Faculty of Electrical Engineering & Computer Science
Master Degree Course Electronics Engineering, MSc EE

HSB
Hochschule Bremen
City University of Applied Sciences

Master 2017

Md. Kutub Biswas

Delay-Constraint Scheduling for Internet-of-Things and Smart Factory Wireless Communication.

ABSTRACT - Masterthesis

The ultimate goal of next generation wireless communications is to provide ubiquitous, seamless connections between user equipment such as mobile phones and computers so that users can enjoy high-quality services at anytime anywhere without wires. Scheduling is one of the key technologies of packet data based future generation wireless communications systems. The primary purpose of scheduling is to get high data rate for services but currently, because of the necessity of faster response from the target nodes, it is necessary to design Schedulers for delay constrained transmissions. Especially, for latest technologies like Internet-of-Things applications and smart factory wireless communications which need novel scheduling concepts that take short packets and latency constraints into account, it is unavoidable to find out a strictly delay constrained scheduling algorithm.

In the thesis, we have investigated delay constrained scheduling algorithms for delay sensitive wireless communication multi-user single-input-single-output (SISO) transmission systems. Specially, the algorithms are designed to minimize the transmission delay of packets together with different track requirements. The proposed design can be applied for both uplink and downlink.

We have investigated scheduling algorithms in two stages 1) Non-delay oriented Schedulers and 2) to work out scheduling approaches be suitable for future communications. Which leads to construct delay constraint schedulers.

We found a significant reduction in transmission delay in the system by constructing delay oriented scheduling. The non-delay oriented algorithms do not show high delay efficiency and also do not consider delay constraint, although each one of these has its specialty. After studying the different performance measuring criteria of scheduling algorithms, we have implemented two more algorithms which are used on delay constraints. These new algorithms follow the strict delay constraint based on different data tracks, at the same time provide standard fairness among users and high throughput in a wireless system. We have reached this conclusion after successful implementation in a simulation environment.