Streams, Contexts, and Dynamic Configuration[⋆]

Thomas Eiter

Knowledge-Based Systems Group,
Institute of Logic and Computation
Vienna University of Technology
Favoritenstraße 9-11, A-1040 Vienna, Austria
eiter@kr.tuwien.ac.at

Talk Abstract

The increase in network connectivity and the availability of sensors and data sources of other kind has led to a growing interest in processing data streams, and in particular reasoning over streams has received attention in the knowledge representation and reasoning community. Various formalisms have been proposed that offer different features in order to facilitate reasoning from and about a knowledge base over time in the presence of streaming data, often based on temporal logic and extensions. The need for addressing time and temporal evolution of knowledge bases has also led to respective extensions of multi-context systems (MCS), which are a generic formalism for modeling interlinked knowledge bases, called *contexts*, in an abstract way, where information exchange between contexts is enabled by special bridge rules. Among these formalisms are reactive, evolving, asynchronous, and streaming MCS, to name a few.

The generic framework of MCS allows to model particular formalisms, such as argumentation context systems which support group argumentation in the presence of mediators. In this talk, we consider dynamic configuration as another challenging problem for possible realization by multi-context systems. Roughly speaking, components in a system, called *producers*, are controlled by *configurators* which set parameters in order to determine the producers's behaviour; in turn, configurators are linked to *monitors* which observe sensors and feed information to the configurations. In the DynaCon approach, the configurations control also the monitors and may change their behaviour dynamically; this enables more sensitive configuration, while the system behaviour may get more complex, depending on the linkage structure, which in closed control loops is cyclic already in plain settings. The MCS framework and its temporal extensions provide a versatile tool for modeling dynamic configuration and the information flow among components modeled as contexts; notably, heterogeneous components, based on different logics or decision procedures, can be conveniently covered. We shall address issues and problems to consider in the MCS formulation for this application, which open new avenues of research.