

DashReStreamer: Framework for Creation of Impaired Video Clips under Realistic Network Conditions

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Abstract:

The continuous rise of multimedia entertainment has led to an increased demand for delivering outstanding user experience of multimedia content. However, modelling user-perceived Quality of Experience (QoE) is a challenging task, resulting in efforts for better understanding and measurement of user-perceived QoE. To evaluate user QoE, subjective quality assessment, where people watch and grade videos, and objective quality assessment in which videos are graded using one or many objective metrics are conducted. While there is a plethora of video databases available for subjective and objective video quality assessment, these videos are artificially infused with various temporal and spatial impairments. Videos being assessed are artificially distorted with startup delay, bitrate changes, and stalls due to rebuffering events. To conduct a more credible quality assessment, a reproduction of original user experiences while watching different types of streams on different types and quality of networks is needed. To aid current efforts in bridging the gap between the mapping of objective video QoE metrics to user experience, we developed DashReStreamer, an open-source framework for re-creating adaptively streamed video in real networks. The framework takes inputs in the form of video logs captured by the client in a non-regulated setting, along with an.mpd file or a YouTube URL. The ultimate result is a video sequence that encompasses all the data extracted from the video log. DashReStreamer also calculates popular video quality metrics like PSNR, SSIM, MS-SSIM and VMAF. Finally, DashReStreamer allows creating impaired video sequences from the popular streaming platform, YouTube. As a demonstration of framework usage we created a database of 332 realistic video clips, based on video logs collected from real mobile and wireless networks. Every video clip is supplemented with bandwidth trace and video logs used in its creation and also with objective metrics calculation reports. In addition to dataset, we performed subjective evaluation of video content, assessing its effect on overall user QoE. We believe that this dataset and framework will allow the research community to better understand the impacts of video QoE dynamics.