Prof. Dr.-Ing. habil. Falko Dressler
Data Communications and Networking – TKN

Technische
Universität
Berlin

Bachelor Thesis

Analyzing the Communication Standard[1] for Platooning in Europe

The ongoing growth of passenger as well as goods transport results in more road traffic and, therefore, more traffic jams and pollution. Researchers and car manufacturers are trying to improve driving using Inter-Vehicle Communication (IVC), resulting in trends like Intelligent Transportation Systems (ITSs) or cooperative driving. One promising development in this field is *Platooning*, which aims to improve today's driving for example on freeways.

The ongoing research in platooning has tackled the most pressing issues and resulted in real-world prototype demonstrators. The next step for it's widespread application is therefore standardization, in order to (a) regulate the use of the wireless channel and (b) provide inter-operable protocols between Original Equipment Manufacturers (OEMs). This avoids vendor lock-in and supports platoons of different vehicle types and brands, which is necessary to use the full potential of platooning.

The European HORIZON 2020 project ENSEMBLE[2] tries to build a way towards a unified and standardized platooning within Europe. Recently, they published a new standard specifying the communication requirements and proposing a concrete implementation of communication for (truck-)platooning in Europe [1]. The standard is currently under review at the European Commission (EC) and is supposed to build a common base for future implementations of the communication among different OEMs.

■ Goals of the Thesis

The goal of this thesis is to have a closer look at the proposed standard and analyze its potential and behavior regarding IVC for platooning and in general. In order to do so, the standard should be implemented in PLEXE[3] and evaluated in typical platooning scenarios. Within the simulation, several parameters (e.g., platooning controllers) should be varied in order to get a good understanding of the standard's behavior.

To successfully complete this thesis, you need to do the following:

- Understand and implement the standard in PLEXE.
- Define and setup typical scenarios and parameters for platooning.
- Evaluate the proposed standard regarding typical metrics for IVC and platooning.

■ Required Knowledge

You should have a basic understanding of *Vehicular Networking*, *Network Simulation*, and *C++*.

[1]   B. Atanassow and K. Sjöberg, "Platooning protocol definition and Communication strategy," HORIZON 2020 project ENSEMBLE, Deliverable D2.8, Dec. 2018, pp. 1–55.

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[1]The standard has been proposed and is currently under review by the European Commission.
[2]https://platooningensemble.eu/
[3]https://plexe.car2x.org

Contact:
Julian Heinovski, Max Schettler: <heinovski@tkn.tu-berlin.de, schettler@tkn.tu-berlin.de>