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Frequency / belief / physics

① $0 \leq P(A = \text{True}) \leq 1$

② $P(\text{True}) = 1$

$P(\text{False}) = 0$

③ $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A|B) = \frac{P(A, B)}{P(B)}$ Axioms.

$P(A, B) = P(A|B) \cdot P(B)$

$P(A|L, M) = \frac{P(A, L, M)}{P(L, M)}$

$P(A, L, M) = P(A|L, M) P(L, M) P(M)$

$P(A|B, Z) = P(A|Z)$

Conditional independence

B BURGLAR

R RACCON

P BOG BARKLES

T TRASH ANSWER

C POLICE CALLED

Joint Probability Table.

Axioms

Conditional Prob.

Chain rule

Independence

Conditional independence

$P(X_1, X_n) = \dots$ chain rule

$\prod_{i=1}^n P(X_i | X_1, \dots, X_{i-1})$

Independence

$P(A|B) = P(A)$

$P(A, B) = P(A) \cdot P(B)$

$P(A, B|Z) = P(A|Z) \cdot P(B|Z)$

$P(C, D, T, B, R) = P(C|D, T, B, R) \dots$

$\times P(D|\bar{T}, \bar{B}, \bar{R}) \dots$

$\times P(T|B, \bar{R}) \dots$

$\times P(B|R) \dots$

$\times P(\bar{R}) \dots$