A Notation for the Task-Oriented Modeling of Business Processes

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ABSTRACT

Current notations for business processes are mainly technological tools and lack strong links with the ontological items, i.e., the tasks and the business entities that information systems consist of. In particular, the information flow is missing from process models and human decisions are not adequately represented. In order to overcome those drawbacks, this paper proposes a notation, called TOMP (Task-Oriented Modeling of Business Processes), which considers tasks and decisions as first-class constructs in process models and provides the explicit representation of the information flow in connection with an information model. It also illustrates the structure of to-do lists, which are the major interface between the participants and their tasks.

Keywords: Business Processes, Human Decisions, Human Tasks, Information Systems, To-Do Lists

INTRODUCTION

Processes aimed at repetitive, standardized work received great attention in recent research and efficient solutions based on the notion of orchestration have been proposed (Weske, 2007). Orchestration, i.e., the distribution of work among the various participants involved, is carried out by means of the business process (BP) technology, which encompasses a graphical notation and a run-time system called process engine. BPMN (Business Process Model and Notation) is the standard notation (OMG, 2011) and the resulting models (referred to as BP models) are basically flow charts of process actions. Process actions may be divided in two major categories, control-flow actions and orchestrated actions. The former are related to the handling of the execution paths, if there are more than one, and are directly performed by the process engine; the latter result in the execution of external activities, i.e., activities whose performance is not in charge of the process engine. External activities fall into two categories: human tasks, which are performed by participants with the help of graphical interfaces, and automated tasks, which are implemented by services.

While information systems are meant to enable human participants and/or machines to perform work (processes and activities) using information (Alter, 2008), BP models are mainly technological tools and lack strong links with the ontological items, i.e., the tasks, intended as the units of work, and the business entities. This lack of integration is the source of two major drawbacks.

The first drawback is that the actual data flow is not represented in BP models. In fact, while the data flow feeding the tasks is made up
of business entities, the one feeding the process actions is based on process variables, and what is more, there is no automatic mapping between business entities and process variables.

The second drawback is that human decisions are not adequately expressed in BP models and this is due to their orchestration-oriented nature. The process engine assigns work to participants through to-do lists. Participants, by clicking on the entries of their to-do lists, can perform the corresponding tasks, and, when a task has been completed, a notification is sent back to the process engine, which goes on with the next action in the BP model. BP models contain sufficient information for the engine to be able to decide which task to activate next. Although participants may exert influence on such decisions, they do so within the tasks assigned to them.

A human decision is needed when a participant may react to a given request in several ways, each of them implying a different course of action. For example, upon receiving a request for quote from a customer, an account manager could react in three ways: ignoring the request, providing a quote, or starting a reselling initiative whose first step is entering requests for quote for a number of suppliers. Since human decisions are not represented in BP models, the above situation may be handled as follows. The three options are included in one task, which can be assigned through a to-do list; this task is represented in the BP model by means of an orchestrated action followed by a data-driven decision resulting in three branches, one for each course of action. When the task is completed, its output information enables the process engine to select the proper branch. However, this solution is not satisfactory as the participants are not clearly shown the choices they are responsible for.

A process description should be a road map that can be observed from different viewpoints; it must be suitable for being interpreted by a process engine, nevertheless it must be meaningful to the participants involved. Therefore, this paper emphasizes the need of placing tasks, human decisions and the data flow in the foreground and presents a notation called Task-Oriented Modeling of business Processes (TOMP) aimed at fulfilling this purpose.

This paper is organized as follows. First it presents background information on the various issues involved and illustrates the basic features of TOMP; then it analyzes the modeling of human decisions and the handling of assignments in to-do lists, and finally presents the conclusion.

BACKGROUND

TOMP is intended for knowledge-intensive processes (Marjanovic & Freeze, 2011), i.e., processes calling for some degree of creativity and adaptation to specific circumstances (Alvesson, 2004). What distinguishes knowledge-intensive processes from routines is that the participants are not considered as mere resources needed to carry out tasks which are not automatable; on the contrary, their involvement is required at a higher level where they may take decisions which affect the control flow.

Enhancing flexibility in the control flow is an important issue and several approaches have been proposed (Nurcan, 2008). BPMN provides ad hoc sub-processes, whose tasks may be carried out in any number and order as decided by their performers. If this solution is deemed too flexible, the introduction of constraints is needed. With Declare (van der Aalst, Pesic, & Schonenberg, 2009), any task of an ad hoc sub-process may be performed as long as the mandatory constraints are not violated; with the Business Process Constraint Network approach (Lu, Sadiq, & Governatori, 2009), process variants may be built at run-time.

The major difference between TOMP and those approaches is the presence of explicit decision points which clearly show the different courses of action involved.

The complementary aspects of business processes and information systems are emphasized by the notion of Process-Aware Information System (Dumas, van der Aalst, & ter Hofstede, 2005). A process is meant to take care of a specific entity (e.g., an insur-
A Secure Knowledge Resource Management Theory for IT/IS Outsourcing: The Service Provider Perspective
Kevin Duncan and Evan Duggan (2014). International Journal of Human Capital and Information Technology Professionals (pp. 55-69).
www.igi-global.com/article/a-secure-knowledge-resource-management-theory-for-itis-outsourcing/105574?camid=4v1a