

Judder-free videos on the smartphone

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Overloaded cellular networks can get annoying – especially when you want to watch a video on your smartphone. An optimised Radio Resource Manager will soon be able to help network operators accommodate heavy network traffic. Researchers will present their solution at the GSMA Mobile World Congress from 27 February to 1 March, 2012 in Barcelona.

The journey for the family holiday can be a long one. To avoid the incessant “Are we there yet?”, stressed parents gladly hand their smartphones to the back seat – so the kids can watch videos or movies on the internet. While modern technology provides for entertainment, it occasionally reaches its limits and then the whining returns: The movies sometimes judder, or are completely interrupted. The cause may be twofold: If the user is standing at the basin of a valley and has poor reception, the data stream transmission rate is inadequate and the cellphone cannot download the data fast enough. Another cause may be network overload – if too many users download massive data volumes simultaneously, then the mobile radio cell becomes congested.

The standard Radio Resource Managers in use today, installed in every network cell, are designed to prevent this: They check which user needs what data, and how much capacity their transmission requires – and are supposed to ensure that each user swiftly obtains the requested data. However, as the Internet is increasingly being used to watch videos, things can get a bit “haywire”, and function only moderately, or not at all. This is because videos are beyond the grasp of the cellular networks; they don’t “know” how large the downloaded data volumes are and what

requirements the video stream has. Is the mobile device just loading a densely compressed mini-sequence, or a 90 minute video at the highest quality?

Researchers at the Fraunhofer Institute for Telecommunications, Heinrich-Hertz-Institut HHI in Berlin have recently optimised these Radio Resource Managers. “To do so, we combined Long Term Evolution, or LTE, the new cellular standard that is replacing UMTS, with a format for web streaming called Dynamic Adaptive Streaming over HTTP, or ‘DASH’ for short,” says Dr. Thomas Schierl, group manager, Multimedia Communications at HHI. Among other things, the DASH standard makes videos and images available in various qualities, or in other words, it allows different file sizes. This means the user can select different video qualities and define how quickly websites are established or videos are loaded.

“Soon, the DASH standard can play to its full strength, even on [cellular networks](#),” says Thomas Wirth, group manager at HHI. If the user clicks on the preview in order to start a video, the transmitting stations and the mobile end device automatically check reception and the volume of traffic on the network. The advantage: If reception is poor or the network is overloaded, then the transmitting stations and the mobile receiver device adjust the quality of the video in a manner that allows the user to see the film without judders. Poor reception or an overloaded network will slightly diminish just the image quality of the video. As soon as the connection improves, the image quality also increases again.

Network operators also benefit from optimized Radio Resource Managers: They can exploit the resources of a network cell better than before. “With our mechanism, resources can be optimally distributed, and hence saved,” says Wirth. “The saved resources can then be allocated to others. This means we can increase the number of users that can be serviced.” Researchers have already completed a prototype of the

optimised Radio Resource Manager.

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