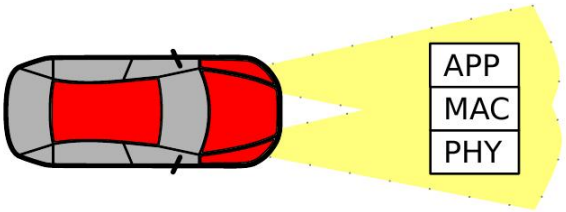
Bachelor/Master's Thesis

Investigating medium access schemes for Vehicular Visible Light Communications



Recently, Visible Light Communication (VLC) has emerged as a candidate access technology for vehicular networking. Many works in the literature investigate the usability of VLC in vehicle-to-vehicle and vehicle-to-infrastructure scenarios. However, oftentimes the utilization of VLC is assumed in the physical layer, while the layers above the , i.e., medium access, are barely addressed, and if at all, the implementations are based on existing protocols such as 802.11.

Nonetheless, these protocols are designed with radio frequency (RF) communications in mind and completely ignore the distinct nature of VLC.

On the other hand, standardization efforts for VLC are ongoing since 2009. However, as of now they have been focused on indoor communications. For example, the IEEE 802.15.7 standard provides specification for the PHY and the MAC layers.

Goals of the thesis

The main objective of this thesis is an in-depth investigation of the medium access schemes for outdoors VLC while taking in consideration i) the dynamic nature of vehicular networking and ii) the distinct properties of VLC. This work has the potential to fill a major gap in terms of medium access research for Vehicular VLC.

The goals of this thesis are:

1. Literature study about existing medium access schemes for vehicular VLC.
2. Comparison of traditional, standardized and newly proposed MAC protocols.
3. Identify potential pitfalls for medium access when utilizing VLC in the vehicular environment.
4. Implement a medium access scheme addressing those pitfalls in Veins.

Keywords

Computer Networks, Medium Access Schemes

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