

Bayesian statistics

Bayesian inference differs from more traditional statistical inference by preserving uncertainty. The Bayesian world-view interprets probability as measure of believability in an event, that is, how confident we are in an event occurring.

Bayesians interpret a probability as measure of belief, or confidence, of an event occurring. A probability is a summary of an opinion. An individual who assigns a belief of 0 to an event has no confidence that the event will occur; conversely, assigning a belief of 1 implies that the individual is absolutely certain of an event occurring.

This philosophy of treating beliefs as probability is natural to humans. We employ it constantly as we interact with the world and only see partial truths, but gather evidence to form beliefs.

Consider an uncertain event, for example whether the Arctic ice cap will have disappeared by the end of the century. These are not events that can be repeated numerous times in order to define a notion of probability (i.e. Frequentist statistics). Nevertheless, we will generally have some idea, for example, of how quickly we think the polar ice is melting. If we now obtain fresh evidence, for instance from a new earth observation, we may revise our opinion on the rate of ice loss. This can all be achieved through Bayesian interpretation of probability.