Title

Simulation-Based Generation and Analysis of Multidimensional Future Scenarios with Time Series Clustering

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Abstract

Scenarios are commonly used for decision support and future exploration of complex systems. Using simulation models to generate these scenarios, called scenario discovery, has received increased attention in the literature as a principled method of capturing the uncertainty, complexity, and dynamics inherent in such problems. However, current methods of incorporating dynamics into scenario discovery are limited to a single outcome of interest. Furthermore, there is little work on the post-generation evaluation of the generated scenarios. In this work, we extend scenario discovery to multiple dynamic outcomes of interest, and present a number of visual and statistical approaches for evaluating the resulting scenario sets. These innovations make model-based scenario generation more widely applicable in decision support for complex societal problems, and open the door to multi-method scenario generation combining model-based and model-free methods such as Intuitive Logics or futures cones.