

Overview of Seminar by Dr. Michael Engel

“Flexible Error Handling for Resource-Constrained Embedded Systems”

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Abstract

Restrictions in energy consumption, memory size, cost of hard- and software systems, etc., have been at the core of research in optimization for embedded systems for the last decades. One tradeoff that is often neglected is the influence of these factors on the dependability of a system. To be on the safe side, embedded systems designers often tend to overspecify error correction methods and, as a consequence, waste resources.

In this talk, I will present our software-based approaches to improve the dependability of resource-constrained embedded systems. The basic idea is to reduce the amount of error correction required by exploiting application knowledge. Using a classification approach for error impacts on data and code of given embedded applications based on static code analysis and, in a further step, even accepting certain incorrect results in appropriate places, we manage to significantly resource requirements of some typical embedded applications while providing the required level of fault tolerance.

This presentation is based on ongoing research in the context of the German Research Foundation's Priority Program SPP1500 "Dependable Embedded Systems" and collaborations with Profs. Krishna Palem (Rice University and NTU Singapore) and Vincent J. Mooney (Georgia Tech).

Biography



Michael Engel is currently a visiting researcher at UC Irvine in the Dept of Electrical Engineering and Computer Science. Since 2007, he is an assistant Professor of Computer Science at TU Dortmund, Germany. Before, he held an interim position as Professor of Computer Science at TU Chemnitz with a focus on operating systems and systems programming. He received his Diplomas in Applied Mathematics and Computer Engineering from Siegen University in 1999 and 2002 and his Ph.D. (Dr. rer. nat.) in Computer Science from Philipps-University Marburg in 2005. Before pursuing an academic career, Michael was founder and CTO of kernel concepts, a startup company specializing on embedded Linux development and consulting. His research interests include dependability, energy optimization, operating system and parallel programming for multi- and manycore embedded systems, software adaptability and hardware/software codesign of embedded MPSoCs.

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2:30-4:00PM

2430 Engineering Hall

CECS Host: Professor Nikil Dutt at dutt@uci.edu