

DCR Graphs Technologies for Declarative Process Design, Analysis and Simulation

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We briefly report on the development of the Dynamic Condition Response (DCR) graphs declarative process technologies, in particular the modelling and analysis tools `DCRGraphs.net` and `dcr.itu.dk`. The research on DCR graphs was initiated as part of the Trustworthy Pervasive Healthcare Processes (Trust-Care) project in the PhD project of Raghava Rao Mukkamala [8] supervised by Thomas Hildebrandt. The aim of DCR graphs is to develop a declarative process language that allows end-users of case and business process management systems to express the constraints of business and workflow processes precisely, while supporting formal analysis of both (timed) safety and liveness properties, run-time adaptation and distribution of processes.

During the period of the BETTY Cost action, the development of DCR graphs and tools has progressed significantly. The industrial PhD project of Tijs Slaats [10] at Exformatics has resulted in several case studies and extensions of the theory [9, 3, 6, 5, 4] and a commercial tool, `DCRGraphs.net`, supporting collaborative modelling, simulation and analysis of declarative process models, which has recently been licensed by the first municipality in Denmark. The online academic tool `dcr.itu.dk` developed by Søren Debois prototypes several extensions to the formalism presented in a series of research papers, including support for time [1], analysis of independence between events (true-concurrency) [4], refinement [5] and projections [3]. The BETTY Cost action, in particular two short term strategic missions (STSM), has allowed to investigate the combination of types and declarative process models for safety and liveness properties. This has resulted in the first session type system for the pi-calculus allowing to guarantee response liveness properties [7] and work in progress on a type system for progress for DCR graphs with data, jointly with Joao Costa Seco. The work is an important step towards extending the usage of DCR graphs from adaptive business and case management processes to a general type-safe programming language for distributed adaptive applications [2].

References

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