TECHNISCHE
UNIVERSITÄT
DARMSTADT

Bachelor Thesis / Master Thesis:
Game Theory Based Resource Allocation for Stochastic Quality-of-Service Guarantees in Wireless Networks

A broad range of applications depending on reliable and fast transfer of information will play an important role in future wireless networks. These delay-sensitive services include control tasks like factory automation or real-time human and machine interaction like augmented reality. To enable the use of these applications in edge networks, the upcoming standard for cellular networks (5G) will provide a new communication paradigm: Ultra Reliable Low Latency Communications (URLLC).

The quality-of-service (QoS) metric models the relevant performance for an application considering latency, throughput or packet error rate. In URLLC each application has strict minimum requirements on the QoS. These strict requirements concern e.g. the maximum latency, the minimum throughput or the maximum packet loss of the transmission. Because of the time-varying channel conditions the correct transmission of a packet in a wireless channel cannot be guaranteed with certainty. The more resource blocks are assigned to a user the higher is the probability of correct decoding the transmitted message

Open Topics:
- How to match users and resources efficiently and stable?
- How to handle information asymmetries between different participants of the network?
- Where to place certain resources that they provide the optimal benefit for the providers and users?

Services

Channels

Channel 1
Channel 2
Channel 3
Channel 4
Channel N

Infra-structure-provider
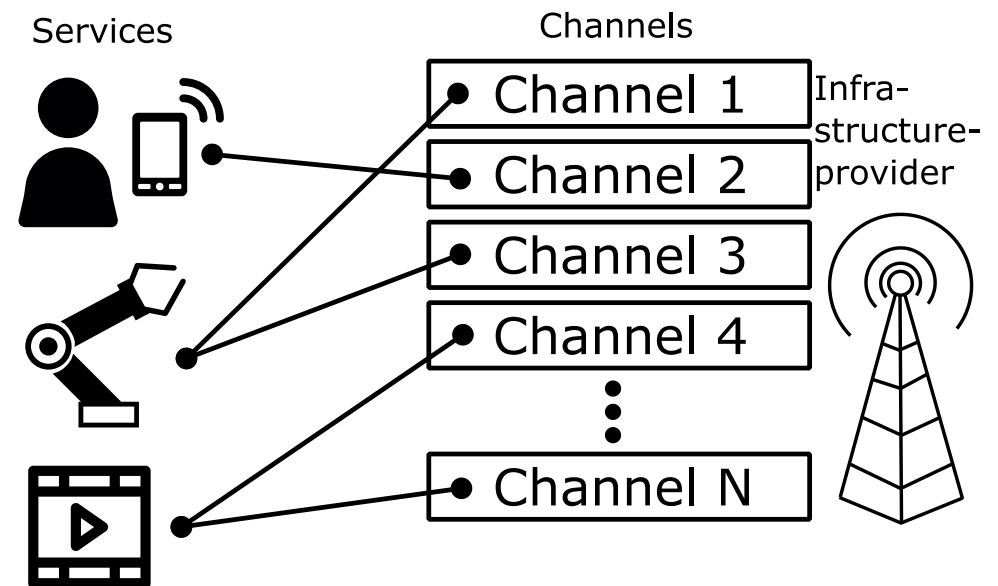
Your qualifications:
- Knowledge in linear algebra and probability theory.
- Basic understanding of wireless communications.
- Basic MATLAB or Python skills.

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