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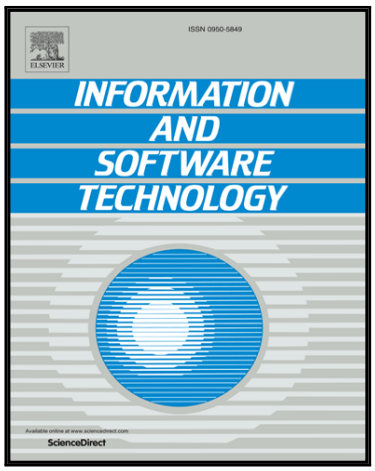

Assumptions and their management in software development: A systematic mapping study

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Assumptions and their management in software development: A systematic mapping study

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Abstract

Context: Assumptions are constantly made by stakeholders or generated automatically in software development. However, there is a lack of systematic analysis and comprehensive understanding of the research and practice regarding assumptions and their management.

Objective: This work aims to explore and analyze the state of the art on assumptions and their management in software development.

Method: A systematic mapping study that covers the literature from January 2001 to December 2015 on assumptions and their management in software development.

Results: 134 studies were included: (1) The studies were published in 94 venues, which indicates that assumptions and their management has been a broad topic in software engineering. (2) Only 21 studies defined the assumption concept. (3) Most assumptions are made for or related to the artifacts in requirements engineering and software design, which demonstrates that assumptions should be managed from the early phases of software development. (4) Much effort has been put on Assumptions Making, Description, and Evaluation. Assumptions Maintenance received moderate attention. More than half of the tools identified aim to support assume-guarantee reasoning. For the other tools, most of them can be used to support Assumptions Description. (5) All the identified types of stakeholders are involved in Assumptions Making, followed by Evaluation and Description. Stakeholders involved in requirements engineering, software design, and software construction play a central role in assumptions management. (6) The main challenge is the difficulty of performing assumptions management activities in software development. (7) The identified assumptions management approaches, tools, benefits, and lessons learned are limited to their specific contexts (e.g., context of use). (8) Most of the negative consequences are caused by invalid or implicit assumptions.

Conclusions: This work provides researchers and practitioners with a reflection of the past fifteen years of research and practice on assumptions and their management in software development.

Keywords: software development, assumption, assumptions management, systematic mapping study

1 Introduction

An assumption is defined as "*a thing that is accepted as true or as certain to happen, without proof*" [1] or as "*a fact or statement taken for granted*" [2]. Accordingly, we define software assumption as software development knowledge taken for granted or accepted as true without evidence. This definition of assumption emphasizes the characteristic of uncertainty in software

[1] http://www.oxforddictionaries.com/definition/english/assumption

[2] http://www.merriam-webster.com/dictionary/assumption

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