

## Advanced Image Processing Lab

### Lab. 5- Image Global and Local Statistics

Observation and comparison of image global and local statistics

#### 5.1 Image histograms and their moments

5.1.1. Compare global histograms of images of detail and texture types (program **imghisto.m**). Observe and compare local histograms of images of detail and texture types (program **lchsttst.m**). Observe variability of local histograms of images (programs **lchstcom.m** and **lchstdif.m**).

5.1.2. Write a program for computing local mean and local standard deviation (using program **conv2.m**). Observe local mean and local standard deviation for different images. Compare local standard deviation and local quasi-spread (program **lcrosvar.m**).

5.1.3. Observe local rank order statistics; compare local mean and local median (programs **lcros.m**, **lcmmedian.m**) for piece-wise constant test, regular detail and texture images.

#### 5.2 Image correlation functions and spectra

5.2.1. Compute, observe and explain global DFT and DCT spectra (magnitude and phase/sign components; programs **fft2.m**, **dct2.m**, **dispspec.m**, **displcsp.m**) for different images of detail and texture types.

5.2.2. Compute magnitude and phase components of DFT spectra of two images; exchange the magnitude components between two images and then reconstruct obtained spectra. Compare resulting images.

5.2.3. Compute and observe, for different images, image correlation functions (program **corimg1d.m**).

5.2.4. Generate a test chirp signal  $\sin(pk^2/T)$ ,  $k=1:1024$ , T as a parameter. Observe and compare local DFT and DCT spectra for different window size (program **lcsptest.m**). Repeat the same for different 1-D signals of your choice (image raws, ECG, etc).

5.2.5. Observe and compare local DFT and DCT image spectra for different images (program **displcsp.m**).

#### Submit

1. Print-outs, with comments, of histogram comparison.
2. Print-outs, with comments, of comparison image local mean, local standard deviation and quasi-spread. Print-outs, with comments, of comparison of local mean, median and other rank-order statistics.
3. Print-outs, with comments, of comparison of global and local image spectra.
4. Print-outs, with comments, of comparison of global and local image spectra magnitude exchange.
5. Print-outs, with comments, of comparison of image correlation functions.
6. Print-outs, with comments, of comparison of 1-D signal local spectra.
7. Print-outs, with comments, of comparison of image local spectra.