WE-MQS: A new LTE Downlink Scheduling Scheme for Voice Services based on User Perception

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Abstract

The Long Term Evolution (LTE) is a high data rates and fully All-IP network. Scheduling and resource allocation are very important tasks in LTE network. So that, the optimization of the real-time services transmission is very essential. However, there are many challenges when deploying the live multimedia services such as VoIP, Video, etc. This paper proposes a new scheduling scheme which based on the Wideband (WB) E-model, Channel- and QoS-Aware (known as WE-MQS scheduler) for voice traffic in LTE downlink direction. The voice traffic flow is very sensitive to network impairments such as delay, packet loss, jitter, etc. The proposed scheduling scheme is based on the extension of the WB E-model and the consideration of Maximum Queue Size (MQS) as a factor for the metric. Since this scheduling scheme considers Mean Opinion Score (MOS) values, thus, it gets higher user perception. The simulation results show that the proposed scheme has the performance which not only satisfies QoS requirements of voice services but also outperforms well-known schedulers such as Frame Level Scheduler (FLS), Modified Largest Weighted Delay First (M-LWDF) and Exponential/Proportional Fair (EXP/PF) schedulers in terms of delay for all the number of user
(NU) and Packet Loss Rate (PLR) when the NU is more than 47. For the cell throughput, Fairness Index (FI), and Spectral Efficiency, the proposed scheduler is always in the middle of the remaining schedulers. The performance evaluation is compared in terms of Delay, PLR, Throughput, FI, and FI for FLS, M-LWDF, EXP/PF schedulers and the proposed one.

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Index Terms

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Keywords
Scheduling scheme, user perception, LTE, WB E-model, VoLTE, WB-MQS.