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ETM+

PCA

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ETM+

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eCognition

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(eCognition

Per- Per-parcel classification
) field classification

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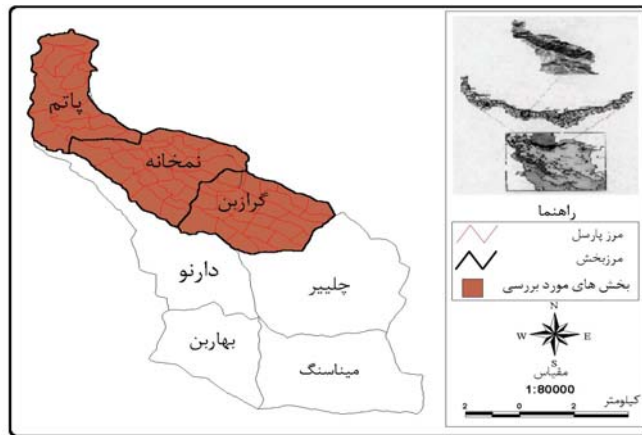
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- Pixel based
 - Object oriented
 - Segmentation
 - Scale parameter
 - Fuzzy Logic
 - Knowledge-based
 - Salt-peppery

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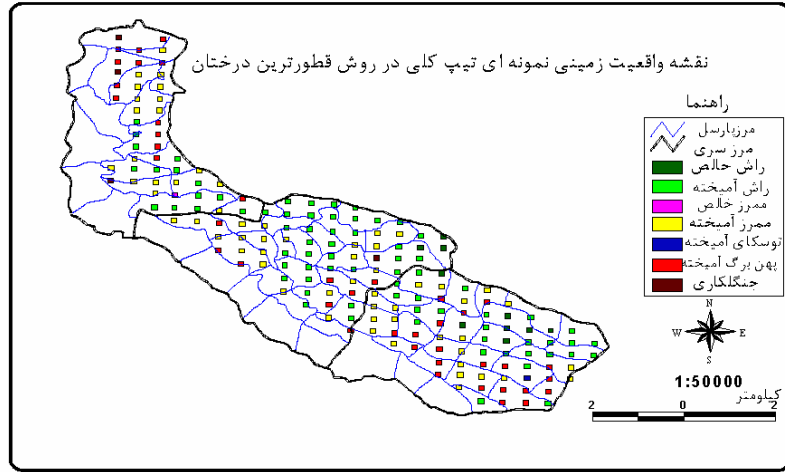
$51^{\circ} 39' 56''$ $51^{\circ} 33' 12''$
 $36^{\circ} 36' 45.5''$ $36^{\circ} 32' 0.8''$
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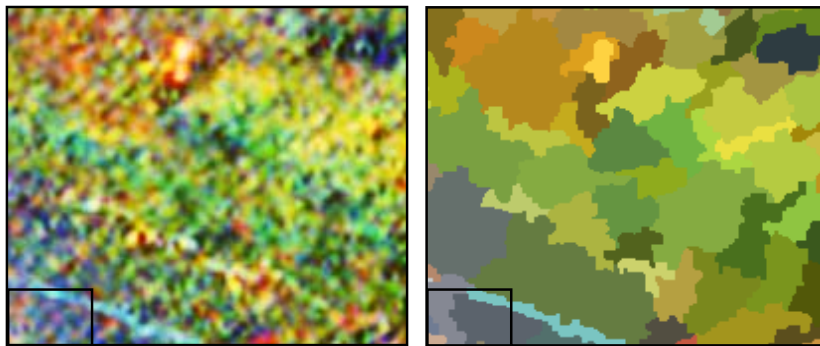
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- Divergence

Convolution
Resampling
Principal Component Analysis
Tasseled Cap Transformation
Ratioing
- Bathachariya

ETM1, ETM2, ETM3, ETM4, ETM5, ETM7, Pan	PCA1, PCA2, PCA3, Brightness, Greenness, ETM4-ETM2, ETM4/ETM2, ETM4/ETM3+ETM2, (ETM4- ETM7/ETM4+ETM7), (ETM4- ETM3/ETM4+ETM3)	PCA1, PCA3, Brightness, Greenness, ratio(4/2), ratio (4/3+2)



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(RGB)

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(eCognition) -

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Context
Semantic
Threshold

Smoothens
Compactness
Primitive Objects
Membership Function
Nearest Neighbor
Sample Objects
Class Descriptions
Texture

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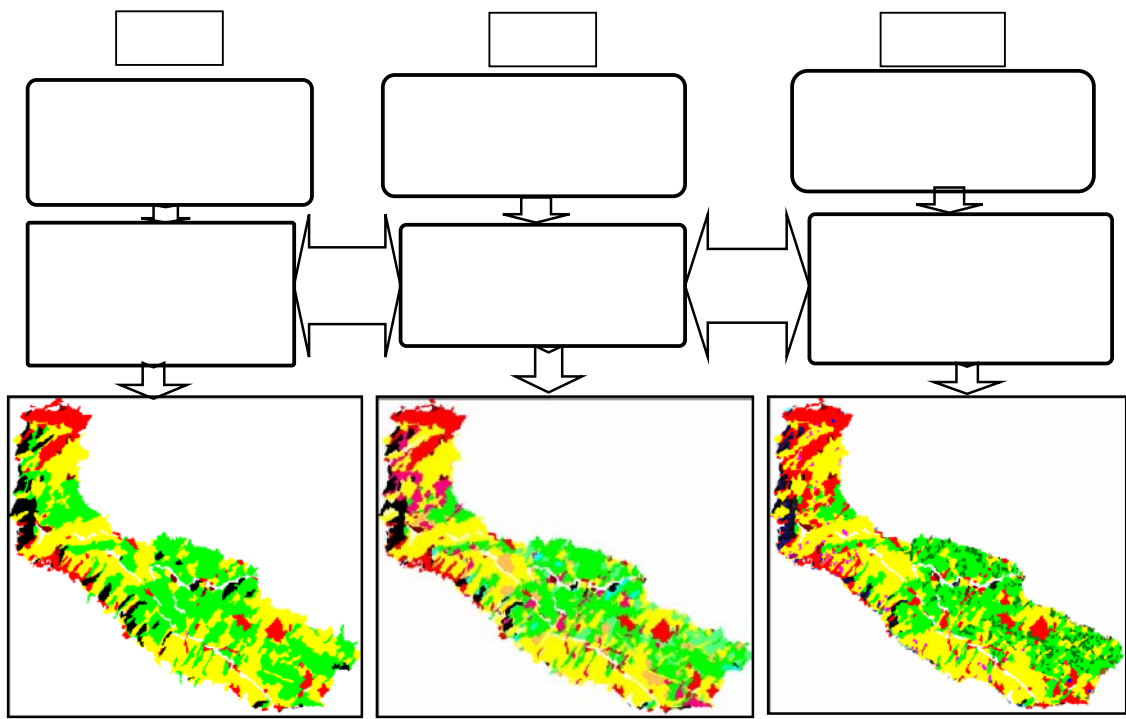
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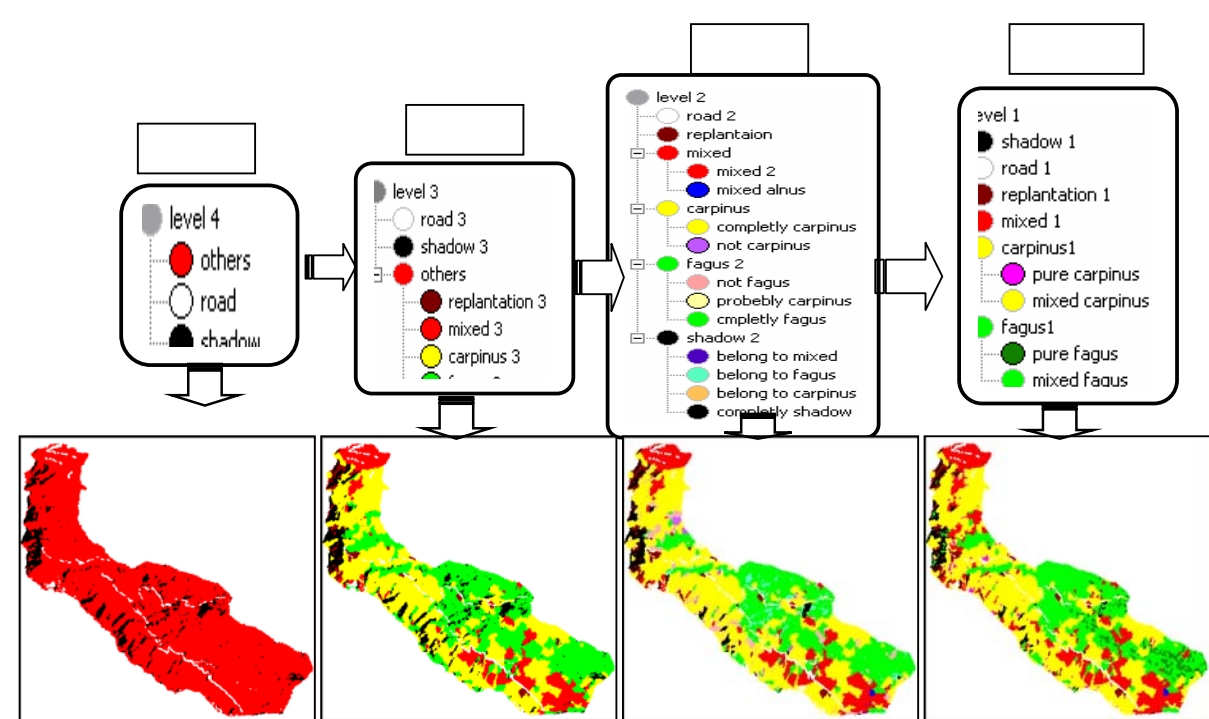
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Overall accuracy: /		
Kappa accuracy: /		
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ETM+

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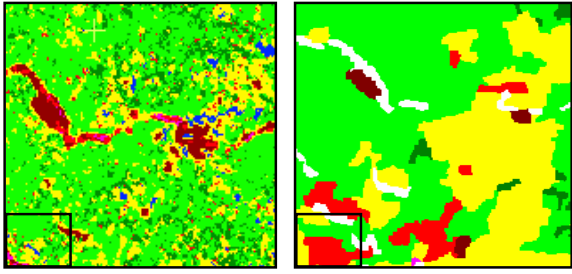
ETM+

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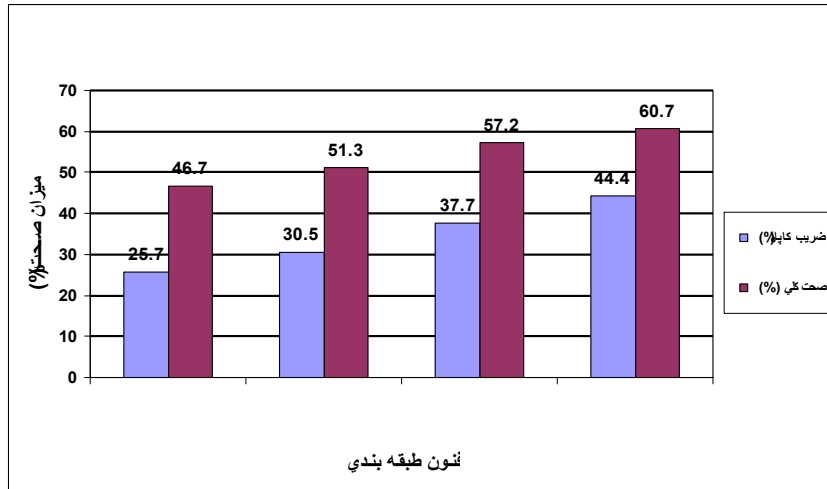
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Klaus Itten

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Comparison of pixel-based and object-based approaches for forest type mapping using satellite data

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Abstract

There are various methods for classifying phenomena in satellite images. Conventional methods of classification are pixel-based. Satellite images may also be classified using object-based methods. In this method, a group of pixels that form the phenomenon are selected. In order to compare pixel-based and object-based methods in distinguishing forests types, this research was conducted in Forest Research Station of Tehran University in the central Caspian forests. The Landsat 7 ETM+ image was analysed. First, a precise orthorectification was done. Then, enhancement techniques, including PCA, Tasseled cap, and rationing, were employed. In the pixel-based method the Maximum likelihood classifier was used and the forest types classified were pure beech, mixed beech, pure hornbeam, mixed hornbeam, mixed alder, mixed and plantation areas. In object-oriented approach, three classification methods of nearest neighbour, membership function, and an integrating of both methods were used. In each method the best segmentation parameters were applied in order to extract the homogenous area as a forest type. By nearest neighbour method, after segmentation, some objects in each type were selected as training objects. By membership function method, classification was done by three steps and segmentation levels. At each level, forest types hierarchically were extracted by determining the best fuzzy logic and function. The third method (combined of two first methods) was performed by four segmentation and classification levels. To generate a ground truth map of forest general types, a systematic random sampling method with 193 plots with one hectare area was done in the forest. In each plot, forest type was determined by computing tree species frequencies using two methods: total number of each species and, a frequency of each species in 100 thick tree classes. The accuracy assessment of forest type maps showed that the object-oriented classification approach considerably improved the results comparing with pixel-based classification approach (from 25.5% to 44.4%). The study also indicated that the combined nearest neighbour and membership function methods could improve the results over the other techniques.

Key word: Forest type, Classification, ETM+, Pixel-base, Object-base, Nearest neighbor, Membership function