

Assignment1: Probability

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Exercise 1.1 (Bayesian Rules)

1. Bayes rule

$$P(a|b) = \frac{P(b|a) \cdot P(a)}{P(b)}$$

2. Product rule

$$P(a \wedge b) = P(a|b) \cdot P(b)$$

3. Chain rule

$$P(X_1, \dots, X_n) = P(X_n|X_{n-1}, \dots, X_1) \cdot P(X_{n-1}, |X_{n-2}, \dots, X_1) \cdot \dots \cdot P(X_2|X_1) \cdot P(X_1)$$

4. Marginalization

$$P(X) = \sum_{y \in Y} P(X, y)$$

5. Normalization

$$P(X|e) = \alpha P(X, e)$$