Using Process Modelling and Simulation for Setting Quality Gates in Complex Product Development Processes

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Abstract

Quality gates are check points to ensure that the current product development effort satisfies product requirements. Quality gates are frequently used in product development processes to detect errors and deviations early and thus prevent big and costly rework cycles. Despite their utility, quality gates may lead to significant effort overhead, and too frequent quality checking can significantly increase overall effort and span time in a process. This paper develops a decision support method that uses process modelling and simulation to successfully place quality gates in a process, such that an optimal trade-off can be obtained between rework reduction and checking effort. Process mapping is used to represent activities that occur in a process, the information flow between activities, and likely rework iteration routes. Possible quality gates are identified and quality gate placing scenarios are also built as part of the proposed process mapping method. Simulation is used to evaluate the impact of rework risk associated to each quality gate placing scenario, along with overall quality checking effort that is necessary to undertake the process. Gate placing scenarios are compared based on the estimated process span time and effort. The proposed method is illustrated in a sample product development process.

Keywords
Product Development Processes, Simulation, Quality Gates, Rework

Biography

Onur Hisarciklilar is currently a Visiting Researcher at McGill University, Canada. He received his PhD degree from Grenoble Institute of Technology, France in 2008. He participated in several research projects in collaboration with automotive and aerospace industries. His research is mainly focused on PLM systems, process improvement and design collaboration in New Product Development.

Mickaël Gardoni is professor and director of the innovation management program at ÉTS (Québec - Canada) and acting director of the PhD school. He was professor at INSA de Strasbourg and INP Grenoble (France) and Co-Director of the "French-Chinese PLM Centre for Innovation" in Tsinghua University, Beijing, China. He is engineer in industrial engineering and has done his PhD in EADS (European Aeronautic Defence and Space Company). His research interests include methodologies of creativity-innovation and knowledge management.