Seminar Data-Aware Processes

Knowledge-Based Systems Group

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Matrix-Channel

Topic Selection

- A candidate seminar outline is provided after this slide
- References are mainly taken from the survey paper "Foundations of data-aware process analysis"
- Additional references are provided

- You can pick one of the provided topics (one bullet of one slide) or pick another reference
- Propose a short-list (2) of topics in the matrix chat
- The assignment of topics will be done via the matrix chat

Potential Seminar Structure

Diego Calvanese, Giuseppe De Giacomo, and Marco Montali. 2013. Foundations of data-aware process analysis: a database theory perspective. In Proceedings of the 32nd ACM SIGMOD-SIGACT-SIGAI symposium on Principles of database systems (PODS '13).

Relational Transducers

- Introduction, modeling, first analysis problems [19, 20]
- Analysis problems: details and complexity [19, 20]
- Verification of Relational Transducers [20, 114]

Artifact-Centric Systems

- Modeling [101]
- Verification [38]
- SMT-based Verification of Data-Aware Processes
  - D. Calvanese, S. Ghilardi, A. Gianola, M. Montali, and A. Rivkin, "SMT-based verification of data-aware processes: a model-theoretic approach," *Math. Struct. Comp. Sci.*, vol. 30, no. 3, pp. 271-313, Mar. 2020, doi: 10.1017/S0960129520000067.

Data-Centric Dynamic Systems

- Introduction, Modeling, First Analysis Problems [24]
- Verification [24, 26]
- Soundness
  - M. Montali and D. Calvanese, "Soundness of data-aware, case-centric processes," *Int J Softw Tools Technol Transfer*, vol. 18, no. 5, pp. 535-558, Oct. 2016, doi: 10.1007/s10009-016-0417-2.

DB-nets

- DB-nets: On the Marriage of Colored Petri Nets and Relational Databases
  - M. Montali and A. Rivkin, "DB-Nets: On the Marriage of Colored Petri Nets and Relational Databases," in *Transactions on Petri Nets and Other Models of Concurrency XII*, M. Koutny, J. Kleijn, and W. Penczek, Eds. Berlin, Heidelberg: Springer, 2017, pp. 91-118.
  - M. Montali and A. Rivkin, "From DB-nets to Coloured Petri Nets with Priorities (Extended Version)," *arXiv:1904.00058 [cs]*, Mar. 2019, Accessed: Jul. 23, 2020. [Online]. Available: http://arxiv.org/abs/1904.00058.

Additional Topics

- Knowledge and Action Bases:
  - Modeling, Analysis [25]
  - Handling Inconsistent Data
    - M. Raghothaman, J. Mendelson, D. Zhao, M. Naik, and B. Scholz, "Provenance-guided synthesis of Datalog programs," *Proc. ACM Program. Lang.*, vol. 4, no. POPL, p. 62:1–62:27, Dec. 2019, doi: 10.1145/3371130.
- Datalog Synthesis
  - M. Raghothaman, J. Mendelson, D. Zhao, M. Naik, and B. Scholz, "Provenance-guided synthesis of Datalog programs," *Proc. ACM Program. Lang.*, vol. 4, no. POPL, p. 62:1–62:27, Dec. 2019, doi: 10.1145/3371130.
- Overview Model Checking [122]