A FUSION APPROACH TO VIDEO QUALITY ASSESSMENT BASED ON TEMPORAL DECOMPOSITION

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Abstract

❖In this work, an input video clip is first decomposed into smaller units along the temporal domain, called the temporal decomposition units (TDUs).

❖Next, for each TDU that consists of a small number of frames, we adopt a proper video quality metric (specifically, the MOVIE index in this work) to compute the quality scores of all frames.

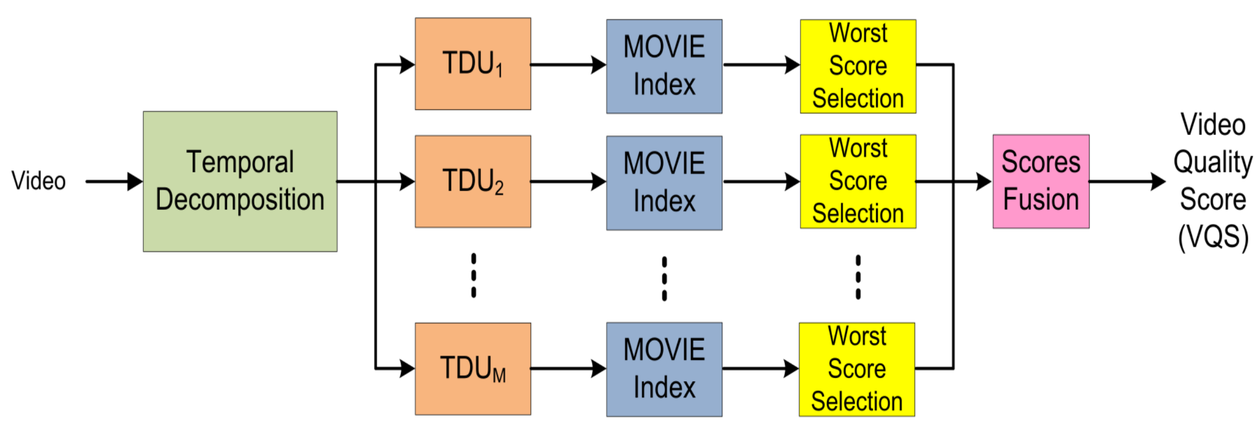
❖ Based on the sociological findings, choose the worst scores of TDUs for data fusion.

❖Finally, a regression approach is used to fuse selected worst scores from all TDUs to get the ultimate quality score of the input video.

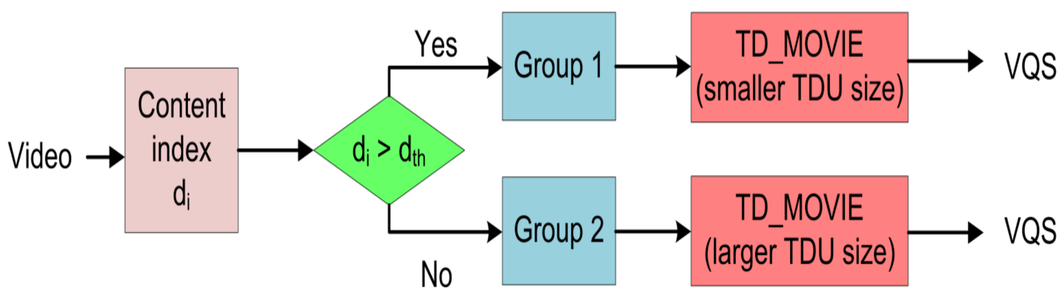
❖Conduct extensive experiments on the LIVE video database, and show that the proposed approach indeed improves MOVIE and is also competitive with other state-of–the-art video quality metrics.

Proposed Video Quality Assessment (VQA) Methods

❑TD_MOVIE



❑CA-TD_MOVIE



Experiments and Performances

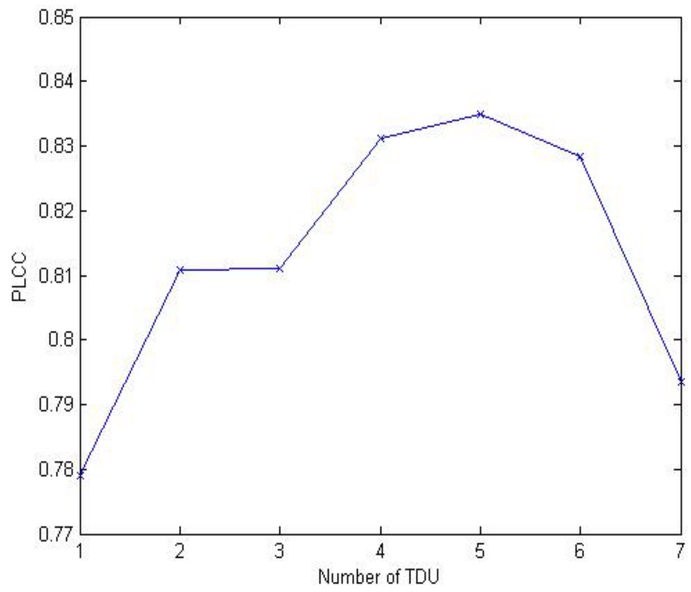
❑Test Database

LIVE Video Quality Database

➢YUV 4:2:0 formats

➢spatial resolution: 768x432 pixels

❑Performance Measure of TD_MOVIE vs. number of TDUs



❑Performance of TD_MOVIE

Measure / Type of Score	Min.	Mean	Max.
PLCC	0.6990	0.8015	0.8350
SROCC	0.6581	0.7814	0.8233
RMSE	7.8504	6.5649	6.0397

❑Performance Comparison of VQA models

VQA Model / Measure	PLCC	SROCC	RMSE
PSNR	0.5465	0.5205	9.1929
V-SSIM	0.6058	0.5924	8.7337
VQM	0.7695	0.7529	7.0111
MOVIE	0.8116	0.7890	6.4130
TD_MOVIE	0.8350	0.8233	6.0397
CA-TD_MOVIE	0.8494	0.8420	5.7932

Conclusions

❑We proposed a methodology (TD_MOVIE) to enhance the performance of MOVIE by using

- Temporal decomposition
- Selecting the worst scores for fusion

❑The results can be improved further via CA-TD_MOVIE by using

- Adaptive TDU size selection based on a content aware mechanism

❑Experimental results show that they both outperform MOVIE as well as other state-of-the-art video quality metrics by a significant margin

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