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**DISSERTATION TITLE:** *Visual Perception of Scalable Video Streaming:  
Applied to Mobile Scenarios*

**Evaluering av brukerOpplevd video kvalitet baserer seg sterkt på subjective kvalitetsverdering. I denne avhandlingen presenterer vi metodikk for subjective kvalitetsvudering, og deretter vi rapporterer en sekvens av brukerundersøkelser som utforske menneskelig kvalitet persepsjon av visuelle artefakter assosiert med video tilpasningsteknikker.**

Quality of Experience in the context of video streaming services rests mainly in the perceived video quality, which is a typical subjective measure. We can no longer assume a monotonic relationship between video bitrate and user perceived quality. The quality evaluation of streaming video relies highly on subjective quality assessment.

In this thesis, we present a subjective quality evaluation method for conducting audiovisual quality assessment studies in the field. Field studies are known to be expensive and difficult to administer. Our method is designed with realistic assumptions of the time and effort that an assessor will have to spend. With the use of this method, an experimenter can easily obtain stable results with accuracy close to traditional experiment designs at a much lower cost. We demonstrate the efficiency and practicality of this method by simulations.

This thesis presents also a sequence of user studies that evaluates the effects of multidimensional video adaptation techniques on human quality perception. These studies reveal that frequent quality variations may create additional visual artefacts denoted flicker effects, and it is not worthwhile making quality changes unless the negative impact of flicker on visual quality is eliminated. We identify the main influential factors on the visibility of flicker effects and determine the threshold quantities of these factors for acceptable visual quality of video. These findings can help improving video adaptation strategy or bit-rate controllers deployed in video streaming solutions, such as Scalable video streaming, Dynamic Adaptive Streaming over HTTP, and Microsoft Smooth Streaming.

In all of our studies, the quality assessments were made on different types of video content, we therefore provide some preliminary analyses of content effects on human quality perception. In addition, we found that human perception of visual artefacts varies in relation to the viewing environment. Especially, people can detect slow or irregular frame-rates much easier on large HDTV screens than small screens of mobile devices.

