4th International ICSE workshop on
Software Engineering for Automotive Systems

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The amount of software in cars grows exponentially. Driving forces of this development are the availability of cheaper and more powerful hardware as well as the demand for innovation through new functionality. The rapidly growing significance of software and software-based functionality is at the root of various challenges in the automotive industries, concerning their organization, definition of key competencies, processes, methods, tools, models, product structures, division of labor, logistics, maintenance, and long term strategies [1,2].

Within only thirty years, the amount of software has evolved from zero to tens of millions of lines of code. A current premium car, for instance, implements about 270 functions a user interacts with, deployed over about 70 embedded platforms. Altogether, the software amounts to about 100 megabytes of binary code. The next generation of upper class vehicles, hitting the market in about 5 years, is expected to run up to 1 gigabyte of software. This is comparable to what a typical desktop workstation runs today. Today, more than 80% of the innovations in a car come from computer systems; software has thus become a major contributor to the value of contemporary cars but software has also become an increasing cost factor.

One reason for this trend is that software enables the implementation of functionality previously deemed impossible. Another reason is that electronics in cars help reduce gas consumption and increase performance, comfort and safety, as indicated by today's numbers of increasing traffic with decreasingly many serious accidents. Information processing technology cuts across all aspects of the car and is a persuasive, sophisticated and differentiating value addition to the product. Furthermore, software enables the car manufacturers and suppliers to tailor systems to particular customers' needs. In other words, software can help differentiate between cars. At least in principle, it is the software that also allows hardware to be reused across different cars. Mercer estimates the market of automotive electronics to hit a staggering 316 billion Euros by 2015.

Software engineering for automotive systems is an emerging discipline within software engineering. It provides enabling technologies for implementing and integrating new and software-driven vehicle features. Classical fields such as requirements engineering, specification languages, testing, and compatibility management have to be specifically tailored to the needs of the automotive domain. This tailoring strongly demands additional research and technology transfer effort with respect to continuity, integration and automotive-specific modeling concepts. The workshop concerned with all aspects of software engineering for automotive systems. Specifically, we target the integration problem that is a consequence of the vertical division of labor in the manufacturing process. Because of constraints like intellectual property this integration is based on nothing but the specification and development artifacts such as interface descriptions. Because of safety and quality requirements on automotive software, this integration phase is of particular relevance for software development.

The workshop provides a discussion forum for researchers and practitioners working in or interested in the field of automotive software. It addresses both academia and industry to transfer techniques and methods from other domains to the applicability in embedded automotive systems.

References

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