Bayes-Adaptive Information Gathering

Aly Lidayan
UC Berkeley, Berkeley, California, United States

Luigi Acerbi
University of Helsinki, Helsinki, Finland

Abstract

Problem-solving often requires both acting on and gathering information from the environment. Prior work in psychology proposes that people are intrinsically motivated to seek information (Ryan and Deci, 2000; Ruggeri et al., 2021). However, in realistic settings most available information has no utility, so optimal performance requires estimating its value. We introduce a model that applies the Bayesian framework of Lidayan et al. (2024), which formalizes the value of information as the resulting increase in expected rewards. Our model calculates the utility of information-gathering actions and treats humans as noisy utility-maximizers. We design a novel task in which information sources vary in their likelihood of enabling downstream rewards. Preliminary results suggest our model predicts human behavior more accurately than intrinsic motivation models, suggesting that humans learn to estimate the value of information from experience, and use it to make better decisions.

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