FuMaMa 2019-2020: Fuzzy Measures Management

Funded by ProFIT
Project partners: TU Berlin Field of Expertize Quality Science
Lead partner: Prof. Dr. Roland Jochem

Starting Point

Using a specific method or procedure does not automatically result in persistently high quality work. Rather, high quality work is the result of the continuous pursuit of improvement and adaptation to changing framework conditions. This mindset is reflected in the PDCA model - Plan, Do, Check, Act.

Software development in the automotive industry makes use of the ISO 26262-6 for functional safety precisely because the developed software has to take over safety relevant tasks. For example, software designed for steering control or a braking system is safety relevant because failure of the software can cause bodily harm or injury. ISO 26262-6 therefore prescribes quality assurance measures that must be applied during the development of such software products.

There are many tools and manually generated reports that are currently being used to capture quality assurance results in accordance with ISO 26262-6. Yet this heterogeneous database is confusing and as a result difficult to define for individual projects. For these reasons, automotive software manufacturers want to see the conformity of the software development process in a central location to efficiently determine the necessary countermeasures.

Aim and Uses

The motivation of the cooperation project aims at holistic quality management within the framework of the PDCA model. With regards to a continuous improvement process, it is not only necessary to systematically measure and check the quality situation, but also to effectively and efficiently improve both.

The main focus of the project is on the automation of measure determination. Based on the identified compliance status in a project, the comprehensive set of options should be used to define those actions that will produce compliance efficiently and effectively. For this purpose, a to-do-list generator will be developed that will propose suitable countermeasures based on the fuzzy set theory for given distributions of the quality parameters as well as their aggregation by the quality model. Beyond mere assessments, countermeasures will also be identified and the PDCA cycle will be fully implemented. This corresponds to the high practical demand for efficient, high quality software development.

The recommendation system should be designed for specific countermeasures in such a way that potential users who lack prior knowledge or in-depth expertise can systematically and objectively initiate and implement improvements.

Automotive software manufacturers are looking for a holistic view of ISO compliance and automated generation of countermeasures. Therefore, the recommendation system should be integrated into the tool MES Quality Commander. In this way, necessary steps for ISO 26262-6 compliance, such as identifying countermeasures, can be ascertained automatically.

Project partner: Model Engineering Solutions GmbH

Model Engineering Solutions GmbH (MES) is a high-tech software company specializing in the integrated quality assurance of embedded software in automobiles. MES was founded in October 2006. The managing directors are Dr. Heiko Dörr (CEO) and Dr. Hartmut Pohlheim (CTO).

Since its inception, MES has developed and distributed tools that support the development of embedded vehicle software through constructive and analytical quality assurance. In addition to tool development, MES also advises on model-based development of embedded software, for example by offering support in defining efficient development processes. MES' customers include the major German car manufacturers such as Daimler AG, Volkswagen, and Audi, as well as suppliers to the automotive industry, such as Continental, Bosch, and Siemens.

Project partner: Technische Universität Berlin

The Production Technology Center at the Technische Universität Berlin has stood for future-oriented research and teaching for a quarter of a century. 25 years of interdisciplinary cooperation has put Berlin's quality science in an outstanding position in both the scientific and industrial environment.

The Department of Quality Science at the Institute of Machine Tools and Factory Operations of TU Berlin is engaged in the research and development of approaches and methods for model-based, holistic quality description, and assessment as well as the procedures for applying the developed methods in the product life cycle in both production and service companies. The goal is to improve the organizational efficiency of companies in addition to increasing product and process quality.

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