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Title: The false dilemma: Bayesian vs Classical Statistics

Abstract:

There are two main opposing schools of statistical reasoning: classical and Bayesian. Classical statistics is entirely based on the philosophical view of science of Karl Popper, in which a scientific hypothesis can not be proved, but only disproved (the Falsification Principle). The so-called Hypothetico-Deductive method of Popper is well-founded in the (frequentist) probability theory of Andrey Kolmogorov, and in the statistical works of Ronald Fisher, Karl Pearson, Jerzy Neyman, among many others. Although Classical statistics is considered the "standard" for scientific practice and statistical teaching, the Bayesian approach is quickly gaining ground. For this reason, the Bayesian vs Classical debate emerges frequently in the statistical community, with each side blaming the methodological flaws of one another. However, this debate should not be on the methodological level, but rather on the philosophical level. Contrary to general consent, Bayesian statistics is not suited to the Popperian view of science. In this lecture, we will show alternative views of the scientific method, as well as alternative views of probability (such as probability as an extension of logic, as defined by Richard Cox and Edwin Jaynes), which makes Bayesian reasoning appear as a genuinely scientific approach, rather than a mere "opponent" of Classical statistics.

Disclaimer: the title of this talk was freely inspired by the title of the article by Jordi Vallverdú, "The False Dilemma: Bayesian vs. Frequentist", published in the Electronic Journal for Philosophy in 2008. I will also talk about why I changed "frequentist" to "classical".