5G System Simulation of Remote-Rendering Augmented Reality

Student/Master/Diploma Thesis

Problem Statement

A promising use-case discussed for the sixth generation (6G) of mobile communications systems is augmented reality (AR). Contrary to virtual reality (VR), where the user is fully immersed in the virtual content, AR aims to overlay the real world with virtual objects. Possibilities for applications are various, ranging from enhanced navigation, ubiquitous social interaction to entertainment.

Currently, available AR glasses are still chunky and, thus, not suitable for everyday life. Hence, lightweight AR glasses are desired that do not differ much from reading glasses. To be able to build lightweight glasses in the future, video rendering could be outsourced to the cloud and the rendered result could be transmitted to the device as a video stream. Such a remote-rendering architecture moves the challenges from the device to the network. Additional to strict latency requirements, high data rates have to be achieved at the same time, which is a huge challenge for today's 5G systems. The cell load becomes especially demanding when multiple users in a radio cell are active at the same time and compete for radio resources.

To evaluate the performance and identify potential bottlenecks of streaming AR content over today's 5G systems, extensive system level simulations need to be performed. Matlab's *5G Toolbox* offers the necessary 5G simulation capabilities, which can be used to build a close to reality remote-rendering AR simulator. We offer a student, diploma or master thesis, which shall implement a simulator, investigate the resource consumption and identify possible solution for future AR systems.

Tasks

- Literature study of AR applications and AR traffic modelling
- Definition of simulation scenarios
- Development of AR traffic models
- Development and implementation of the AR system simulator
- Performance analysis and identification of enhancements

Expected Skills

- Experience with programming languages
- Interest in cellular communications technologies

Contact Person

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