DATABASES employed in the paper "Evaluation of quality measures for color quantization"

The available material is constituted by the databases employed in the paper "Evaluation of quality measures for color quantization", Multimedia Tools and Applications, (), 1-35, DOI: 10.1007/s11042-021-11385-y, 2021.

This material is intended to support the possibility of comparison by other authors.

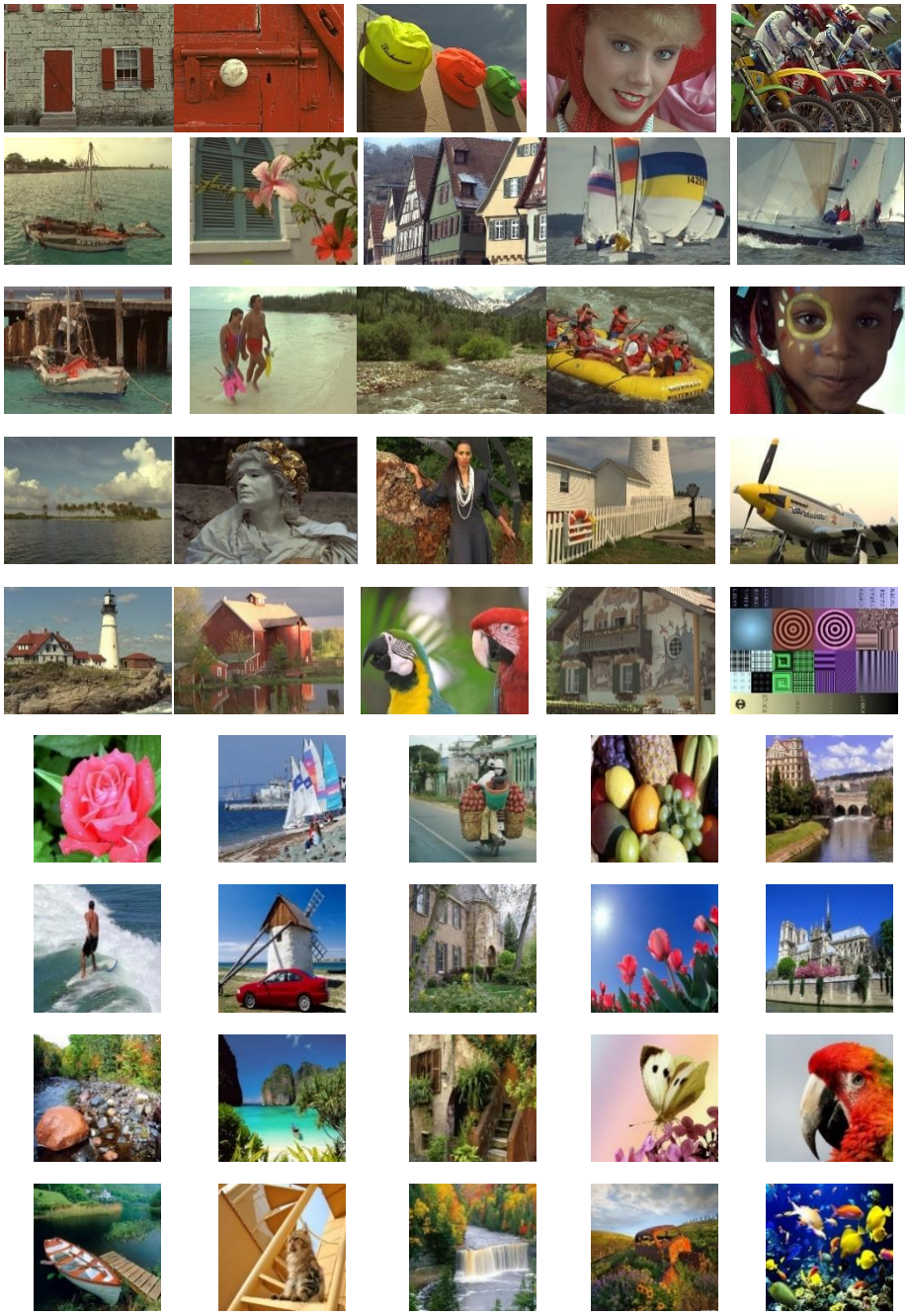
In case of publishing results obtained utilizing this material, please refer to the following paper:

Ramella, G. Evaluation of quality measures for color quantization", Multimedia Tools and Applications, (), 1-35, DOI: 10.1007/s11042-021-11385-y, 2021

In this paper, the reference images are taken from two publicly available image quality databases: **TID2013** (here indicated by TID) and **CQD**.

TID: Ponomarenko N., Jin L., Ieremeiev O., Lukin V., Egiazarian K., Astola J., Vozel B., Chehdi K., Carli M., Battisti F., Jay-Kuo C. Image database TID2013: Peculiarities, results and perspectives, Signal Process. Image Commun., 30, pp. 57–77 (2015)
Available online: www.ponomarenko.info/tid2013.htm (accessed on 18 August 2021)

CQD: Hassan M., Bhagvati C. Evaluation of Image Quality Assessment Metrics: Color Quantization Noise. Intern. J. Appl. Inform. Syst., 9, 1, pp. 1-8 (2015)
Available online: http://scis.uohyd.ac.in/~hassan/Color_Quantization_Database.rar (accessed on 22 November 2017)



Reference images of TID rows 1-5; reference images of CQD rows 6-10.

TID contains 25 reference color images of fixed size 512x384 pixels and the distorted images generated by 24 types of distortions with fifth distortion levels for a total of 3000 distorted images. The number of quantization levels is selected in the interval [2, 380] for each test. All images are saved in a bitmap format without any compression and with the original File names. TID provides subjective scores in terms of MOS for comparing the performance between fidelity measures. In addition, the nine chosen metrics, calculated using the Matlab code Metrix MUX Visual Quality Assessment package[1], are available.

CQD contains 25 reference color images of fixed size 512x512 pixels and the distorted images generated by quantization noise with seven levels of quantization: 4, 8, 16, 32, 64, 128, 256 colors by five popular CQ methods, for a total of 875 distorted images. The popular CQ methods are the Kmeans, Median Cut, Octree, Wu's, Dekker's SOM method. All images are saved in the database in png format without any compression and with the original filenames. CQD provides subjective scores in terms of MOS for comparing the performance between fidelity measures. Unfortunately, the nine chosen metrics are not available. To favorite the comparison with TID, the authors calculated the nine metrics using the Metrix MUX Visual Quality Assessment package and added them to CQD.

Data have been extracted from TID2013 to form two sub-databases, named TID* and TIDD*, by considering those relative to the color quantization distortion (\#7) and color quantization followed by dithering (\#22). In detail,

TID* contains the 25 reference images of TID of fixed size 512 x 384 pixels and the distorted images generated by quantization noise (\#7) with fifth distortion levels for a total number of 125 images. Like TID, the number of quantization levels is selected in the interval [2, 380] for each test. The corresponding MOS and the nine chosen metrics relative to the images of TID* are extracted from TID.

TIDD* contains the 25 reference images of TID of fixed size 512 x 384 pixels, the distorted images generated by quantization noise (\#7), and color quantization with dithering (\#22) with fifth distortion levels for a total number of 250 images. Like TID, the number of quantization levels is

[1] Gaubatz, M. "Metrix MUX Visual Quality Assessment Package: MSE, PSNR, SSIM, MSSIM, VSNR, VIF, VIFP, UQI, IFC, NQM, WSNR, SNR", 2014. http://foulard.ece.cornell.edu/gaubatz/metrix_mux/

selected in the interval [2, 380] for each test. The corresponding MOS and the nine chosen metrics relative to the images of TIDD* are extracted from TID.

From CQD and the two above sub-databases have been obtained other two databases, named TID*CQD and TIDD*CQD. In detail,

TID*CQD contains the 25 reference images of TID of the fixed size 512 x 384 pixel and the 25 reference images of CQD of a fixed size of 512 x 512 pixels. Also, it contains the distorted images generated by quantization noise (\#7) with fifth distortion levels for a partial total of 125 images plus the distorted images generated by the five popular CQ methods at seventh levels of quantization (4, 8, 16, 32, 64, 128, 256 colors) for a partial total of 875 distorted images, and hence with a total of 1000 distorted images. In TID*CQD, the images have filenames, number of quantization levels, and format type (.bmp or .png) depending on the database from which they have been derived. The corresponding MOS and the nine chosen metrics are extracted from the databases TID* and CQD.

TIDD*CQD contains the 25 reference images of TIDD* of fixed size 512 x 384 pixel and the 25 reference images of CQD of a fixed size of 512 x 512 pixels. Also, it contains the distorted images generated by quantization noise (\#7) and color quantization with dithering (\#22) plus the distorted images generated by the five popular CQ methods at seventh levels of quantization (4, 8, 16, 32, 64, 128, 256 colors) for a partial total of 875 distorted images, and hence with a total of 1125 distorted images. In TIDD*CQD, the images have filenames, number of quantization levels, and format type (.bmp or .png) depending on the database from which they have been derived. The corresponding MOS and the nine chosen metrics are extracted from the databases TIDD* and CQD.

Material description

The shared folders **CQD, TID_star, TIDD_star, TID_star_CQD,** and **TIDD_star_CQD** respectively contain the following databases: **CQD**, **TID***, **TIDD***, **TID*CQD**, **TIDD*CQD**.

In the folder **CQD**, there are the following subfolders:

- **distorted_images_CQD_Kmeans** - containing the distorted images of CQD by Kmeans
- **distorted_images_CQD_Median** - containing the distorted images of CQD by Median
- **distorted_images_CQD_Octree** - containing the distorted images of CQD by Octree
- **distorted_images_CQD_SOM** - containing the distorted images of CQD by SOM
- **distorted_images_CQD_Wu** - containing the distorted images of CQD by Wu
- **distorted_images_CQD_all** - containing the distorted images of CQD by all previous methods
- **metrics_CQD** - containing the files with the metric values.
- **MOS_CQD** - containing the files with the MOS values.
- **reference_images_CQD** - containing the reference images of CQD.

In the folder **TID_star** (**TIDD_star**), there are the following subfolders:

- **distorted_images_TID_star** (**distorted_images_TIDD_star**) - containing the distorted images of TID* (TIDD*)
- **metrics_TID_star** (**metrics_TIDD_star**) - containing the files with the metric values.
- **mos_TID_star** (**mos_TIDD_star**) - file with the MOS values.
- **reference_images_TID_star** - containing the reference images of TID*.

In the folder **TID_star_CQD** (**TIDD_star_CQD**), there are the following subfolders:

- **distorted_images_TID_star_CQD** (**distorted_images_TIDD_star_CQD**) - containing the distorted images of TID*CQD (TIDD*CQD)
- **metrics_TID_star_CQD** (**metrics_TIDD_star_CQD**) - containing the files with the metric values.
- **mos_TID_star_CQD** (**mos_TIDD_star_CQD**) - file with the MOS values.
- **reference_images_TID_star_CQD** - containing the reference images of TID*CQD.