

Robust Statistical Temporal Filtering for Temporal Fluctuation Artifact Reduction ^[1, 2]

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Abstract: A long standing and challenging problem with digital video is the temporal fluctuation noise which impairs digital video picture quality, due to either techniques used for compression or spatial de-noising techniques to minimise random noise incurred in video acquisition or transmission process. For instance, while the H.264/AVC video coding standard uses a spatial loop-filter to reduce the blocking artefact, the temporal fluctuation artefact is still noticeable between intra-coded frames or between an intra (I) frame and its preceding or subsequent inter prediction (P) frames. This talk will present the robust statistical temporal filtering (RSTF), a non-linear temporal post-filtering framework using a robust prior model to reduce the temporal fluctuation and to preserve picture sharpness of the reconstructed video. Performance of the fluctuation reduction with proposed filter is evaluated by a temporal metric, namely the sum of square difference (SSD), and a traditional metric, the peak signal to noise ratio (PSNR). Significant reduction of temporal fluctuation artefacts has been observed using the RSTF, compared with existing benchmark methods.

References

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2. J.X. Yang and H.R. Wu, "A Non-linear Post Filtering Method for Flicker Reduction in H.264/AVC Coded Video Sequences," Proc. of 2008 10th IEEE Workshop on Multimedia Signal Processing, pp.181-186, Cairns, Australia, 2008.

About the speaker: Hong Ren Wu received his BEng. and MEng. from University of Science and Technology, Beijing, (formerly Beijing University of Iron and Steel Technology), P.R. China, in 1982 and 1985, respectively. He received his Ph.D. degree in electrical and computer engineering from The University of Wollongong, NSW, Australia, in 1990. From 1990 to 2005, Dr Wu worked on academic staff of Faculty of Information Technology, at Monash University, Australia. Dr Wu joined Royal Melbourne Institute of Technology (RMIT University) in February 2005 and is currently a professor of visual communications engineering and discipline head of Computer and Network Engineering, School of Electrical and Computer Engineering. Dr Wu has published extensively in refereed journals and his significant contributions in the area of the proposed tutorial include the no-reference picture blocking metric in 1997, the vision model based video blocking metric in 2002, vision model based perceptual image coding in 2004, and perceptually lossless coding of medical images in 2006. Dr Wu is the co-editor of the book *Digital Video Image Quality and Perceptual Coding*, (Taylor and Francis, 2006). Dr Wu was a guest editor, respectively, for special issue on Multimedia Communication Services, Circuits, Systems and Signal Processing, No. 3, 2001 and for the special issue on Quality Issues on Multimedia Broadcasting of the *IEEE Transactions on Broadcasting*, Vol. 54, No.3, Pt II, September 2008.