


ER2016 Submission 7

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Submission 7	
Title	Annotating and Mining for Effects of Processes
Paper:	 (Apr 18, 03:24 GMT) (previous versions)
Author keywords	Business Process Modeling Semantic Annotation Effects Belief bases Annotated Processes Effect Logs Effect mining
Abstract	Business processes play an important role in modern enterprises by providing vital clues offered by the business, and thus impacting customer satisfaction. A key challenge in devising solutions to a range of problems associated with business process management lies in identifying process semantics. The current industry standard business process modeling notation, BPMN, does not provide much light on of semantic description of the effects of a process (beyond the nomenclature of tasks and the decision conditions associated with gateways). In this work we provide a novel explicit annotation of process models by way of accumulating effects of individual tasks specified by analysts and computing the accumulated effect up to the point of execution of the process model in an automated manner. This technique permits the analyst to specify immediate effect annotations in a practitioner-accessible simple propositional logic formulas and generates a sequence of tasks along with cumulative effects, called effect logs. Further we propose an effect mining problem, that is, given an effect log discover the process model with original effect annotations of individual tasks which is as close as the original annotated process model.
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Reviews

Review 1	
Review	
Review	<p>The paper proposes semantic annotation of process models depicting the immediate effects of activities, suggesting this can support the analysis of cumulative effects as well as backwards analysis of causes. It then presents an algorithm for "effect mining" – mining an annotated process model from logs that include the effect information.</p> <p>The main strength of the paper is the semantic annotation, which is formally defined using logics / AI-related formalism, making it a sound basis for reasoning and further analysis. Yet, the paper has several weaknesses.</p> <p>Motivation: The paper does not describe a real problem to be solved – neither by the semantic annotation nor by the "effect mining". While some applications are discussed, no real business need is indicated, and hence the motivation seems weak.</p> <p>The notion of effect: Right from the beginning, the paper relates to "effects" of tasks or activities, without defining or explaining this notion. Later on, some hints are given in the formal part, but I think that such a central notion, which is not part of standard terminology, should be presented better. As I understand, an effect is some kind of fact which materializes when a task is performed. But some further elaboration of what such fact can be (besides the very simple running example), what information it can hold, how it should be related to data or physical objects manipulated by the process – all this is missing.</p> <p>Limitations of the approach: As a general idea, the approach does not rely on a specific process modeling notation or process mining algorithm. The specifics of the presented approach relate to a very partial variant of BPMN (modeling notation) and the alpha algorithm (mining algorithm). These specific choices can be considered as the easiest choices and also very limited ones. The BPMN variant has very limited expressiveness. In fact, while using BPMN notation, the expressiveness is similar to that of Workflow nets – meaning no control flow structures besides sequence, AND, and XOR (not even OR), no event types besides initiating and ending the process, no pools and lanes, etc. The Alpha algorithm is the most basic process discovery algorithm, whose limitations have been extensively discussed (inability to address loops, non-free-choice structures, limited ability to address variability and infrequent paths). The proposed algorithm is basically an Alpha algorithm which uses effects instead of activity names, and all the known limitations apply. The paper should discuss the limitations imposed by the process model and the mining algorithm, and can emphasize that the basic idea does not depend on these choices and can apply to more expressive models and more advanced discovery algorithms.</p> <p>Related work: Not sufficiently discussed in the context of process mining – specifically – compare the approach with data-aware process mining and with decision mining.</p> <p>Minor comments: – Section 2, syntax of business process (A BPM process is a pair) – relates to a process model, not to a process. – Section 5, "given an effect log..." – should first specify what such a log includes or look like. Section 5, p. 10 at the bottom – the definitions of the annotated tasks and their order relation – there seems to be some confusion with the use of symbols, as there are different expressions implying the same using an if and only if relation.</p>

Review 2	
Review	
Review	<p>The paper illustrates a notation for annotating processes and computing effect traces and discusses the effect mining problem.</p> <p>The provided notation is very dense and difficult to read for a conference paper.</p> <p>In some cases, such as for instance in the initial process definitions, the presentation could be simplified referring to the literature. This very dense notation is illustrated with a running example, but the reader is not supported in understanding the relation of the example with the formalism.</p> <p>Even if the notation seems to be fully explained, there are some doubts arising from the given examples.</p> <p>The meaning of negation in the effect traces should be better explained. Is it used to delete a previous effect? it would seem so for the PaymentExpected accumulated traces in Table 2 (for AcceptPayment). However, later in the paper, in Table 3 when mining is discussed, the negated paymentExpected appears in the traces until the end. Also in this case the traces should be accumulated traces, so this annotation should have disappeared. Why not?</p> <p>In the last part of Sect. 3, the second implication in T seems to be contradicted by the effects in the second trace of Table 2 for RejectOrder. Also in this case the semantics of negation in the computation of effects should be clarified.</p> <p>The discussion concerning the relations between effect traces mining and annotation should be provided. The derivation of annotations from the mining activity is only mentioned as future work, so the effect mining seems to be very close to the process mining techniques presented in the literature. In the first part of the paper, instead, the authors state that they are considering the inverse problem, given an effect log the goal is to derived the effects of tasks.</p>

Review 3	
Review	
Review	<p>The paper aims at providing a method to explicitly annotate the process models using the cumulative effect of individual tasks.</p> <p>The paper is not easy to read and it has some grammatical mistakes. The paper provides a logic based method for annotating the processes and analyzing the cumulative effect of tasks in the whole process. However, the paper is very technical with only one example. It would be better if the paper provides more examples and show how the method works in practice.</p> <p>In addition, there is no evaluation or technical proof of the method. That is why it is not easy to justify if the method really works in the real cases and if it is sound and correct.</p> <p>The method at its current state and without a tool support does not seem to be very practical. It would be great if the paper clarifies the application of the method in practice and discuss if there is or there will be a tool support for the method.</p>