

The Field Robotics Center

Seminar Series

Friday, 19th Sep

GHC 2109 10:30am – 11:30am

Snacks will be served



Matthias Althoff

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Guaranteeing Safety of Autonomous Vehicles with On-The-Fly Verification

Abstract: Ensuring safety is of paramount importance for the development of automated vehicles operating in public road traffic. For this reason, it is important to provide methods that formally verify the safety of automated vehicles. This is challenging since automated vehicles will operate in partially unknown environments so that there exists no finite set of scenarios that can be verified before deployment. Verifying the safety during the operation based on the current perception of the environment is often infeasible due to the computational demand of formal verification methods. In this work, we compute sets of behaviors for parameterized motion primitives using reachability analysis, which is used to build a maneuver automaton that connects motion primitives in a safe way. Thus, the computationally expensive task of building a maneuver automaton is performed offline. The proposed analysis method provides the whole set of possible behaviors of the own vehicle and other traffic participants so that it can be verified whether a collision with other traffic participants can be avoided.

Speaker Bio: Matthias Althoff received the diploma in Mechatronics and Information Technology from the department of mechanical engineering at the Technische Universität München, Germany, in 2005. He received his PhD degree (summa cum laude) in electrical engineering from the same university under the supervision of Univ.-Prof. Dr.-Ing./Univ. Tokio Martin Buss in 2010. From 2010 - 2012 he was a postdoctoral researcher at Carnegie Mellon University, USA, with a joint appointment in electrical engineering and the Robotics Institute. He joined the computer science department at Ilmenau University of Technology, Germany, in 2012 as assistant professor for automation systems. Since 2013 Matthias Althoff is assistant professor in computer science at the Technische Universität München. His research interests include the design and analysis of cyber-physical systems, formal verification of continuous and hybrid systems, reachability analysis, planning algorithms, robust and fault-tolerant control. Main applications of his research are automated vehicles, robotics, power systems, and analog and mixed-signal circuits.



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