Learned Components in Complex Event Processing Systems

Research Proposal

Abstract
Complex Event Processing (CEP) has to process enormous event stream dimensions. In CEP, the ability to react as fast as possible to changing situations provides value. Learned Components have been show to improve DBMS when replacing classical, hand-tuned components. The author would like to present a research proposal that enhances Remote Data Integration as well as Event Query Execution in CEP systems to reduce latency.

Learning Components in DBMS [2]
... improve complex components and reduce manual engineering effort in DBMS by replacing classical DBMS components with ML models.

Workload-driven Learning
- Run queries, collect results, train model
- Expensive and repeated execution of training queries

Data-driven Learning
- Learn data distribution + Fast updating
- Limited to tasks that do not consider workload

Zero-Shot Learning
- Learn models that generalize to new DBs and workloads
- Transferable representation and sufficient training data needed + No updating required

Research Proposal

Problem

Efficiency in CEP matters. The system only has limited time to process. The later we react to an event, the less the value of our action (e.g. credit card fraud detection).

Related Work

[4] showed that rule-based classifiers can be used for detecting rule patterns in CEP systems.
[5] created IL-Miner that discovers patterns from labeled event data by learning abstractions and correlation conditions.
[6] used ML for pattern creation to detect security attacks in IoT.
[7] summarized opportunities for ML in CEP systems.

References

All graphics based on the lectures and modified by the author.