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Visualizing, Analyzing and Managing the Scope of Software Releases in Large-Scale Requirements Engineering

by Krzysztof Wnuk, Dept. of Computer Science, Lund University
http://www.lunduniversity.lu.se/o.o.i.s?id=12683&postid=3124810

Popular Science article Krzysztof Wnuk

Software business changed significantly during the last 20 years. Software becomes more and more pervasive and gains more and more importance in our lives. The complexity of software systems continues to grow together with the complexity of associated requirements engineering and decision making activities. As a result, large software companies that develop product for customer markets face new challenges in requirements engineering and management. The pressure generated by competitors’ and users’ expectations demands being more competitive, creative and flexible to more quickly respond to a rapidly changing market situation. In the pursuit of staying competitive in this context, new ideas on how to improve the current requirements engineering practice are requested to help maintaining the engineering efficiency while coping with growing size and complexity of requirements engineering processes and their products.

This thesis focuses on visualizing, analyzing and managing the scope of software releases in large-scale requirements management for developing software products to open markets. In particular, this thesis focuses on the following requirements management activities in the mentioned context, namely: scope management, decision making, obsolete requirements and requirements consolidation. The goals of the research effort in this thesis are to provide effective methods in supporting mentioned requirements management activities in a situation when the size of them and their complexity require large time and skills efforts.

Based on empirical research, where both quantitative and qualitative approaches were utilized, this thesis reports on improved understanding of requirements scoping in very-large projects by investigating factors affecting decision making, causes and effects of oversoping and presents visualization techniques to assist scope management for large-scale software product development contexts. The technical solutions reported in this thesis were empirically evaluated in case studies in a large-scale context and designed in close collaboration with our industry partners. Additionally, the benefits of using linguistic methods for requirements consolidation are investigated in a replicated experimental study based on a relevant industry scenario. Finally, the phenomenon of obsolete software requirements and their impact on industry practice is explored.