SBAT. A stochastic BPMN analysis tool

This paper presents SBAT, a tool framework for the modelling and analysis of complex business workflows. SBAT is applied to analyse an example from the Danish baked goods industry.

Based upon the Business Process Modelling and Notation (BPMN) language for business process modelling, we describe a formalised variant of this language extended to support the addition of intention preserving stochastic branching and parameterised reward annotations. Building upon previous work, we detail the design of SBAT, a software tool which allows for the analysis of BPMN models. Within SBAT, properties of interest are specified using the temporal logic Probabilistic Computation Tree Logic (PCTL) and we employ stochastic model checking, by means of the model checker PRISM, to compute their exact values.

We present a simplified example of a distributed stochastic system where we determine a reachability property and the value of associated rewards in states of interest for a real-world example from a case company in the Danish baked goods industry. The developments are presented in a generalised fashion to make them relevant to the general problem of implementing quantitative probabilistic model checking of graph-based process modelling languages.

This paper contains three key elements:
1. SBAT description.
2. Case company description.

The paper concludes by indicating SBAT's practical applicability and suggests further research directions.

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