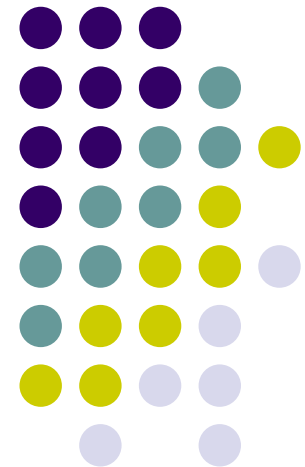


Texture-based classification of MR images : differentiation of 5 grades of liver fibrosis

Duda D, Bezy-Wendling J, Kretowski M
(*Rennes- Bialystok*)





Database

- 21 patients
- for each patient, maximally 30 images were chosen
- for each image, one circular ROI was manually traced
- the smallest ROI area: 214 pixels, the largest ROI area: 1598 pixels

5 classes		3 classes	
Class	Number of ROIs	Class	Number of ROIs
F0	195	F0	195
F1	89	F1+F2	114
F2	25		
F3	60	F3+F4	295
F4	235		
Total	604	Total	604

Texture Analysis

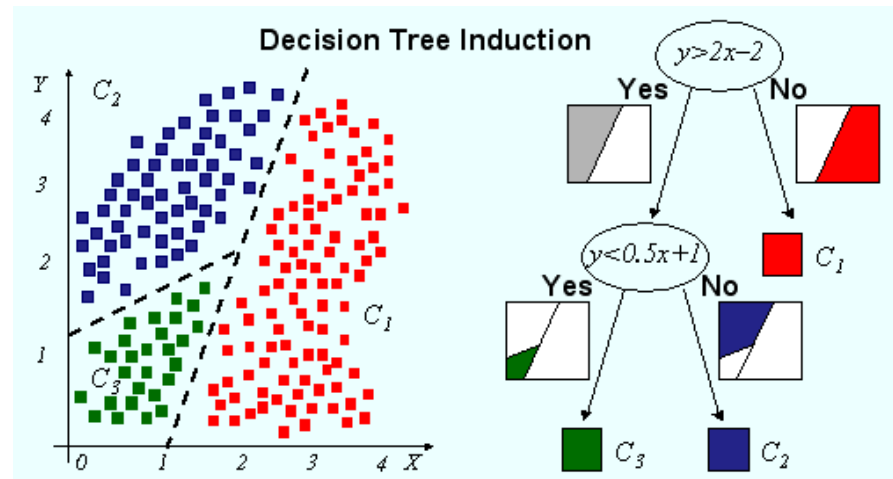


- **Texture Analyser** (software developed by M Kretowski and D Duda)
- Image preprocessing
 - Dicom images converted to BMP format with 256 gray levels
- 24 textural parameters utilized for tissue characterization:
 - 4 first order parameters (calculated from the gray level histogram)
 - 8 Run-Length Matrix features
 - 11 Co-occurrence parameters
 - fractal dimension estimator based on the concept of Brownian Motion Model



Methods

- **Classifier :** Decision induction trees by using dipolar criteria



- **Feature selection :**
Sequential Forward Selection method applied separately for each non-terminal tree node



Results

- Experiments
 - Each experiment was repeated 20 times
 - 10-fold cross-validation was used to estimate the classification accuracy
- Results
 - Classification of 5 classes of liver tissue: F0, F1, F2, F3, F4
Classification accuracy (with standard deviation) was 95.89 ± 0.59 %
 - Classification of 3 classes of liver tissue: F0 vs (F1 and F2) vs (F3 and F4)
 - F1 and F2 was put in the same class
 - F3 and F4 was put in the same classClassification accuracy (with standard deviation) was 97.32 ± 0.61 %