Monitoring real-time systems under uncertainty

Asbtract: Given a log and a specification, timed pattern matching aims at exhibiting for which start and end dates a specification holds on that log. For example, "a given action is always followed by another action before a given deadline". This problem has strong connections with monitoring real-time systems. We address here timed pattern matching in presence of an uncertain specification, i.e., that may contain timing parameters (e.g., the deadline can be uncertain or unknown). That is, we want to know for which start and end dates, and for what values of the deadline, this property holds. Or what is the minimum or maximum deadline (together with the corresponding start and end dates) for which this property holds.

I will first give a brief introduction to parametric timed model checking. Then I will report on a framework for timed pattern matching based on parametric timed model checking. In contrast to most parametric timed problems, the solution is effectively computable, and we perform experiments using IMITATOR to show the applicability of our approach.