Viewpoint Model Manipulating Inconsistencies Management

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Abstract

In this paper, each inconsistency management process activities was addressed. In addition, a guideline to deal with inconsistency by viewpoints method are introduced. At the end of the paper you should have clear idea to support inconsistency management in future research and having good knowledge of inconsistency management process activities and research issues. Moreover, it gives the researcher ability to design new framework by using powerful concept in inconsistency management and viewpoint techniques. The paper is organized as follows: an introduction is presented in section one, section two contains process viewpoint, while section three includes the proposed model and conclusions are in section four.

Keywords:

viewpoint, inconsistency, stakeholders, viewpoint process and inc onsistency resolving.

1. Introduction

Organizations around the world put a huge effort to enhance their business processes to improve productivity. Software development process is one class of business processes that has received big attentions due to the importance of software engineering. Given that, the ever-increasing advancement in computing, the size and complexity of today's applications become larger so developing cost-effective software systems become a difficult task. Moreover, software engineers generally have to deal with various kinds of inconsistencies.

1.1 Process inconsistency

Inconsistency is a syndrome of each big project. Therefore, it has been dealt with different ways. One might see the advantages of it, other focuses on its disadvantages. Thus, the problem was shifted from maintaining inconsistency to managing it.

1.2 Inconsistency management basic definitions

Tending to have any process as an ideal one, different actors tried to reach such a goal in different ways. If one looks at inconsistency as a logical contradiction from organizational and social point of view, then the consequences will be more difficult.

Manuscript received February 5, 2023
Manuscript revised February 20, 2023
https://doi.org/10.22937/IJCSNS.2023.23.2.10

Inconsistent models might have negative and positive effects on the software development life cycle. On the negative side, inconsistencies can delay and increase the cost of system development and do not guarantee some properties of the system, such as safety and reliability. In addition, it may generate difficulties on system maintenance in some cases as well as it may lead to misunderstanding and errors[1]. On the positive side, inconsistencies highlight conflicts between the views and goals of stakeholders and can facilitate identification of some aspects to decide whether the system needs further analysis. Not only this, but also inconsistencies help to show the specification of alternatives regarding development of the system, and support elicitation of information about it. Moreover, inconsistencies are desirable when alternative requirements and alternative solutions exist for the same problem. Alternative solutions are emerged due to continuously changing requirements. Thus, certain new projects have focused on modeling and handling inconsistencies.

1.3 Inconsistency management process activities

Set of activities that are used in most inconsistency management frameworks were addressed in [2]. The most important activities that are used in inconsistency management process are:

Overlaps detection: The detection of overlap in software models is expressed in different levels of abstraction, and different terminologies. It needs to develop specialized methods or algorithms for software models that are expressed in specific modeling languages. Since the Stakeholders need representation for activity to do the exceptions. The identification of specific sets of overlap relations that are effected by human inspection is an open research issue. As any organization needs to reduce the cost and complexity of overlap identification, therefore, different overlap identification techniques are required.

Detection of inconsistencies: it must be efficient and scalable especially in real projects that deal with large number of complex software models and many consistency rules. None of the current detection approaches including

theorem proving, model checking, and special forms of automated analysis are efficient and scalable. It is necessary to find possible ways trying to reduce the original models into versions that could be safely used to reason about specific consistency rules. Reduced model should be equivalent to the original one. Bearing in mind that the parts of the models that have been changed and the rules that refer directly or indirectly to these parts might avoid unnecessary checks.

Diagnosis of inconsistencies: Identification of resources is computationally expensive, therefore; reducing it is necessary. In addition, schemes of reasoning regarding different formulas and validity still to be investigated per finding concrete guidelines. However, supporting stakeholders is important to establish the cause of inconsistency.

Handling inconsistencies is a central activity in inconsistency management; this activity is concerned with actions, benefit, risks and execution. Actors develop their own ways of evaluating or measuring the factors of cost, risk and benefit of applying an action depending on their experience. Hence, it is necessary to identify the optimal time to perform various actions associated with different types of inconsistencies. Pseudo code may be used to specify actions' semantics to ease efficient generation of actions.

Tracking: This activity is concerned with recording of the reasoning for detection of an inconsistency, the source of causes, the handling actions and the arguments in the decision that is done to select or reject. Given this, more approaches for managing inconsistencies that support tracking of the whole process is needed.

Specification and application of an inconsistency management policy should focus on alternative schemes. Furthermore, construction of efficient process monitoring mechanisms by deep understanding of the roles of participants, procedures, phases and milestones. Finally, measuring inconsistency, analyzing risk and impact can be done. Inconsistency's descriptions, prioritizing and assessing the progress is a crucial issue.

2. Process viewpoints

Viewpoints have appeared since different people, in the same process, think and describe it in completely different ways. Also, there is no single notation that all process participants and stakeholders are familiar with. Moreover, people want to describe 'their' process in their own way. For example, requirement specifications provided by multiple stakeholders and involvement of multiple persons in the same project. Thus, the development of such systems necessarily involves many people each with their own perspective on the system. They are limited to their skills, responsibilities, knowledge and expertise. Different teams of designers' work in different locations, and the sources of information are used in modeling requirements may be dispersed at different sites. In addition, a fully decentralized environment often has difficulties of maintaining consistency between large collections of agents as in [1].

2.1 Process viewpoints definition

Viewpoints were defined as a technique for organizing, structuring and describing a system and a possible suggested framework that should allow different types of viewpoint from different sources, as end-user, stakeholder or domain. Achieving single generic framework besides providing a mechanism that organizes requirements engineering process to achieve business goals and constraints. Process viewpoints are an approach to inconsistency management. This supports the activities of a process where the viewpoints encapsulate process information that is elicited from different sources. The approach allows the process to be described in notations that refer to the sources of the viewpoint information in some way. Some methods do not introduce desired inconsistencies model and therefore, these methods aim to kill inconsistencies whenever they are detected [3].

2.2 Stages of Process viewpoints

2.2.1 Initial process viewpoint

The initial process viewpoint model was based on the requirements viewpoint model as simple example of process viewpoints with 5 components as follows:

PV = < name, concerns, focus, sources, process description > that is described in reference [1]
There are many stages for process viewpoints as following:

A. Viewpoint naming: The name of the process viewpoint is a meaningful identifier that should reflect the process perspective.
B. Concerns and concern decomposition: the goal to introduce the notion of viewpoint concerns that reflects the organizational goals, needs, priorities, constraints, etc. A viewpoint is an encapsulated process description under related concern.

• *Understanding concerns*: These reflect the organization's objectives for process understanding.

• *Improvement concerns*: These reflect the objectives of the organization as far as process improvement is concerned.

• *Constraint concerns:* These are organizational constraints placed on the process or on the process improvement activity. Examples of concerns that are constraints might be: Budget, Existing tools and standards or Training.

2.2.3. Viewpoint focus

Focus description should normally identify the sub-processes that are of interest to that viewpoint. It may also include a statement of the organizational functions, viewpoint sources or type of model that will be presented.

2.2.4 Viewpoint sources

The most important sources of process information are usually the process's participants, management in the organization and organizational process charts, responsibility charts, etc. The list of sources connected with a viewpoint is useful because it provides an explicit trace to where the process information was derived from.

2.2.5 Process descriptions

Process description understandability and flexibility to be accepted in common by describing processes using stable and variable parts.

2.3 Using process viewpoints in process analysis

The process viewpoint model that is intended to help elicit and analyze information about processes .The stages for using process viewpoints in process analysis is four main phases that should include concern definition, possible viewpoints, data collection and improvement suggestions.

2.3.1 Viewpoint and source identification

Viewpoints and their sources are identified in an iterative way so that these activities are interleaved. The sub-activities involved are identifying viewpoints, re-identifying viewpoints and identifying viewpoints sources.

2.3.2 Viewpoint data collection and process description

This is stage of the process of improvement process is concerned with understanding, analyzing and describing the current process that is used. The analyst then refines the questions and repeats this consultation and refinement process until all viewpoints have been covered.

2.3.3 Inconsistency analysis

During the inconsistency analysis, process descriptions to each viewpoint are compared and reviewed by a team includes process participants and organizational process improvement group to classify process inconsistencies. Thus, tolerable, accidental improvable inconsistencies and constraints are classified. Best practices help in process improvement to achieve organizational goals [5].

2.4 viewpoints Issues

The problem is how to guide and organize development since there are multiple perspectives problem. Relating two viewpoints to each other needs to be clarified and defined. Dataflow diagrams as a notation might be a solution. Viewpoint owner has to invoke a consistency rule, if needs, to check whether the relationship expressed by the rule holds or not. Checking is always performed from the context of one of the Viewpoints. There is no central control given preconditions and post-conditions for various actions.

When a consistency rule is applied, both Viewpoints must cooperate to perform the check, and both Viewpoints need to know the result. An inter-Viewpoint communication protocol specifies the checking process. By applying an inter-Viewpoint rule, we can determine whether a relationship holds, or whether there is an inconsistency between two Viewpoints in addition. However, identifying the specification must be done locally by each Viewpoint [4].

The resolution process is concerned with establishing a relationship between two Viewpoints. Resolution only becomes necessary if a consistency check failed, and the owner of the source Viewpoint wishes to correct this problem. In many cases, resolution will not be necessary after the failure of a rule, because the inconsistency might be tolerated. If a given specification is inconsistent, while

actions on that specification may be mistaken or confliction, then, we can test a specification for the existence of inconsistency, but we cannot test for conflicts or mistakes [6].

As a result of inconsistency resolution of viewpoints; stakeholders have to re-establish the relationships contained in the failed rule or rules. The Viewpoint owners may take various actions during the resolution process. Consistency rules and resolution actions associated will be generated from four main sources:

- the rationale and operation of the method
- examples and case studies
- experiences of method users where their expertise may be encoded as guidance offered to tool
- general purpose conflict exploration tools [7]

As mentioned above, one might tolerate certain inconsistencies. This means there is no need to repair them immediately. An important consideration is resolving an inconsistency does not ensure it has been resolved. Tolerance of inconsistencies offers flexibility in terms of development strategy applied. However, if large number of rules has been broken, it may be hard to find suitable solution actions.

3. Proposed approach

Reducing complexity of dealing with viewpoints allegation this paper introduces a comprehensive model that might lead to faster and more precise treatment. First, viewpoints as services are a structuring strategy for software definition as well as for software operation. On the one hand, viewpoints as Specifications comparison is rather important, in order to advance the possibility of using more semantics and being less dependent on syntax. Second, another aspect that needs investigating is the use of viewpoints and perspectives simultaneously in the process of viewpoint analysis. Relating to comparison of several viewpoints in parallel and not in a pair wise fashion will reduce time and effort. Third, improving the ability of considering non-functional requirements another Four, a decision must be taken for how long in the process of software production might be delayed and when to merge partial specifications into a specification to be ready for implementation.
Viewpoints Integration in SE is used to support a loosely-coupled distributed approaches to software development by studying relationships between viewpoints and the inconsistencies which is usually taken in syntactic means. Consistency or inconsistency spans as semantics and pragmatics. Not only this, but also, a number of representation schemes can be developed to capture and manage the consistency relationships in modeling languages. Further considerations would be of great help to ease the whole process might be:

- Develop a number of reasoning techniques that tolerate inconsistency.
- Develop theoretical framework for combining information from multiple inconsistent sources drawing on our experience with work on viewpoints and inconsistency management and observations of a typical software design process.
- Develop Analyses of an emerging design will only be possible if we have automated tools for testing these consistency relationships to identify inconsistencies.

As it is clear, the central problem in large-scale software design is the management of inconsistency in fragmentary design models. Due to the conclusions reached on consistency management in the viewpoints framework. In particular, practical solutions to two of the greatest challenges are proposed:

- Representing the consistency relationships between models, and
- Reasoning over composite models that contain inconsistencies.

4. Conclusions

The lack of a benchmark regarding dealing with inconsistency and the existence of different viewpoints of stakeholders, compromises are the only solution available. A comprehensive model is introduced here to deal with such problem. Due to conflicts that may arise, a framework is presented to minimize the complexity and save time of dealing with it.
Upon applying such framework on big software project, then realistic evaluation can be done. The introduced framework is open to any enhancement.

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