

PMP - LAB3

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1 Ex4 Bonus: Calculați cele 2 probabilități folosind regula lui Bayes

I-Incendiu, C-cutremur, A-Alarma

Prima probabilitate(pct 2):

$$P(C = 1 | A = 1) = \frac{P(A=1|C=1) \cdot P(C=1)}{P(A=1|C=1) \cdot P(C=1) + P(A=1|C=0) \cdot P(C=0)} \approx \frac{0.0296096 \cdot 0.0005}{0.0296096 \cdot 0.0005 + 0.009608499 \cdot 0.9995} \approx \frac{0.000014804}{0.00961849955} \approx 0.00153911739$$

$$P(A = 1 | C = 1) = P(A = 1 | C = 1, I = 1) \cdot P(I = 1) + P(A = 1 | C = 1, I = 0) \cdot P(I = 0) = 0.98 \cdot 0.01001 + 0.02 \cdot 0.98999 = 0.0296096$$

$$P(I = 1) = P(I = 1 | C = 1) \cdot P(C = 1) + P(I = 1 | C = 0) \cdot P(C = 0) = 0.03 \cdot 0.0005 + 0.01 \cdot 0.9995 = 0.01001$$

$$P(A = 1 | C = 0) = P(A = 1 | C = 0, I = 1) \cdot P(I = 1) + P(A = 1 | C = 0, I = 0) \cdot P(I = 0) = 0.95 \cdot 0.01001 + 0.0001 \cdot 0.98999 = 0.009608499$$

A doua probabilitate(pct3):

$$P(I = 1 | A = 0) = \frac{P(A=0|I=1) \cdot P(I=1)}{P(A=0|I=1) \cdot P(I=1) + P(A=0|I=0) \cdot P(I=0)} \approx \frac{0.049985 \cdot 0.01001}{0.049985 \cdot 0.01001 + 0.9997901 \cdot 0.98999} \approx \frac{0.00050034985}{0.99028255094} \approx 0.00050525968$$

$$P(A = 0 | I = 1) = P(A = 0 | I = 1, C = 1) \cdot P(C = 1) + P(A = 0 | I = 1, C = 0) \cdot P(C = 0) = 0.02 \cdot 0.0005 + 0.05 \cdot 0.9995 = 0.049985$$

$$P(A = 0 | I = 0) = P(A = 0 | I = 0, C = 1) \cdot P(C = 1) + P(A = 0 | I = 0, C = 0) \cdot P(C = 0) = 0.98 \cdot 0.0005 + 0.9998 \cdot 0.9995 = 0.9997901$$