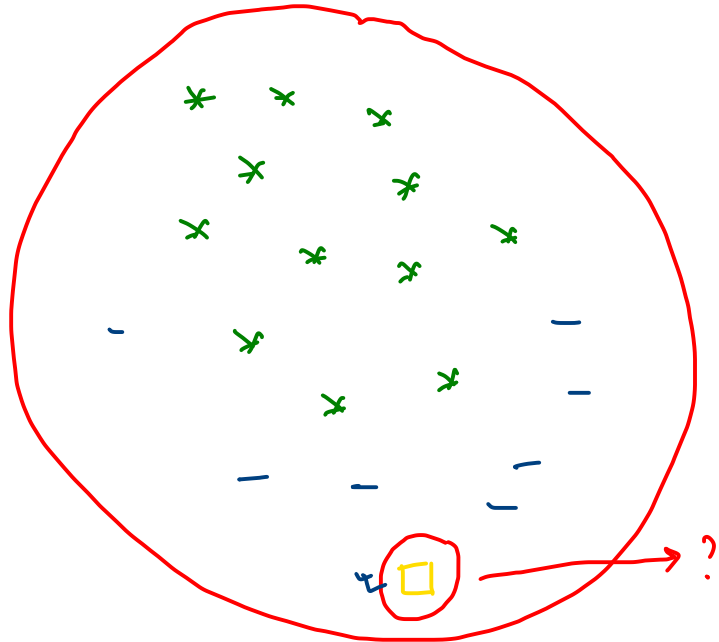
$$P(y = b|x)$$

①

19

$g \rightarrow 12$

$b \rightarrow 7$

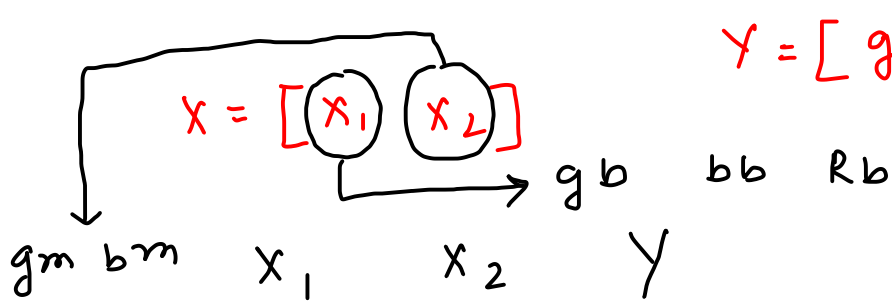


$$\begin{aligned} \llcorner P(y = g d) &= 12/19 \\ \llcorner P(y = b) &= 7/19 \end{aligned} \left. \begin{aligned} &\llcorner P(y = 0 | x) \\ &\llcorner P(y = 1 | x) \end{aligned} \right] ??$$

② Likelihood \llcorner

$$\llcorner \underline{P(x | y = 0)}$$

$$\llcorner \underline{P(x | y = 1)}$$



$$Y = [g_d \quad b]$$

$$P(Y = g_d) = 3/5$$

$$P(Y = b) = 2/5$$

$$P(A \cap B) = P(A) \cdot P(B)$$

	x_1	x_2	Y
{	g_b	g_m	g_d
	b_b	b_m	b
	g_b	g_m	g_d
	g_b	g_m	g_d
	b_b	g_m	b

$$P(X | Y)$$

$$X = [R_b \quad b_m]$$

$$P(X = [\underline{R_b} \quad \underline{b_m}] | Y = g_d)$$

$$= P(\underline{x_1} = R_b | Y = g_d) \cdot$$

$$P(\underline{x_2} = b_m | Y = g_d)$$

$$P(X = [R_b \quad b_m] | Y = g_d)$$

$$= ? \times ? = 0 \times \frac{1}{2}$$

$$= \frac{1}{3} \times \frac{0}{3}$$

$$g^r(\mu, \sigma)$$

x_1	x_2	y
2	2	gd
6	1	b
12	4	gd
14	5	gd
6	6	b

$$P(y = gd \mid x = [4 \ 2]) = ?$$

$$P(y = b \mid x = [4 \ 2]) = ?$$

$$P(y = gd) = 3/5$$

$$P(y = b) = 2/5$$

$$P(x = [4 \ 2] \mid y = gd)$$

$$= P(x_1 = 4 \mid y = gd) * P(x_2 = 2 \mid y = gd)$$

$$\sim g(x, \mu, \sigma) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x - \mu)^2}{2\sigma^2}}$$

Bayes Th.

$$\checkmark P(A|B) = \frac{P(B|A) P(A)}{P(B)}$$

$$P(y|x) = \frac{P(x|y) P(y)}{P(x)}$$

Two-class problem

$$\checkmark P(y=0|x) = \frac{P(x|y=0) P(y=0)}{P(x)} \approx \frac{P(x|y=0) P(y=0)}{P(x)}$$

$$\checkmark P(y=1|x) = \frac{P(x|y=1) P(y=1)}{P(x)} \approx \frac{P(x|y=0) P(y=0)}{P(x)}$$

$$P(x_1 = 4 \mid y = gd) \\ = \frac{1}{\sqrt{2\pi} \sigma} e^{-\frac{(4 - \mu)^2}{2\sigma^2}}$$

σ, μ .

$$\text{or } P(x_2 = 2 \mid y = b)$$