Title:
Subjective and objective quality evaluation of compressed medical video sequences

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ABSTRACT
Existing objective video quality metrics such as VQM from NTIA [1] and MOVIE [2] are known to perform well for assessing compression degradation in natural scene and broadcast television sequences but their suitability for the quality evaluation of compressed medical video has not been studied extensively. In this work we assess the quality of compressed medical video sequences using objective metrics and a subjective evaluation study conducted with non-expert subjects. Test sequences consist of High Definition medical video of laparascopic surgery. Four compression types (Motion JPG and three variants of H.264) at four bit-rates (5, 12, 20, and 45 Mbps) are studied and compared to original uncompressed sequences. One reduced reference metric (VQM) and one full-reference metric (MOVIE) are studied. Subjective video evaluation consists of overall quality scores as well as difference scores between compressed and uncompressed sequences for similarity and five types of artifacts or attributes: blurring, blocking, noise, color fidelity, and motion artifacts. The results of the subjective and objective evaluations exhibit similar trends across the compression types and bit-rates, and may indicate that these objective quality metrics may be valid reflections of subjective quality judgments made by non-expert observers on compressed medical video sequences. In future work we will expand the subjective quality evaluation to include expert laparoscopic surgeons as subjects.

[1] M. H. Pinson and S.Wolf, “A new standardized method for objectively measuring video quality,” IEEE Transactions on Broadcasting, vol. 50, no. 3, pp. 312–322, Sep. 2004.

[2] K. Seshadrinathan and A. C. Bovik, "Motion Tuned Spatio-temporal Quality Assessment of Natural Videos", *IEEE Transactions on Image Processing*, vol. 19, no. 2, pp. 335-350, Feb. 2010.