Proceedings of the 1$^{\text{st}}$ Workshop on
High-Level Declarative Stream Processing

HiDeSt '15

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Preface

Stream processing as an information processing paradigm appears in various applications and has been investigated by various research communities within computer science. Next to algorithmic oriented research on low-level stream processing (e.g., for sensor networks), stream-related research of recent years resulted also in declarative stream processing frameworks, which are in the focus HiDeSt '15. Declarative stream processing frameworks such as data stream management systems or systems for complex event processing (CEP) provide amongst other things stream query languages with a clear-cut semantics.

The progress of technologies and computer science as a whole has brought up new challenges for stream processing that call for the modeling of knowledge and the construction of query engines which account for the knowledge. In ontology-based streams access (OBSA) as needed, e.g., in Semantic Web, queries are answered over data streams that contain declarative assertions with symbols from an ontology. Query answering now has to incorporate reasoning over the ontology in order to guarantee completeness of the set of answers. Also context-aware reasoning for streams or CEP have to incorporate some form of reasoning in order to deal with the consequences that the context/entity models have for the set of query answers.

All of the papers of the HiDeSt '15 proceedings (5 long papers, 1 short paper) contribute to results in high-level declarative stream processing.

The paper "Towards Enriching CQELS with Complex Event Processing and Path Navigation" by Minh Dao-Tran and Danh Le-Phuoc describes extensions of the stream query language CQELS in two directions: adding RDFS stream reasoning support and adding query constructors known from CEP (in particular a constructor for path queries which support a limited kind of recursion).

The paper entitled "Towards Comparing RDF Stream Processing Semantics" by Minh Dao-Tran, Harald Beck and Thomas Eiter compares the semantics of two query languages for RDF streams, the above mentioned CQELS and C-SPARQL. The comparison is done by a translation into a logical framework (LARS) developed by the authors.

Whereas both papers above deal with light-weight ontology languages as provided by RDFS, the paper "Dealing Efficiently with Ontology-Enhanced Linked Data for Multimedia" by Oliver Gries, Ralf Möller, Anahita Nafissi, Maurice Rosenfeld, Kamil Sokolski, and Sebastian Wandelt incorporates (efficient) reasoning over streams w.r.t. expressive ontologies. The authors describe an approach—developed in the CASAM project—for abductive interpretation of semantically annotated video streams.

Both papers by Ralf Möller, Christian Neuenstadt, and Özgür L. Özçep ("Stream-temporal Querying with Ontologies" and "OBDA for Temporal Querying and Streams") contribute to OBSA, describing the architecture and evaluations os stream engines based based on the query language framework STARQL. The former describes an engine using a transformation via Datalog, whereas the latter describes in detail a transformation algorithm adapted from database theory.

The paper "Towards Temporal Fuzzy Query Answering on Stream-based Data" by Anni-Yasmin Turhan and Erik Zenker can be considered as a contribution to OBSA too. They authors provide a pragmatical approach for answering conjunctive queries extended with temporal operators where the background ontology is formulated in a fuzzy DL-Lite ontology and where the stream of data is a (potentially growing) finite sequenced of data sets (ABoxes).

In addition to the main program, we invited a keynote from the data stream management community. Marco Grawunder will introduce "Odysseus – An Extensible Research Platform

for Streaming", an open source platform that can serve as basis for future works on high-level declarative stream reasoning research.

We thank all authors for their contributions, our reviewers for their detailed and timely reviews and look forward to interesting and fruitful discussions at the workshop.

Workshop Organization

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