

Structuring and describing requirements in a flexible mesh for development of smart interdisciplinary Systems

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ABSTRACT

Requirements Engineering (RE) is a main topic in the development of smart systems. Especially due to the increasing interdisciplinary development work, definition and management of requirements are gaining importance. RE defines the needs of the customer and any additional stakeholder for the system which should be developed and translate the needs and wishes in technical written requirements [1]. Most of the costs of a development project are defined in the early requirement stage of the development process [1]. Therefore requirements are collected in a structured list of requirements, which is clustered in different categories [2].

This paper proposes an approach which transfers the requirements list into a flexible mesh. Every requirement contains attributes, which make it possible to extend further information about the individual requirement as well as about the interconnections with other requirements. The different kinds of interconnections are based on SysML 1.3 specifications (requirements diagram) [3], [4].

The mesh is realized in a java-based tool which describes the requirements in an object orientated way with different attributes and methods. Even the interconnections between the requirements are implemented as objects, which contains the possibility to describe different characteristics of interconnections. Because of the possibility to search through the mesh by algorithms and methods, different information can be identified. Exemplary the number of interconnections of a requirement to other requirements or System elements can give a hint of importance or of criticality of the requirement. Different categories which are used to structure the classic requirements list can be implemented flexible to filter the whole requirements portfolio and enhance the possibility to have different views at the flexible requirements mesh [5].

Aim of the flexible mesh of requirements is a tool to structure, analyse and maintain requirements in a development project. It should be able to extract critical requirements and identify the core requirements which have the strongest interconnection to each other. Later on in the development process there should be the possibility to illustrate which requirements are verified and connect them with a testing procedure and the following individual testing-results to use the mesh as a kind of checklist. The proposed flexible mesh is used as an instrument for testing and validating research work, which concerns elicitation, the structure and the implementation of changes during product engineering process. The mesh provides a flexible tool to handle requirements for interdisciplinary systems. In future work the approach should be validated and expanded for a bigger number of requirements in complex systems.

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