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PAN XS

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IRS-1C

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ETM+<sup>1</sup>

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(*Gleditsia* (*Carpinus betulus*)  
(*Diospyrus lotus*) (*caspiaca*)  
(*Parrotia persica*)

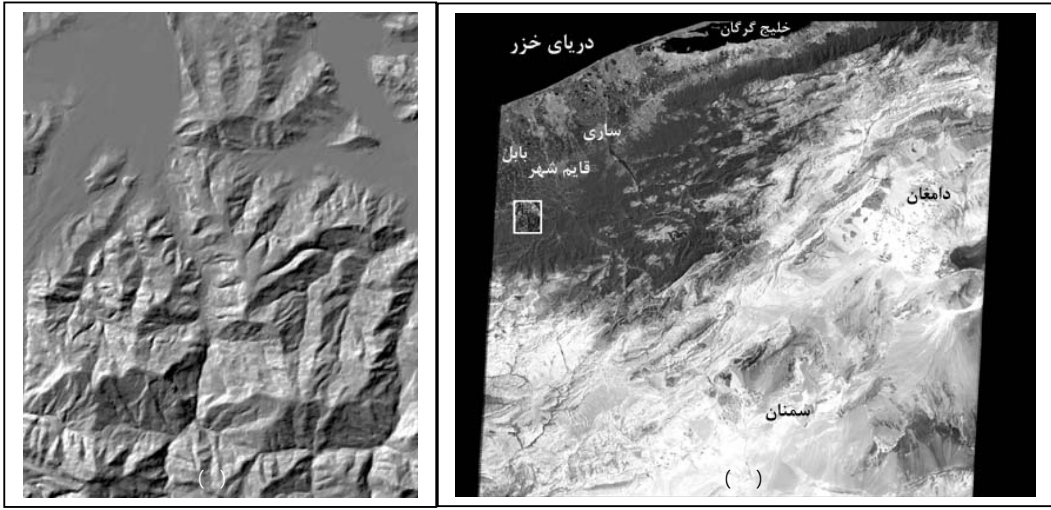
ETM+

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Fast



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noise

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(NDVI<sup>3</sup>, VI)

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- Digital Elevation Model (DEM)

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- Vegetation Index

Normalized Difference Vegetation Index

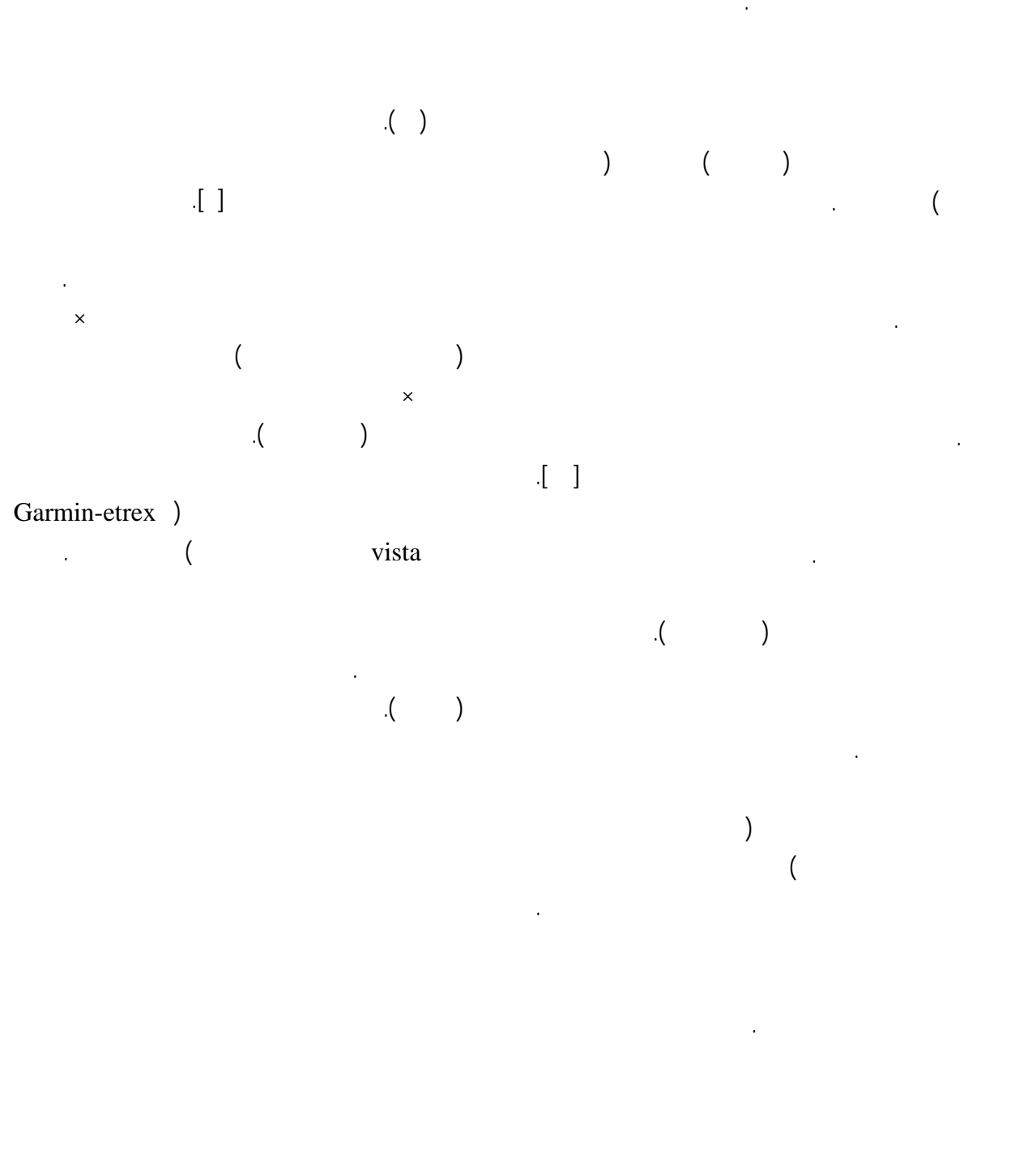
- Tasseld Cap Transformation

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- Colour Space Transformation

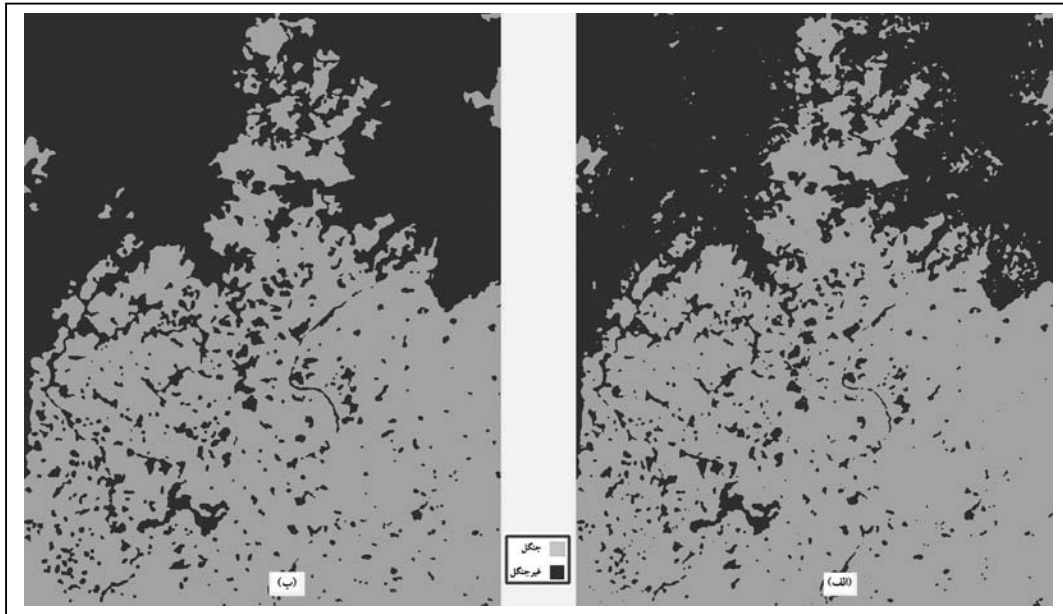
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Orthorectification

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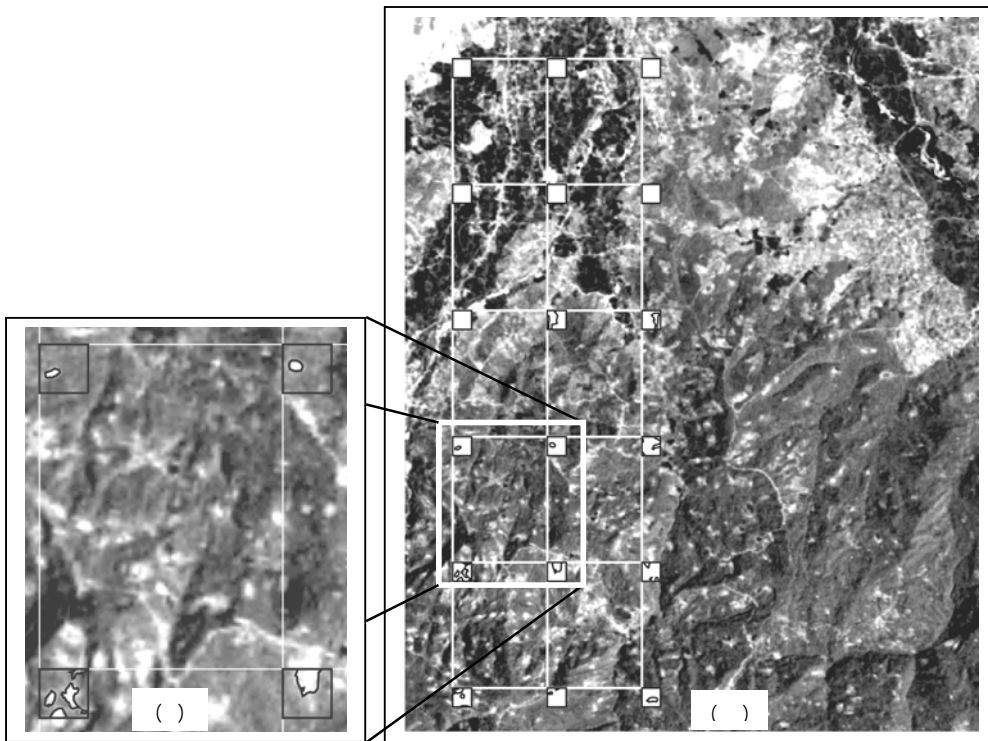


- Global Positioning System (GPS)

- Spectral Response
- Automatic Classification
- Transformed Divergence Index
- Bhattacharyya Distance



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GPS

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ردیف	مجموعه باندها	صحت کلی (%)	ضریب کاپا	ردیف	مجموعه باندها	صحت کلی (%)	ضریب کاپا
۱	B1, B2, B3, B4, B5, B7, B8	۹۴/۵۶	۰/۸۹۰	۱۰	FUS1-3, FUS5-7	۹۳/۵۱	۰/۸۶۹
۲	B1, B2, B3, B5, B7, B8	۹۴/۳۸	۰/۸۸۶	۱۱	FUS3, FUS5, BRIGHT, NDVI	۹۴/۳۲	۰/۸۸۵
۳	B1, B2, B3, B5, B7	۹۴/۴۵	۰/۸۸۹	۱۲	FUS3, FUS5, BRIGHT, NDVI, B8	۹۴/۳۵	۰/۸۸۶
۴	PCA1-3, PCA5-7, B8, BRIGHT	۹۴/۳۱	۰/۸۸۵	۱۳	PCA1-3, PCA5-7, B4, B8, BRIGHT	۹۴/۳۷	۰/۸۸۶
۵	PCA1-3, PCA5-7, B8, NDVI	۹۴/۰۱	۰/۸۷۹	۱۴	PCA1-3, PCA5-7, B4, B8, NDVI	۹۴/۰۲	۰/۸۷۹
۶	PCA1-3, PCA5-7, B8, NDVI, BRIGHT	۹۴/۱۵	۰/۸۸۲	۱۵	PCA1-3, PCA5-8, NDVI, BRIGHT	۹۴/۰۴	۰/۸۸۰
۷	PCA1-3, PCA5-7, B8, NDVI, GREEN	۹۴/۰۸	۰/۸۸۰	۱۶	PCA1-3, PCA5-8, BRIGHT	۹۳/۸۳	۰/۸۷۵
۸	PCA1-3, PCA5-7, B8	۹۴/۳۵	۰/۸۸۶	۱۷	PCA1-3, PCA5-8	۸۶/۲۸	۰/۷۲۷
۹	FUS1-7	۹۳/۳۲	۰/۸۶۵				

: PCA1-3  
: PCA5-7  
: PCA5-8  
: BRIGHT  
: GREEN  
: NDVI  
: FUS1-3  
: FUS5-7  
: FUS1-7

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IRS-1C Pan

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## Evaluation of Landsat7 Data in Forest Mapping (Case study: Forest of Babol)

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### Abstract

To prepare a comprehensive plan for the northern forests of Iran, the precise quantitative and qualitative information are required. In this regard, forest mapping is one of the first steps. The traditional methods of forest mapping (e.g. aerial photo interpretation) in large areas are costly in terms of time and money spent. In contrast, satellite data benefit from a great potential in decreasing fieldwork and consequently reducing the cost of forest data acquisition. In this study the potential of Landsat7 data for forest mapping was evaluated. The study was performed in an area covered by a sheet of 1:25000 topographic map in forest of Babol in Mazandran Province. To do this, Landsat7 ETM+ image acquired on July 30, 2001 was evaluated. Due to the existence of plenty of residential units, the study area is mostly degraded. The evaluation of image quality illustrated less than  $\pm 1$ DN stripping distortion in the ETM 2, 4, 5 bands. There were also duplicate scan lines and sweep (less than 1 pixel) distortion in all spectral bands. Orthorectification was implemented using ephemeris data and a digital elevation model. Several image enhancements such as spectral ratioing, PCA and tasseled cap transformation were performed. The panchromatic band was fused with the other spectral bands utilizing color space transformation and spectral response methods. In order to assess the accuracy of the classified image, a sample ground truth map was prepared through fieldwork considering 18 sample plots (360×360m). Image classification was performed applying automatic and hybrid (digital and visual) classification procedures. In order to classify images, maximum likelihood classifier was applied using training set, prepared through fieldwork. Overall accuracy of resulted forest map in comparison with the ground truth was equal to 94.56%. This map was vectorized to accomplish hybrid interpretation. It was then edited based on various color composites, fused images and ancillary data such as slope, aspect, hillshading images and additional information obtained from fieldwork operation. In this case the overall accuracy of the forest map was equal to 96.39%. This research indicates the high potential of Landsat 7 data for forest mapping in such mountainous and fragmented forests.

**Keywords:** Forest map, Landsat7, Orthorectification, Hybrid classification, Accuracy, Sample ground truth