Collection

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Contents

1 Bayes' Theorem

Axiom 1 (Conditional probability):

$$P(A \cap B) = P(A)P(B|A) = P(B \cap A) = P(B)P(A|B) \tag{1}$$

Axiom 2:

$$\begin{aligned} P(A) &= P(A \cap B) + P(A \cap \neg B) \\ &= P(B)P(A|B) + P(\neg B)P(A|\neg B) \end{aligned} \tag{2}$$

Bayes' Theorem:

$$\boldsymbol{P(A|B)} \overset{(1)}{=} \frac{\boldsymbol{P(A)P(B|A)}}{\boldsymbol{P(B)}} \tag{3}$$

$$\overset{(2)}{=} \frac{\boldsymbol{P(A)P(B|A)}}{\boldsymbol{P(A)P(B|A) + P(\neg A)P(B|\neg A)}} \tag{4}$$