MaZda
Texture Analysis Software
M. Strzelecki, P. Szczypiński
Institute of Electronics
Technical University of Lodz, Poland

Quantitation of Magnetic Resonance Image Texture

- to develop methods for reliable discrimination of different kinds of tissue in MR images

- contribution to more reliable and repeatable medical diagnosis

Goals

- To develop PC MS Windows computer programs with appropriate GUI and agreed set of functions.
- To develop efficient techniques of image processing and pattern recognition, adequate for MRI quantitative texture analysis.

MaZda texture analysis software

- specialised software tool for calculation of texture features (parameters), feature selection, preprocessing and classification
- written in C++ and compiled for a graphical user interface of Windows 9x/NT system
- MaZda – acronym for co-occurrence matrix – Macierz Zdarzen in polish
- under develop since 1996 in Institute of Electronics, Technical University of Lodz

MaZda - texture analysis flowchart

Loading and viewing image

- Image size adjustment
- Image grey-scale or threshold adjustment tools
- Window for viewing image info-header
- Image layer switches: grey-scale, threshold, hide
Definition of regions of interest (ROIs)

- Built-in tools for ROI editing
- Viewer for image histogram within ROI
- Window for changing ROI name (class)
- Up to 16 ROI marked with unique colours

3D Editor

- Loading and visualisation of 3D images
- Definition of volumes of interest

Analysis options (1)

- Haar wavelet analysis options
- Wavelet energy within ROI
- Switch for type of image normalisation

Analysis options (2)

- Tree-view for maps selection
- Mask size adjustment
- Step adjustment
- Choosing region for normalisation
- Saving and loading options

Analysis

- Possibility to stop the analysis
- More precise information on what have been done

Feature maps window

- Saving and loading maps in floating-point format
- Feature value in mouse cursor co-ordinates
Report window – feature values

Report window – feature selection

Automation of analysis

Script language commands:

- `LoadImage file_path_and_name`
- `LoadROI file_path_and_name`
- `LoadOptions file_path_and_name`
- `RunAnalysis`
- `SaveReport file_path_and_name`
- `CloseReport`
- `SaveMap file_path_and_name`
- `CloseMap`
- `RenameROI roi_name1,...`
  
/ and ; for remarks

Further feature preprocessing with B11

Visualisation, analysis, classification

Methods

- data analysis: PCA, LDA, NDA
- classification: k-NN, ANN
Unsupervised data analysis

- data clustering: AHC, SCM, k-means
- image segmentation