(1)

(a) $P(F \cap H) = \dfrac{80}{300}$

(b) $P(M \cap B^c) = \dfrac{40+58}{300}$

(c) $P(F|_H) = \dfrac{80}{58+80}$

(d) $P(B^c|_M) = \dfrac{40+58}{150}$

(2)

$$P\left(T \geqslant 20 \,\Big|\, T \geqslant 70\right) = \frac{P(T \geqslant 80 \,\wedge\, T \geqslant 70)}{P(T \geqslant 70)} = \frac{P(T \geqslant 80)}{P(T \geqslant 70)} = \frac{0.2}{0.6}$$

(3)

$$P\left(B|_{DF}\right) = \frac{P(DF|_B)\,P(B)}{P(DF)} = \frac{P(DF|B)\,P(B)}{P(DF|_B)\,P(B) + P(DF|_{B^c})\,P(B^c)}$$

$$= \frac{0.03 \times 0.995}{0.03 \times 0.995 + 0.95 \times 0.005}$$

(4)

A   B

(a) $P(R_B) = P(R_B|_{R_A})\,P(R_A) + P\left(R_B|_{R_A^c}\right) P(R_A^c)$

$$= \frac{3}{10} \times \frac{4}{9} + \frac{7}{10} \times \frac{5}{9}$$

(b) $P(R_A|_{R_B}) = \dfrac{P(R_B|_{R_A})\,P(R_A)}{P(R_B)} = \dfrac{\frac{3}{10} \times \frac{4}{9}}{\frac{3}{10} \times \frac{4}{9} + \frac{7}{10} \times \frac{5}{9}}$

(5)

$$P(A|_R) = \frac{P(R|_A)\,P(A)}{P(R)} = \frac{P(R|_A)\,P(A)}{P(R|_A)\,P(A) + P(R|_M)\,P(M) + P(R|_B)\,P(B)}$$

$$= \frac{0.02 \times 0.1}{0.02 \times 0.1 + 0.01 \times 0.2 + 0.0025 \times 0.1 +}$$

(6)

GNC = { GOTO NO CARACOL }   PNP = { PERRO NO POMERANIA }

GE = { GOTO CARACOL }   PP = { PERRO POMERANIA }

B = { IMAGEN BIEN CLASIFICADA }

$$P(B) = P\left(\frac{B}{GC}\right)P(GC) + P\left(\frac{B}{GNC}\right)P(GNC) + P\left(\frac{B}{PNP}\right)P(PNP) + P\left(\frac{B}{PP}\right)$$

$$P(B) = 0,8 \times 0,25 + 1 \times P(GNC) + 1 \times P(PNP) + 0,7 \times 0,1$$

$$P(B) = 0,8 \times 0,25 + 1 \times 0,65 + 0,7 \times 0,1$$

(8)
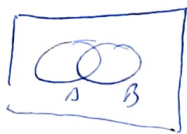
(a) $P\left((A \cup B)^c\right) = 1 - P(A \cup B) = 1 - (P(A) + P(B)) - P(A)P(B)$

$$= 1 - \left(\frac{1}{4} + \frac{1}{3} - \frac{1}{4} \times \frac{1}{3}\right)$$

(b) $P\left((B \cap A^c) \cup (A \cap B^c)\right) = P(B \cap A^c) + P(A \cap B^c) = P(B)P(A^c) + P(A)P(B^c)$

$$= \frac{1}{3} \times \frac{3}{4} + \frac{1}{4} \times \frac{2}{3}$$

(9) $P(FALLO) = 1 - P(NO FALLO) = 1 - P(B_1 \cap B_2 \cap \ldots \cap B_n) = 1 - P_1 P_2 \ldots P_n = 1 - p^n$

(10) $A \subset B$ $P\left(\frac{B}{A}\right) = \frac{P(B \cap A)}{P(A)} = \frac{P(A)}{P(A)} = 1$ ✓

$$P\left(\frac{A^c}{B^c}\right) = \frac{P(A^c \cap B^c)}{P(B^c)} = \frac{P(B^c)}{P(B^c)} = 1$$ ✓

(11) $0 = P(A \cap B) \overset{?}{=} P(A)P(B)$ SOLAMENTE SI A o B SON EL CONJUNTO VACIO

si $P(A) > 0$ y $P(B) > 0$ ω A y B DISJUNTOS → A y B SON DEPENDIENTES

(12) $P(A \cap B^c) = P(A) - P(A \cap B) = P(A)(1 - P(B)) = P(A)P(B^c)$ ✓

si A y B son i. ⇒ A y B^c son indep.