5 Overview of Demonstrators

5.1 A Toolchain for Enabling Process Mining from IoT Data

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Process Mining (PM) as a subdiscipline of Business Process Management (BPM) focuses on the discovery, analysis and improvement of business processes based on the digital traces (event logs) of the corresponding process executions monitored and managed by a BPM system [1]. While these systems usually exist within enterprises to manage various kinds of digital commercial and organizational processes, the availability of a BPM system in Internet of Things (IoT) environments or cyber-physical systems (CPS) cannot always be assumed. Thus, the large body of process mining methods and techniques developed by the PM community is not applicable “as-is” to this kind of high-level processes—although these processes clearly exist in CPS/IoT and would benefit from a PM-based analysis [2]. On the other hand, data produced by the sensors, devices and machines of an IoT environment is usually not process-aware and too fine-grained (low-level) to be a suitable basis for process mining.

This demo presents a toolchain for enabling process mining from IoT data of a smart factory [3]. Using recorded and replayed event streams of raw IoT data from a smart factory, we show how to use stream processing/complex event processing (CEP) as core technology to aggregate, abstract and correlate these low-level event streams to higher level (business) process events [4]. These process events are transformed into the XES standard to enable 1) offline process mining from a persisted event log, and 2) online process mining on process event streams [5]. With standard process mining tools and techniques, the underlying processes and statistics can then be discovered, conformance regarding a normative process model can be checked, and processes can be enhanced. These techniques may also be suitable for visualizing and analyzing interactions and collaboration (e.g., as social networks) among multiple agents in autonomous systems—not necessarily relying on the presence if a BPM system to manage the process executions.

References