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ABSTRACT

In order to support effective and efficient business process management, it is imperative that the process management lifecycle be integrated with risk management knowledge. In this regard, this article presents a knowledge-based approach to integrating risk management with business process management. The adopted approach is based on conversational case-based reasoning (CCBR) with the objective to provide support in developing an appropriate risk management strategy for an ongoing workflow instance. This approach builds on the notion of integrating risks within business process models. A prototype is currently under development, which will assess the feasibility of this approach. We then intend to validate this approach using case studies.

Keywords (Required)

Business Process Management, Risk Management, Conversational Case-based Reasoning

INTRODUCTION

Process-aware information systems, such as Business Process Management Systems (BPMS), are becoming increasingly commonplace with the need to manage business operations crossing functional and even organizational boundaries. The emphasis in such systems is to explicate the processes embedded in work practices in the form of process models and provide mechanisms to support their design, execution, and monitoring. As with any management technique, business process management (BPM) should also involve risk management steps across its different phases of process discovery, specification, implementation, execution, monitoring, and controlling (zur Muehlen et al. 2006). Also, in order to reduce the efforts involved in managing risks, it is important to utilize knowledge regarding risk realization occurrences and risk management strategies previously adopted, in association with the situation at hand. In this regard, this article presents a knowledge-based approach to integrating risk management with business process management. The adopted approach is based on conversational case-based reasoning (CCBR) with the objective to provide support in developing an appropriate risk management strategy for an ongoing workflow instance. This approach builds on the notion of integrating risks within business process models (zur Muehlen et al. 2005).

BACKGROUND

With the need to manage complex business processes in increasingly competitive and dynamic environments, BPM has gained attention by researchers and practitioners for more than a decade. Definitions abound. For example, Weske, van der Aalst, and Verbeek (2004) define BPM as: "supporting business processes using methods, techniques, and software to design, enact, control, and analyze operational processes involving humans, organizations, applications, documents, and other sources of information". An iterative lifecycle emphasizing continuous improvement of process performance is implicit in the notion of BPM (Zairi et al. 1995).

Execution of organizational processes is subject to numerous risks that can negatively impact process performance and consequently the goals of continuous improvement. Risks are essentially potential problems or events that may manifest themselves with certain probability and cause unwanted consequences (Charette 1990). Extensive literature is available in management science that discusses various aspects of risk management (March et al. 1987). Generally, risks are characterized by properties such as impact, probability, time frame, and relationship with other risks (Gemmer 1997). Depending on these characteristics, risks are managed with one or more strategies including mitigation, avoidance, delegation, and acceptance (Adler et al. 1999; Peltier 2004; zur Muehlen et al. 2006).

Despite the importance of risk management in general, and in association with BPM in particular, proposed research approaches in integrating risk management with BPM have been scare. Recently, zur Muehlen et al. (2006; 2005) have proposed an approach to integrate risks at the process modeling stage by augmenting process models with risks associated with various activities therein. However, the authors do not discuss how these augmented process models can be integrated in the business process management at the execution and monitoring stages. In this article, we build upon this work to provide such an application using a knowledge-based approach.

PROPOSED APPROACH

Given augmented process models with risks associated with various activities, the question becomes that of leveraging it to manage ongoing instances of business processes. This can take the form of employing different risk management strategies that are appropriate to the current process execution instance, in order to either proactively reduce the possibility of realization of a particular risk or reactively taking suitable measures to respond to a realized risk event. In order to provide an appropriate risk management strategy corresponding to any given situation, knowledge regarding similar instances and prior employed risk management strategies may be very useful. Given this potential of risk management support, a knowledge-based approach is deemed suitable.

A knowledge base, used in the context of this paper, is a system that retains information collected from expert knowledge (as historical cases or theoretical events or rules) (Holger 1997). It is proposed to consist of two main components. The first component would consist of encoded knowledge regarding potential risk strategies. The other component would consist of a case base of prior process instances with their associated risk management information. Case-based reasoning on this knowledge base may be performed in order to leverage the generic risk management knowledge regarding a process and as well as adapting previous successful solutions to handle similar situations at hand (Kolodner 1993; Leake 1996). Conversational case-based reasoning (CCBR) approach is a specific kind of CBR approach that is more suited for the current research problem because of its interactive nature. Essentially, a CCBR system guides users through a sequence of question-answering in a case retrieval context through a mixed-initiative dialogue. A mixed initiative dialogue is defined as follows: "At any one time, one agent might have the initiative – the interaction – while the other works to assist it, contributing to the interactions as required. At other times, the roles are reversed…" (Allen 1999). Instead of requiring a complete a priori problem specification for case retrieval as in the case of traditional CBR, a CCBR assists the user in finding relevant cases by presenting a set of questions to characterize a situation. CCBR approaches have been proposed in the context of BPM, primarily for adapting process models to deviations from process models (Weber et al. 2004) and to manage the evolution of process models (Weber et al. 2005).

A prototype of the above mentioned approach is currently under development. This prototype will be used to assess the feasibility of this approach. We further intend to validate this approach using case studies.

CONCLUSIONS

In this article, we have proposed an approach that suggests risk management to be integrated within BPM. The approach is based on leveraging information available in the literature related to risk management and various strategies, as well as utilizing information about successful risk management associated with prior similar instances. A prototype to validate this approach is currently under development.

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