Bayesian Networks and the Problem of Unreliable Instruments

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Abstract

We appeal to the theory of Bayesian Networks to model different strategies for obtaining confirmation for a hypothesis from experimental test results provided by less than fully reliable instruments. In particular, we consider (i) repeated measurements of a single testable consequence of the hypothesis, (ii) measurements of multiple testable consequences of the hypothesis, (iii) theoretical support for the reliability of the instrument, and (iv) calibration procedures. We evaluate these strategies on their relative merits under idealized conditions and show some surprising repercussions on the variety-of-evidence thesis and the Duhem-Quine thesis.

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