PEVQ™ – Perceptual Evaluation of Video Quality

PEVQ provides MOS estimates of the video quality degradation occurring through a network by analyzing the degraded video signal output from the network. This approach is based on modelling the behavior of the human visual system and detecting anomalities in the video signal quantified by a variety of KPIs.

OPTICOM, the leading provider of signal based perceptual measurement technology for voice, audio and video, offers its new easy to use **PEVQ V 1.1** measurement as an OEM solution. PEVQ evaluates the quality of CIF, QCIF, VGA and Rec. 601 video formats based on perceptual measurement, reliably, objectively and fast.

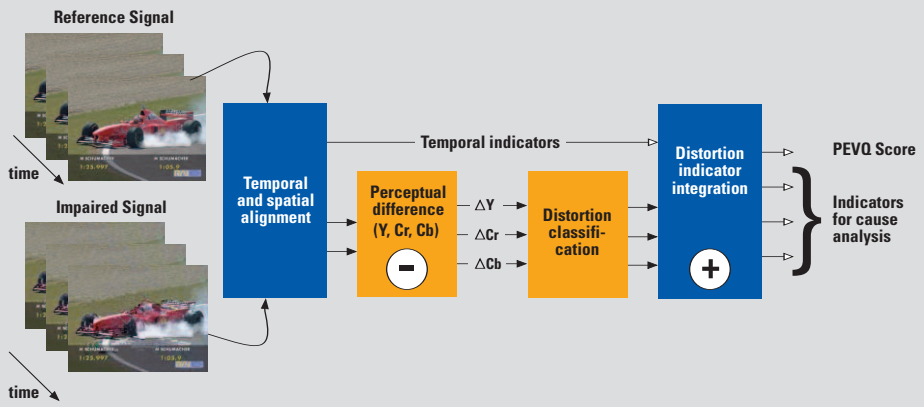
PEVQ is partially based on the earlier PVQM technology developed by KPN Research and new developments of OPTICOM.

Video Quality Testing

OPTICOM Product Line:
Voice/Audio Quality
PSQM ITU-T P.861
PESQ ITU-T P.862
3SQM ITU-T P.563
ECHO
PEAQ ITU-T BS.1387
Video Quality
PEVQ
Network Quality
VQmon

Principle

PEVQ is a full reference, intrusive measurement algorithm for video quality. Its basic structure is shown in the figure below.



The algorithm can be divided up into four separate blocks. The first block – pre-processing stage – is responsible for the spatial and temporal alignment of the reference and the impaired signal. This process makes sure, that only those frames are compared to each other that also correspond to each other.

The second block calculates the perceptual difference of the aligned signals. Perceptual means that only those differences are taken into account which are actually perceived by a human viewer. Furthermore the activity of the motion in the reference signal provides another indicator representing the temporal information. This indicator is important as it takes into account that in frame series with low activity the perception of details is much higher than in frame series with quick motion.

The third block in the figure classifies the previously calculated indicators and detects certain types of distortions.

Finally, in the fourth block all the appropriate indicators according to the detected distortions are aggregated, forming the final result - the mean opinion score (MOS). The MOS value

Key Features:

- Analysis of video quality
- Outputs MOS score that correlates well with subjective MOS
- Additional KPIs for detailed analysis
- Measurement with QCIF (real time), CIF, VGA and Rec. 601 video sizes
- Perceptually based end-to-end quality analysis
- Available as DLL/Library or Source
- Applications: IPTV, streaming video, 3G, video telephony

describes the video quality on a range from 1 for very bad quality, to 5 for excellent quality. Besides the final quality score additional indicators are provided at the output of the algorithm for further cause analysis.

This approach to video quality estimation includes the effects of both packet level impairments (loss, jitter) and signal related impairments such as blockiness, jerkiness, blur and distortions caused by coding processes.

Future releases will be further optimized in computational performance and prediction accuracy to provide the complete picture of the quality estimate. OPTICOM's roadmap for PEVQ targets at candidating in the competition of the Video Quality Experts Group (VQEG) for the best video quality measurement model.

Specifications

PEVQ - Perceptual Evaluation of Video Quality

Functionality

- Perceptual Evaluation of Video Quality- PEVQ, with mapping to MOS scale (1 bad, … 5 excellent quality)

Input

- AVI with RGB24 video data
- QCIF, CIF, VGA and Rec. 601 frame sizes
- 6 to 20 seconds in length

Output

PEVQ MOS / DMOS
The PEVQ MOS value lies within a range from 1 (bad) to 5 (excellent). The PEVQ MOS is based on a multitude of perceptually motivated parameters. The DMOS (difference-MOS) is directly derived from the PEVQ MOS and translated into a difference scale (0=best, 4=worst).

Distortion indicators
For a more detailed analysis the perceptual level of distortion in the luminance, chrominance and temporal domain are provided.

Delay
The delay of each frame of the test signal related to the reference signal.

Brightness
The brightness of the reference and degraded signal.

Contrast
The contrast of the distorted and the reference sequence.

PSNR
To allow for a coarse analysis of distortions in different domains the PSNR is provided for the Y, Cb and Cr components separately.

Jerkiness
describes the smoothness of a video playback which is often impaired by down-sampling, coding processes and perturbed transmissions.

Blur
is a distortion characterized by reduced sharpness of contour edges and spatial detail.

Blockiness
is often the result of a low bit rate coding that uses a block matching algorithm for the motion estimation and a coarse quantization for the image blocks.

Complexity

- PEVQ is widely optimized and is capable of processing QCIF streams faster than real-time on a 3GHz Pentium 4 machine.

Platforms

- Windows
- Linux

OPTICOM

About OPTICOM

With PSQM, PESQ and PEAQ, OPTICOM GmbH, the pioneer in perceptual quality testing has been providing four international world-class standards for voice and audio quality measurement since its foundation in 1995.
With their new single-sided speech quality measure 3SQM™, a joint development with partners, the perceptual experts from Germany now presented their latest ITU standard. At its 10th anniversary, the presentation of the new PEVQ™ video measure leverages the company's huge experience towards the multimedia testing domain. Recognized an industry reference, OPTICOM's OPERA voice/audio quality test tools are available to users world wide. And while specialized on OEM customers in particular, the directory of OEM licensees today reads like the 'Who-is-Who' of the Telecoms industry. OPTICOM is a privately held company located in Erlangen, Germany.

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