MaZda 4.5 Tutorials
### Color Image Analysis

June 2006

Piotr M. Szczypiński

Technical University of Lodz
Institute of Electronics

Color images

Procedures for texture analysis implemented in MaZda operate on grey-scale images only. A color image having three color components (red, green and blue), when loaded into MaZda, must be converted into the gray-scale image. Grey-scale images, which are results of such conversions are usually called color components or color channels. MaZda provides eight ways of such conversion, which may be selected through the File→Color conversion… menu option and a File→Color conversion dialog box.
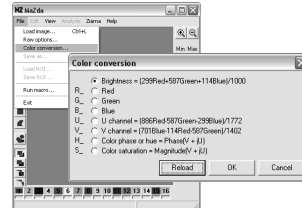

Loading color image

Select *File→Color conversion…* menu option, with a *Color conversion* dialog box set the color to grey-scale conversion required, and press *OK*. Then, load color bitmap image into the MaZda software.

To load another channel of the image that was already loaded select *File→Color conversion…* menu option, set the conversion required and press *Reload*

Test image and results of color to gray-scale conversions

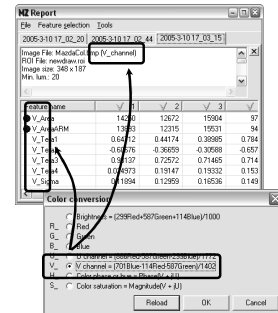Natural image and its brightness, U and V channel
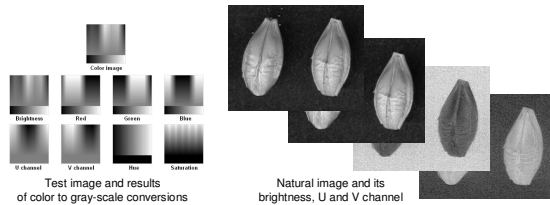
3

Analysis

The analysis is run the same way as for grey-scale images. The resulting features are presented within a *Report* window.

Depending on a color channel that was analyzed, corresponding prefix is added to every feature name. The exception is a brightness channel, for which no prefix is added.


4

Combining analysis results

The analysis results computed for various channels of the same color image may be merged in a single tab-page.

To merge data from the currently viewed tab-page with data from the left-adjacent tab-page select *File→Aggregate reports* from the *Report* menu.

Example of report that combines analysis results from three color channels of the same image
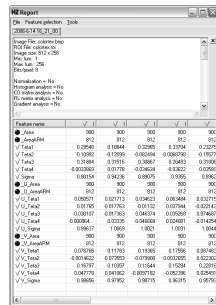
5

Make it quick

To simplify the analysis of color images a plugin *Color analysis* has been written for MaZda. The plugin will automatically load consecutive color channels of the image, run the analysis and merge reports.

To quickly analyze all the channels of color image:
- Load a color image to be analyzed
- Draw regions of interest
- Set analysis options
- Start the Color analysis plugin (*Tools→Color analysis*)
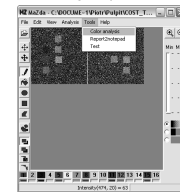
6

Exercise 1

1. Start MaZda or, if it is already started, close all the report tab-pages
2. Load brightness channel of *dtex.bmp* from *Tutorials\4_Color_Analysis* folder
   (The image contains two similar textures)
3. Define 16 regions of interest of an approximate size 60x60 pixels, 8 regions per texture
4. Set analysis options and run the analysis (*Analysis→Run*)
5. Select the most discriminative features with a Fisher coefficient procedure
   (Observe values of Fisher coefficient computed for the selected features).
6. Start B11 (*Tools→B11 analysis* in the *Report* window)
7. Observe the raw data distribution (*Analysis→Raw data* in *B11*)
8. Close the report tab-page in the *Report* window of MaZda and start *Color analysis* plugin (*Tools→Color analysis*)
9. Repeat steps 5 – 7
10. In which case the Fisher coefficients where higher?
11. Which color channel holds the most valuable information for discrimination of the two textures?

Exercise 2

1. Start MaZda or, if it is already started, close all the report tab-pages
2. There are three classes of endoscopic images in *Tutorials\4_Color_Analysis* folder, six images per class (file names beginning with letter *A*, *B* or *C*)
3. Load these images one by one, and perform *Color analysis* within the circular region of interest covering a field of view
4. Assign corresponding class names to the feature vectors produced by MaZda
5. Select the most discriminative features with a selection method of your choice
6. View the data distribution with B11
7. Which color channel holds the most valuable information for discrimination of the three classes?