TECHNISCHE UNIVERSITÄT DRESDEN

Faculty of Electrical and Computer Engineering Vodafone Chair Mobile Communications Systems

Quality of Service Prediction for Vehicular Communication

Student Assistant

(max. 19h/week, according to WissZeitVG, until 31st March 2023)

Problem Statement

Vehicular communication is a key enabler for cooperative autonomous driving, which is intended to increase safety on the road and make transportation more efficient, e.g., by platooning. However, each use case of vehicular communication comes with specific requirements towards quality of service (QoS) parameters such as throughput or latency. A violation of those requirements can lead to dangerous or even life-threatening situations. QoS prediction aims to foresee fluctuations in the QoS to enable a proactive management of the network to achieve a more stable QoS.

Machine learning (ML) is a promising technique for QoS prediction [1]. Within the project AI4Mobile, a measurement campaign has been executed on the 5G-ConnectedMobility test field. A data set which is suitable for experiments on ML-based QoS prediction with real-world data originates from this measurement campaign [2, 3].

Tasks

The goal of this position is to examine how sequences of input data can be employed to predict the upcoming QoS with ML, particularly with recurrent neural networks.

- Get acquainted with the subject machine learning
- Get familiar with the data set
- Implement machine learning algorithms for quality of service prediction

Expected Skills

- Programming experience, preferably in Python
- Basic knowledge on machine learning
- Interest in wireless communication

Contact Person

Anton Krause (anton.krause@tu-dresden.de)

For the application, please send a CV and a recent transcript of records.

Please also describe shortly your programming experience and your knowledge about ML.

Recommended References

[1] D. F. Külzer et al., "AI4Mobile: Use Cases and Challenges of AI-based QoS Prediction for High-Mobility Scenarios," 2021 IEEE 93rd Vehicular Technology Conference (VTC2021-Spring), 2021, https://ieeexplore.ieee.org/document/9449059

[2] A. Palaios et al., "Network under Control: Multi-Vehicle E2E Measurements for AI-based QoS Prediction," 2021 IEEE 32nd Annual International Symposium on Personal, Indoor and Mobile Radio Communications (PIMRC), 2021, https://ieeexplore.ieee.org/document/9569490

[3] A. Palaios et al., "Effect of Spatial, Temporal and Network Features on Uplink and Downlink Throughput Prediction," 2021 IEEE 4th 5G World Forum (5GWF), 2021, https://ieeexplore.ieee.org/document/9605036