Abstract

This poster presents a proposal for the seamless integration of Intelligent Planning & Scheduling techniques into the BPM life-cycle. The integration is intended to leverage current BPM techniques by allowing them to manage Smart Processes as adaptive cases based on Intelligent Planning technologies. This poster presents a proposal that leverages the current BPM life-cycle in order to support smart processes through the development of Knowledge Engineering and intelligent Planning & Scheduling techniques, focused on a two-fold transformation process.

Aims

Smart Processes may be viewed as business cases that demand some kind of intelligent management since, on the one hand they are very difficult to foresee, as they respond to unstructured sets of procedures which reside either in experts mind or in documents, making difficult to devise a priori which tasks to execute. On the other hand, they need to be adaptively generated, since they are unpredictable and they strongly depend on the context of the organization and do not respond to a fixed pattern. Finally, they have to be flexibly and interactively executed by humans since they are subject to change.

So, new techniques must be developed at both steps, process modeling / generation and process execution, in order to fully cover the needs of knowledge workers on Smart Processes. In this sense, we present in this work a proposal that leverages the current BPM life-cycle in order to support smart processes through the development of Knowledge Engineering and Intelligent Planning & Scheduling techniques, focused on a two-fold transformation process.

Jabbah in action

Transformation from process models to planning domains.

Given an XPDL process model as input (which can be clearly seen as a graph), JABBAB proceeds by identifying common workflow patterns (that is, sequential, parallel, subprocess and conditional structures) as process blocks in the process model, and then generate a tree-like structure, much similar to HTN planning domains.

i) Firstly, the XPDL document is parsed, transforming it into an intermediate data structure and graph model that can be easily managed throughout the next stages.

ii) Then, the different blocks of workflow patterns (serial, parallel, subprocess and conditional blocks) are detected and a tree model is built.

iii) Finally, we carry out the planning domain generation, where the tree model is analyzed, trying to identify workflow patterns found in the graph, and writing the domain code that corresponds to that tree fragment.

Transformation from plans to executable process models.

BPM engines are commonly endowed with the necessary machinery in order to interactively execute every task in the process (allowing to start, finish, suspend or abort it) by following an execution model based on state-based automata.

ii) Having the planning domain and problem generated, the IACTIVE intelligent planner is able to interpret them, obtaining a corresponding plan instance that respects the constraints imposed in the process model. This instance, can be shown as a Gantt diagram.

Remarks

HTN Planning

Compound tasks, decomposition methods and primitive actions represented in an HTN (Hierarchical Task Network) planning domain mainly encode the procedures, decisions and actions that are represented in the original BPM model. More concretely, the knowledge representation language, as well as the IACTIVE planner used, are also capable of managing different workflow patterns present in any BPM process model, adhering to represent control structures that define both, the execution order (sequential, parallel, split or join) and the control flow logic of processes (conditional and iterative ones).

Case studies

To date, JABBAB has been tested in two case studies drawn from different domains: e-learning and e-health. The first model represents the whole process to develop and deploy a specific course within the e-learning center at the University of Granada. So, having an incoming course request, as well as some available workers with different capabilities each, we want to assign an activity to every worker, so that a plan over time can be obtained, providing the e-learning managers information that helps to do decision-making upon the course request. The second one represents a general care-process starting from a patient admitted into the hospital and finishing when the health insurance billing for this patient takes place. In this second process, we can better observe how process planning is carried out, given different input parameters which can vary in real situations (e.g. is it an emergency? does it need an urgent operation?).

More info

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