University of Stuttgart
Germany

SUPER – Stuttgart University Program for Experiencing Research
Project Information

Institute's Information

Name of Institute	Institute of Industrial Automation and Software Engineering (IAS)
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Duration of Project/Number of Students

June/July	
June/July/August	X
Number of Students	1

Name of Project Intelligent mastering of complexity in variant-rich software systems

Beneficial Skills & Knowledge Knowledge in Software Engineering

Description of Work

Requirements for high configurability of software systems, market-specific adaptations, as well as hardware limitations, lead to a high variance of the software in space. In addition, due to continuous extensions and improvements of the software, a variance over time occurs. This variance over time is driven by new methodologies, such as agile software development, as well as new technologies, such as CI/CD pipelines and over-the-air software updates and the resulting short development cycles. Well-known examples of variant-rich software include the Linux kernel and the software in modern vehicles. This variance in several dimensions leads to a high complexity both in software development and in its management.
The software product line engineering is an approach, that already faces the mastering of complexity in the development and management of variant-rich software. However, the very high effort in the introduction and evolution of a software product line (SPL), as well as a lack of frameworks and tools, limit the usefulness of an SPL, especially in the combined handling of complexity in space and time.

In the context of this work, the named challenges should be investigated, and possible solutions are to be explored. The student will work in an expert team on the creation of a complete software product line demonstrator to develop new methods for an intelligent complexity handling of variant-rich software in space and time.