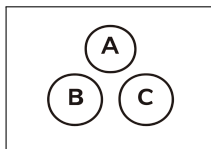


10 Discrete Distribution Posterior Probabilities

A

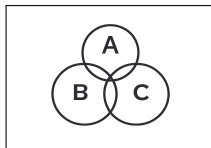


$$P(H) = 0.30$$

$$P(L) = 0.70$$

$$P(A|H) = 0.40$$

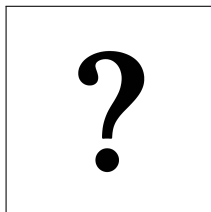
$$P(A|L) = 0.20$$



$$P(A) = P(A|H)P(H) + P(A|L)P(L)$$

$$P(A) = (0.4)(0.3) + (0.2)(0.7) = 0.12 + 0.14 = 0.26$$

$$P(H|A) = \frac{P(A|H)P(H)}{P(A)} = \frac{(0.4)(0.3)}{0.26} = \frac{0.12}{0.26} = \frac{6}{13} \approx 0.4615$$



$$P(G_1) = 0.08$$

$$P(G_2) = 0.15$$

$$P(G_3) = 0.49$$

$$P(G_4) = 0.28$$

$$P(A|G_1) = 0.06$$

$$P(A|G_2) = 0.03$$

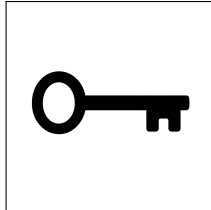
$$P(A|G_3) = 0.02$$

$$P(A|G_4) = 0.04$$

$$P(G_1|A) = ?$$

10 Discrete Distribution Posterior Probabilities

A



$$P(G_1) = 0.08$$

$$P(G_2) = 0.15$$

$$P(G_3) = 0.49$$

$$P(G_4) = 0.28$$

$$P(A|G_1) = 0.06$$

$$P(A|G_2) = 0.03$$

$$P(A|G_3) = 0.02$$

$$P(A|G_4) = 0.04$$

$$P(G_1|A) = ?$$

$$P(A) = P(A|G_1)P(G_1) + P(A|G_2)P(G_2) + P(A|G_3)P(G_3) + P(A|G_4)P(G_4)$$

$$P(A) = (0.06)(0.08) + (0.03)(0.15) + (0.02)(0.49) + (0.04)(0.28)$$

$$P(A) = 0.0048 + 0.0045 + 0.0098 + 0.0112$$

$$P(A) = 0.0303$$

$$P(G_1|A) = \frac{P(A|G_1) \cdot P(G_1)}{P(A)} = \frac{(0.06)(0.08)}{0.0303} = \frac{0.0048}{0.0303} \approx 0.16$$