Perspectives on semantic mining and business process monitoring

The paper presents a study of Semantic Business Process Management (SBPM), which is an extension of Business Process Management (BPM) enriched by Semantic Web and Semantic Web Services (SWS) technologies. The aim of SBPM is to automate and improve the BPM lifecycle through in-depth conceptualization, supporting the modeling, composition, execution, and analysis of business processes. The main opportunity offered by such systems is the link between the events generated (necessary for analysis) and the actual concepts they represent. This link is established by annotating elements in SBPM systems with concepts in ontologies. Two challenges are raised by this opportunity: firstly, how to use this semantic perspective in process exploration and monitoring tools. Secondly, how to exploit semantic information and thus contribute to the migration of current information systems to BPM environments.

It is explained that business process analysis benefits from the use of semantic information to significantly improve analysis techniques, such as control flow paths, bottleneck detection and performance evaluation. The paper highlights the importance of ontologies in process mining, enabling conceptual-level analysis of annotated event logs, process models and reasoners. These techniques can be enhanced by semantic information for process discovery, conformance checking and model extension.

In addition, a five-phase approach is proposed for monitoring semantic business processes: Observation: This phase involves observing business processes as they run. It involves collecting business process data and events for later analysis. Evaluation: After observation, evaluation is carried out to analyze the data collected. This phase assesses the performance and efficiency of business processes according to predefined criteria. Detection: The detection phase is used to identify potential problems or deviations from expected business process behavior. This may include the detection of bottlenecks, errors, or other anomalies. Diagnosis: Once problems have been detected, the diagnosis phase seeks to understand the underlying causes and nature of the problems identified in the detection phase. Finally, resolution: The last phase is resolution, where solutions are developed and implemented to resolve the problems diagnosed. This may involve adjusting or re-engineering business processes to improve their performance.
These phases use ontologies and problem-solving methods to support effective monitoring and improve the understanding and management of semantic business processes.

The paper also discusses the challenges of using the semantic perspective in the development of process mining and monitoring tools. It discusses how events generated by SBPM systems can be annotated with concepts in ontologies to link events to the concepts they represent.
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