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Authors

Lapidow, Elizabeth

Bonawitz, Elizabeth

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Heuristics in exploration: Distributional information is selectively used for active learning

Elizabeth Lapidow

Rutgers University - Newark

Elizabeth Bonawitz

Rutgers University - Newark

Abstract: Everyday decision-making is filled with choices about what to act on, with outcomes playing a critical role in learning. Information gain is oft cited as a valuable approach to maximize potential learning, but its computation is costly. It entails evaluating the probability of multiple outcomes given any possible action, and then considering the degree of belief-change over all possibilities. Given the computational complexity of this evaluation, it becomes important to ask whether learners employ cues to information gain; are there heuristics that drive choice in active learning? Our experiments ask participants to choose between two options (varying in distributional characteristics) in either a “learning-condition” or “collecting-condition”. Our results suggest that adults are sensitive to cues (e.g. variance) that tend to correlate with information gain. These cues are only favored in learning-goal contexts, suggesting that certain distributional qualities are not always appealing, but rather are selectively-employed heuristics towards information gain.