⓪ 图像全参考客观评价算法比较

Lin Zhang等人在论文《A COMPREHENSIVEEVALUATION OF FULL REFERENCE IMAGE QUALITY ASSESSMENT ALGORITHMS》中，比较了几种全参考图像质量评价算法，在此记录一下他们的结果。

下表所示是他们所用的图像库，包含了： TID2008database ， CSIQ database ， LIVEdatabase ， IVCdatabase ， Toyama-MICTdatabase ， Cornell A57 database ，以及 WirelessImaging Quality database (WIQ) 。从上到下数据库的规模依次下降。

一共比较了如下所列的全参考图像客观质量评价算法：

PeakSignal to Noise Ratio(PSNR)

峰值信噪比。

noise quality measure (NQM) index

参考文献：N. Damera-Venkata, T.D. Kite, W.S. Geisler, B.L. Evans, and A.C.Bovik, "Image quality assessment based on a degradation model," IEEE Trans. IP,vol. 9, pp. 636-650, 2000.

universal quality index (UQI)

参考文献：Z. Wang and A.C. Bovik, "A universal image quality index," IEEE SignalProcess. Lett., vol. 9, pp. 81-84, 2002.

structural similarity (SSIM) index

参考文献：Z. Wang, A.C. Bovik, H.R. Sheikh, and E.P. Simoncelli,"Image qualityassessment: from error visibility to structural similarity," IEEE Trans. IP,vol. 13, pp. 600-612, 2004.

multi-scaleSSIM (MS-SSIM) index

参考文献：Z. Wang, E.P. Simoncelli, and A.C. Bovik, "Multi-scale structuralsimilarity for image quality assessment," ACSSC'03, pp. 1398-1402, 2003.

information fidelity criterion (IFC) index

参考文献：H.R. Sheikh, A.C. Bovik, and G. de Veciana, "An information fidelitycriterion for image quality assessment using natural scene statistics," IEEETrans. IP, vol. 14, pp. 2117-2128, 2005.

visual information fidelity (VIF) index

参考文献：H.R. Sheikh and A.C. Bovik, "Image information and visual quality,"IEEE Trans. IP, vol. 15, pp. 430-444, 2006.

visual signal to noise ratio (VSNR) index

参考文献：D.M. Chandler and S.S. Hemami, "VSNR: a wavelet-based visualsignal-to-noise ratio for natural images," IEEE Trans. IP, vol. 16, pp. 2284-2298, 2007.

information content weighted SSIM (IW-SSIM) index

参考文献：Z. Wang and Q. Li, "Information content weighting for perceptualimage quality assessment," IEEE Trans. IP, vol. 20,

pp. 1185-1198, 2011.

Riesz transforms based feature similarity (RFSIM) index

参考文献：L. Zhang, L. Zhang, and X. Mou, "RFSIM: a feature based imagequality assessment metric using Riesz transforms," ICIP'10, pp. 321-324, 2010.

feature similarity (FSIM) index

参考文献：L. Zhang, L. Zhang, X. Mou, and D. Zhang, "FSIM: a feature similarityindex for image quality assessment," IEEE Trans. IP, vol. 20, pp. 2378-2386,2011.

统计了每种全参考图像质量评价算法的客观值和主观值之间的相关系数：

斯皮尔曼秩相关系数（Spearman rankorder correlation coefficient，SROCC），肯德尔秩次相关系数（Kendallrank-order correlation coefficient，KROCC），皮尔森线性相关系数（Pearsonlinear correlation coefficient，PLCC）。客观算法的结果和主观评价的结果相关性越高，则以上三个系数的值越接近于1，说明算法越准确。由表可见，FSIM算法的准确度相对来说是最高的，三个系数的取值分别达到了0.9094，0.7409，0.9050。

下表将上表的数值进行了一下排名。排在前面的有FSIM，IW-SSIM，RFSIM，MS-SSIM。猛然发现：PSNR真的是好不准啊~~

下表反映了每种全参考质量评价算法的耗时，耗时越短，说明算法速度越快。

总体说来FSIM，IW-SSIM，RFSIM这三种比较新的图像质量评价算法准确性比较高。

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个人分类： 视频质量评价