# Navigating uncertainty through information search

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**Abstract**

Selecting informative queries is a crucial component of learning and decision-making, where models of information search have been widely used to provide normative guidance. Yet a typical requirement of these models is complete information about the underlying probabilistic structure of the environment, which is seldom met in real-world situations. Thus, information search models are blind to the epistemic uncertainty that comes with learning through experience, and do not distinguish between probabilities estimated from a sample of two and a sample of one million. We develop a learning paradigm where a successful strategy needs to balance the exploration of queries with high epistemic uncertainty, with the exploitation of queries already known to be useful. We show that a Bayesian sampling variant of traditional information search models learns faster and performs better, but most surprisingly, that a simple take-the-difference heuristic (TTD) performs competitively using only the absolute difference between observed frequencies.