Hochschule Offenburg
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ivESK **Institut für verlässliche Embedded Systems und Kommunikationselektronik**

Offenburg University of Applied Sciences
Institute of reliable Embedded Systems and Communication Electronics (ivESK)

Integration of Unified TTCN-3 Test Framework to Network Simulator (ns-3)

The Institute for Reliable Embedded Systems and Communication Electronics (ivESK) designs, implements and tests algorithms, protocols and platforms for efficient, secure and reliable wireless and wired communication solutions using embedded systems. For the entire development process, ivESK follows a continuous test-driven design flow for the distributed communication nodes, which includes various abstraction levels and is based on identical software or firmware implementations and identical test cases at these levels. These range from simulation to virtualization and emulation of the network to field tests. To support our work related to simulation based tests, we are looking for,

a student for a Bachelor's or Master's thesis

in combination with a

Work as a research assistant

For this multilevel unified testing approach, it is necessary to integrate the currently used Eclipse Titan TTCN-3 based unified test framework to network simulator (ns-3). In principle Eclipse Titan TTCN-3 framework is platform independent and can be integrated to various platforms. However, this need to

be addressed in detail in this work for possible integration. After the integration, identical test cases descriptions need to be executed for various available simulation models (for e.g. using IEEE 802.15.4, or LTE model). Test cases considered are communication range test (LoS/ NLoS), network performance measurements including routing, network application performance tests (such as throughput, packet error rate, end to end delay) and power consumption (application, networks stack, RF front-end) measurements. This test cases need to be realized using available simulation models in ns-3. The execution and identical performance measurements helps to compare the results with other abstraction levels.

More specifically, the tasks will include:

- Study and take control of Eclipse Titan TTCN-3 test framework
- Take control network simulator (ns-3) using various available simulation models
- Definition and implementation of interfaces between TTCN-3 test framework and ns-3
- Test cases implementation in TTCN-3
- Performance evaluation of identical test cases and comparison with other abstraction levels

What you can expect:

- Interesting research questions with practical relevance
- A good balance between theoretical and implementation work
- You will learn in detail how modern wireless cellular networks work

What you should bring:

- Very good experience in programming, preferably using C++
- Willing to experience with TTCN3 development
- Basic knowledge of Wireless Protocol Stack
- Basic knowledge of Linux-based software development

For questions please contact:

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