

Probabilistic System Summaries for Behavior Architecting

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Abstract Smart systems adapt to their context, current situation, and configuration. To engineer such systems' behavior, we need to design and evaluate system-level control strategies and the intelligent management of key scenarios. We propose a model-based approach called *probabilistic system summaries* to explore related design choices, e.g., where to put the 'smarts' of a smart building. Our approach uses Bayesian inference to calculate effects of strategies and implementations, offering causal analysis of the costs and benefits of decision strategies in key scenarios. As the modeling is light-weight and suitable for various abstraction levels, probabilistic system summaries are appropriate for early but sound architecture decisions based on computational science. Next to its use within this analysis, the product of this engineering step, i.e., a Bayes net summarizing systems plus their environment, may form the core of decision making within the system of system.

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