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Scheduling an Information Search: Heuristics and Meaningful Metrics

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Abstract

Many domains involve gathering evidence, from forensic investigations and medical diagnosis, to everyday life. How should one order this collection, given the costs involved (e.g. time, financial, information)? Scheduling theory offers optimal solutions, but requires clear metrics. Evidence can have many influences on it, which affect prioritization, e.g. degradation, contamination, etc. However, to date there has been no clear way to bring this into a unified metric, and thus optimal scheduling has remained out of reach. We propose a new information-based measure, KL, as a way of encapsulating these information costs, and present maximum KL preservation as a clear rule & metric for scheduling. We go on to test several heuristic rules for scheduling evidence collection, based on optimally derived algorithms, providing novel formal backing for a dominant heuristic strategy for scheduling information gathering.