Topics for seminar on process analytics (CS 719 & SM 457, FSS 2021)
Last updated: 25-02-2021

The following topics are suggested for the literature study you shall conduct. The questions after each topic are included to provide a bit more information of what the topic entails. They can serve as inspiration for a research question that you will aim to answer in your literature study, but you are by no means limited to these exemplary questions.

You are also free to propose your own topic by looking at publications at key venues such as the international conferences on Business Process Management (BPM), Advanced Information Systems Engineering (CAiSE), and Process Mining (ICPM), as well as journals such as Information Systems and Decision Support Systems. Topics of interest can relate to research areas such as process analysis, process mining, stream processing, and robotic process automation.

1. **Quality in process discovery.** What makes a discovered process model *good*?
2. **Declarative process discovery.** What are the main challenges in the discovery of declarative constraints?
3. **Organizational process mining.** What insights can be gained about the resources and people involved in the execution of a business process?
4. **Decision mining:** Which techniques exist to recognize how choices in a process are being made?
5. **Stochastic conformance checking.** What does this novel view on process conformance entail?
6. **Anomaly detection in process mining.** What makes process behavior an anomaly and how can it be detected?
7. **Data quality issues in process mining.** Which quality issues are present in realistic event logs, how do they impact process mining, and what solutions tackle them?
8. **Stream-based process mining.** What are the challenges and techniques when considering event data in the form of streams rather than event logs?
9. **Encoding process behavior.** In what ways can process behavior be encoded in order to support machine learning-based approaches for, e.g., prediction and clustering?
10. **Privacy in process mining.** How do existing works aim to ensure that process mining does not violate the privacy of individuals?
11. **Trace clustering.** Which approaches exist that group together similar traces and for what purposes?
12. **Process mining in healthcare.** How is process mining employed to analyze healthcare processes and what are the particular challenges that need to be considered here?
13. **Text-to-model transformation.** Which techniques exist to extract process information from textual descriptions or turn texts into process models?

14. **Natural language processing and process analysis.** How is natural language processing (NLP) employed in the context of business process analysis?

15. **Complex Event Processing and process analysis.** How can concepts from Complex Event Processing (CEP) be employed in the context of business process analysis?

16. **Machine learning and process analysis.** For what purposes is machine learning employed in the context of business process analysis?

17. **Process model matching.** How are relations recognized between different business processes?

18. **Multi-level process mining.** Which approaches exist for discovering and analyzing processes on different levels of granularity, e.g., on the level of activities vs. subprocesses.

19. **Event abstraction.** Which techniques exist to abstract from low-level event data to a higher-level representation?

20. **Event log preprocessing.** Which techniques can be used to preprocess the contents of event logs and for which purposes?

21. **Business process simulation.** What role does simulation play in the context of business process analysis? What are the existing techniques, capabilities, and limitations?