Proof of concept – WebAssembly in AUTOSAR Adaptive

Hochschule München is among the largest German universities of applied sciences, located at the heart of Munich, Germany. The working group "AEMY" focuses on safe, secure and smart systems. Our main working areas include RISC-V processor design, WebAssembly runtime development and open source chip design tools.

For our research group we are looking for a motivated student to research the possibilities of how it might be possible to utilize WebAssembly in an AUTOSAR Adaptive Platform.

WebAssembly is a modern, low-level, assembly-like language with a compact binary format designed for improved application performance in web browsers. Through its security features like sandboxing, it is a promising technology for a wide variety of applications. But it can also be used outside the browser. For example, on microcontrollers. In our labs in Munich and Bad Tölz, we are currently working on an ecosystem of efficient, practical WebAssembly runtimes and supporting tools for modern embedded systems.

Currently AUTOSAR Adaptive and its applications are almost exclusively developed in C++ with some exceptions in Rust. By enabling the use of WebAssembly in AUTOSAR Adaptive, its applications can be developed in any programming language that can be compiled to it. WebAssembly can also simplify the OTA Update functionality, since it is not dependent on a specific architecture. When using WebAssembly only the Runtime must be compiled for a specific architecture, while the modules can be used on every architecture. At last, through the security guarantees of WebAssembly like sandboxing the safety of the system can be improved generally.

The research direction is open, but the following points outline possible focus areas: - Investigate the current state of the art of WebAssembly in the field of automotive - Develop different approaches for integrating WebAssembly into AUTOSAR (Adaptive) - Implement a demonstrator that shows how WebAssembly can be used - Analyze the effects of WebAssembly on execution speed, memory usage, vulnerability of the system

If this topic sounds interesting to you, or if you've been inspired and have a suggestion for a related topic, feel free to reach out!

If you are interested, please get in touch:
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Find more on our website:
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