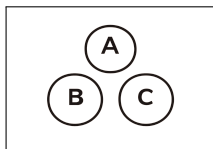


10 Discrete Distribution Posterior Probabilities

F

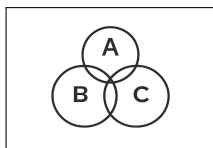


$$P(H) = 0.30$$

$$P(L) = 0.70$$

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

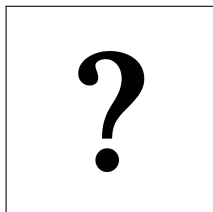
$$P(A|L) = 0.20$$



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

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

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



$$P(D) = 0.01$$

$$P(D^C) = 0.99$$

$$P(X|D) = 0.94$$

$$P(X|D^C) = 0.01$$

$$P(D|X) = ?$$

10 Discrete Distribution Posterior Probabilities

F



$$\begin{aligned}P(D) &= 0.01 \\P(D^C) &= 0.99 \\P(X|D) &= 0.94 \\P(X|D^C) &= 0.01 \\P(D|X) &= ?\end{aligned}$$

$$\begin{aligned}P(X) &= P(X|D)P(D) + P(X|D^C)P(D^C) \\&= (0.94)(0.01) + (0.01)(0.99) \\&= 0.01\end{aligned}$$

$$P(D|X) = \frac{P(X|D)P(D)}{P(X)} = \frac{(0.01)(0.01)}{0.01} = 0.66$$