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Towards Adaptive Inter-Vehicle Communication Protocols

In this talk, the need for a new generation of Inter-Vehicle Communication (IVC) protocols will be discussed. In the past, protocol design was mainly motivated by lessons learned from the field of mobile ad hoc networks. Yet, vehicular networks have very specific characteristics caused not only by the mobility of the vehicles but also by dynamics in the wireless communication channel. Radio signal fading and shadowing effects need to be considered in the entire design process. In the main part of the talk, examples or basic building blocks for such new IVC protocol will be presented.

First of all, there is the Adaptive Traffic Beacon (ATB) approach, which supports the exchange of delay-sensitive traffic information in a wide range of scenarios by flexibly adapting to the availability of infrastructure elements as well as to the network load. From previous work, we see that centralized solutions and flooding based approaches each show benefits and drawbacks depending on traffic density, penetration, network utilization, and other parameters. This observation is in line with findings about intelligent transportation systems that have been developed for specific settings. In order to overcome this limitation, ATB has been designed to be adaptive in two dimensions: First, the beacon interval is adapted dynamically and, secondly, the protocol can dynamically make use of available infrastructure elements.

Secondly, the Dynamic Beacon (DynB) approach will be investigated. This concept takes into account the dynamics caused though signal shadowing by buildings and other vehicles. The optimization goal is again to make full use of the wireless channel but prevent overload situations, i.e., collisions, reducing the performance of the transmissions.

Zeit: Mittwoch, 6. Februar 2013, 08:00 Uhr

Ort: Johannes Kepler Universität Linz

Informatik-Gebäude, SCP 3, HS 19

Kurzbiographie

Falko Dressler is a Full Professor for Computer Science and head of the Computer and Communication Systems Group at the Institute of Computer Science, University of Innsbruck. Dr. Dressler received his M.Sc. and Ph.D. degrees from the Dept. of Computer Science, University of Erlangen in 1998 and 2003, respectively. He is an Editor for journals such as Elsevier Ad Hoc Networks, ACM/Springer Wireless Networks (WINET), and Elsevier Nano Communication Networks. Among others, Dr. Dressler wrote the textbook Self-Organization in Sensor and Actor Networks, published by Wiley in 2007. Dr. Dressler is an IEEE Distinguished Lecturer in the fields of inter-vehicular communication, self-organization, and bio-inspired and nano-networking. Dr. Dressler is a Senior Member of the IEEE as well as a Senior Member of ACM. His research activities are focused on adaptive wireless networking and self-organization methods with applications in wireless ad hoc and sensor networks, inter-vehicular communication, bio-inspired and nano-networking, and network security.