

Introduction to Bayesian Methods

Unlocking Uncertainty: The Power of Bayesian Methods

DEFINITION

Bayesian methods are statistical techniques that update probabilities as new evidence is available. They provide a framework for making decisions under uncertainty.

KEY CONCEPTS

Prior Probability

The initial belief about a hypothesis before seeing new evidence.

Likelihood

The probability of observing the data given a specific hypothesis.

Posterior Probability

The updated probability of a hypothesis after considering new evidence.

Bayes' Theorem

A mathematical formula that relates prior, likelihood, and posterior probabilities.

Credible Intervals

Ranges within which a parameter value is believed to lie with a certain probability.

EXAMPLES

- Updating disease probability after a positive test result.
- Estimating a coin's bias after multiple flips.
- Predicting customer behavior based on past purchases.

MEMORY TIPS

- ★ Remember 'Prior, Likelihood, Posterior' as PLP for the flow of Bayesian reasoning.
- ★ Think of Bayes' Theorem as a 'probability sandwich' with prior as the bottom slice.
- ★ Use 'Credible' to recall that credible intervals give a believable range for estimates.

COMMON MISTAKES

- ✗ Confusing prior probability with posterior probability.
- ✗ Neglecting to update beliefs with new evidence.
- ✗ Overlooking the importance of sample size in likelihood calculations.

QUICK RECAP

Bayesian methods allow for dynamic updating of probabilities based on new evidence. Key concepts include prior, likelihood, and posterior probabilities, all connected by Bayes' Theorem. Remember to apply these concepts to real-world scenarios for better understanding.