

MOVIS (Performance Monitoring System for Video Streaming Networks)

Project number 168219

Estimating subjective video quality from measurements

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When watching streamed video over the Internet, e.g., from a sports event, disturbances in service quality annoy the consumer. In the delivery chain live video content is streamed by a content provider through the network of an Internet Service Provider (ISP) to the consumer's home network, and then shown on a PC.

Should a consumer experience reduced quality a variety of reasons can apply along the entire delivery chain. Monitoring service quality can help to identify the reasons for reduced quality. In an assessment process a test panel of people have evaluated video content streamed under various conditions. The MOVIS project identified what to measure, including thresholds and weight factors in order to estimate the experienced quality for the consumer. The results have been implemented in a prototype for measuring and estimating video quality.

Reasons for reduced video quality

Factors that could reduce the quality experienced by the consumer are encoding, streaming, the network, equipment in the consumer's home, and viewing conditions. We focused on encoding and networking, since the other factors cannot be influenced by the content providers.

Reasons for reduced quality may be found at the consumer's installation or network. Especially bandwidth sharing with other PCs, and the use of wireless networking devices are known to be problematic. Since the consumers often do not know the technical details of their installation, the MOVIS system can detect these conditions.

Estimating video quality

In an assessment process a test panel at the Institut für Rundfunktechnik (IRT) evaluated video content streamed under various conditions, using the SAMVIQ method, also known as ITU-R recommendation BT.700.

Video sequences encoded with the Windows Media 9 codec were assessed with different content, frame rates and bit rates. The project results show that content in CIF resolution requires bit rates above 600 kbps for less demanding content, and 1 Mbps for demanding content. Using SD resolution only fair quality can be achieved at 1.5 Mbps, while good quality requires 3Mbps.

We also assessed the influence of the networking parameters delay, jitter (delay variation), and packet loss to the subjective quality. Quality degradations become visible when the jitter value surpasses ten times the typical values for an ADSL connection. To be considered as a quality reduction incidental packet loss must surpass a multitude of the values for a typical ADSL connection.

Prototype of a video quality measurement system

The MOVIS project partner Nimsoft implemented a measurement system for video quality, which was applied to content from the Norwegian TV channel TV2. Software probes are installed on the consumer's computer measuring the current objective values of selected parameters (including CPU load and software versions). These data are reported to the service provider, and shown on the so-called "dashbord" which visualizes the service quality for one consumer, and for entire groups of consumers sharing networking resources. The MOVIS system helps to document networking problems, and to detect the reason for quality reductions in order to give the customers better service.

Project Web Page: <http://movis.nr.no/>