TOPIC FOR A BACHELOR OR MASTER'S THESIS

VISIBLE LIGHT COMMUNICATION FOR

TRAFFIC LIGHTS

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MOTIVATION

Vehicular Visible Light Communication (V-VLC) is commonly viewed as a salient technology for wirelessly interconnecting road vehicles like cars or trucks. It promises to support futuristic applications like truck platooning (where trucks are following one another at distances far below the regular safety margin of purely autonomous vehicles) with a channel that offers both ultra high capacity and ultra low latency [1]. In this, V-VLC might present a viable complementary technology to current approaches (each of which has its own benefits and drawbacks): both medium range free radio (WLAN, DSRC based) and mobile broadband communication (C-V2X).

In addition to the use of pure vehicle-to-vehicle (V2V) communication, VLC might be also applicable for infrastructure-to-vehicle communication.

GOALS OF THIS THESIS

In this work we want to model a traffic light in software and evaluate to what extent the traffic light can be used for communication with vehicles. Building on Veins (an open-source vehicular network simulation framework that can simulate wireless networks of cars), and Veins-VLC (an extension for Veins with channel models for V-VLC), the thesis will model a traffic light based on existing brightness measurements of a real traffic light.

Based on these frameworks, the following steps will be performed:

- Model the traffic light based on existing measurements
- Validate the model by comparing the model characteristics with the real-world measurements
- Then, conduct a simulation study to quantify the impact of communication through traffic lights in an urban scenario for V2X applications

REFERENCES

Agon Memedi and Falko Dressler, "Vehicular Visible Light Communications: A Survey," IEEE Communications Surveys & Tutorials, vol. 23 (1), pp. 161–181, 2021.

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