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EDITORIAL

Special Issue on: Knowledge-intensive Business Processes

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1 Introduction

We welcome you to this special issue dedicated to extended and revised versions of the papers presented at the 1st International Workshop on Knowledge-intensive Business Processes (KIBP), co-located with the 13th International Conference on Principles of Knowledge Representation and Reasoning (KR 2012) and held in Rome, Italy on June 15, 2012. The special issue was opened to other submissions in the topic of the workshop as well.

Nowadays, workflow management systems (WfMSs) and process management systems (PMSs) are widely used in all human activities, ranging from classical ones (management of supply chain, postal tracking delivery, etc.) to very dynamic ones (healthcare, emergency management, etc.). Every aspect of a business process involves a certain amount of knowledge that can depend on both the complexity of the domain of interest and the modeling language used to represent the process itself. Some processes behave in a way that is well understood, predictable and repeatable: the tasks are discrete and the control flow is straightforward. Recent discussions indicate the increasing demand for knowledge-intensive processes. A knowledge-intensive process is one in which the people performing the process are involved in a fair degree of uncertainty. This is due to the high number of tasks to be represented and to their unpredictable nature, or to the difficulty in modeling the whole knowledge of the domain at design time. In realistic environments, for example, actors lack important knowledge at execution time or this knowledge can become obsolete during the process' execution. Indeed, even if each actor (at some point) has perfect knowledge of the world, it could not be certain of its beliefs at later time points, since tasks by other actors may change the world without those changes being perceived. Typically, a knowledge-intensive process cannot be modeled to sufficient detail by classical static process models and workflows. There is still a lack of maturity in some respect, i.e., a lack of a semantic associated with the models or an easy way to reason about such semantic.

The main focus of the workshop was to discuss how the use of techniques that came from different fields, such as artificial intelligence (AI), knowledge representation (KR), business process management (BPM), and service-oriented computing (SOC), can be used jointly for improving the modeling and the enactment phase of a knowledge-intensive process. The purpose is to devise promising approaches that can still achieve the goals of understanding, visibility, and control of these emergent type of processes. The workshop included two keynote talks and a panel, plus six papers accepted out of several submissions.

Notably, KIBP had a 2nd edition held at Kauai, Hawaii (USA), on December 16, 2013, in conjunction with the 6th IEEE International Conference on Service-Oriented Computing and Applications (SOCA 2013).

2 Content

Out of the papers accepted at the workshop and the new ones received for this special issue, we finally selected three papers.

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In the first one entitled *Knowledge-intensive Processes: Characteristics, Requirements and Analysis of Contemporary Approaches*, Claudio Di Ciccio, Andrea Marrella, and Alessandro Russo provide a precise characterization of KiPs, from a scientific literature analysis and three real-world domains and application scenarios.

In the paper entitled *Semantic Enrichment of GSM-Based Artifact-Centric Models*, Riccardo De Masellis, Domenico Lembo, Marco Montali, and Dmitry Solomakhin provide a comprehensive framework for semantic GSM artifacts, discuss in detail its properties, and present possible architectures the framework is able to represent. The distinguishing aspect of their framework is that it allows expressing both the data and the lifecycle schema of GSM artifacts in terms of an ontology.

Finally, in the last paper *Consistent Abstraction of Business Processes Based on Constraints*, Shamila Mafazi, Georg Grossmann, Wolfgang Mayer, Michael Schrefl, and Markus Stumptner propose a goal-focused and semantic-based approach to generate purposeful abstraction of business processes.

We hope the readers will enjoy this special issue as much as we enjoyed assembling it,

Brisbane (Australia), Rome (Italy) and Melbourne (Australia), Spring 2014, Arthur ter Hofstede, Massimo Mecella, and Sebastian Sardina.

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