Fakultät für Informatik und Mathematik - Universität Passau

Kolloquiums-Einladung
im Auftrag von Prof. Alexey Vinel
zum Vortrag von
Oscar Amador, PhD
(Halmstad University, Schweden)
am Freitag, 27.5.2022
ab 10:00 Uhr
im Raum 004 (IM).

Safety Applications and the ETSI ITS protocol stack

Abstract - The Intelligent Transport Systems (ITS) framework defined by the European Telecommunications Standards Institute (ETSI) consists of entities distributed across several layers. As part of this framework, the ETSI Decentralized Congestion Control (DCC) mechanisms influence the behavior of other entities with the aim of maximizing the Vehicular Ad-hoc Network (VANET) throughput and efficiency by allocating resources (i.e., access to the medium) fairly in congestion situations. ETSI ITS considers the use of DCC both in the Access layer and as part of a cross-layer architecture. This means that DCC mechanisms influence the performance of elements in different layers. One of the components that are directly influenced by DCC is the Cooperative Awareness (CA) basic service —the entity that keeps vehicles aware of the presence of each other on the road. In this series of works, we perform an analysis of the DCC mechanism defined by ETSI, particularly an analytical and experimental evaluation of the performance of the ETSI DCC Adaptive Approach algorithm, comparing it to related algorithms including our own proposal (Dual-alpha). Then, we present an evaluation of the effect of DCC on the end-to-end delay of the CA basic service, and propose Generate-on-Time (GoT), an addition to the standard that accounts for delays caused by DCC and the effects these delays bring on other metrics. Finally, we present an evaluation the performance of the ETSI Contention-Based Forwarding (CBF) GeoNetworking protocol for distributing warning messages in highway scenarios, including its interaction with the Decentralized Congestion Control (DCC) mechanism. Several shortcomings of the standard ETSI CBF algorithm are identified, and we propose different solutions to these problems, which reduce the number of transmissions by an order of magnitude, while reducing the message end-to-end delay and providing a reliability close to 100% in a large area of interest.