

IAF EARTH OBSERVATION SYMPOSIUM (B1)
Earth Observation Data Management Systems (4)

Author: Mr. Rustam Rustamov
Azerbaijan, r_rustamov@hotmail.com

Mr. Elman Alaskarov
Azercosmos, Space Agency of Republic of Azerbaijan, Azerbaijan, elman.alaskarov@azercosmos.az

MACHINE LEARNING ALGORITHMS ENVIRONMENT FOR LAND COVER/LAND USE
CLASSIFICATION**Abstract**

During the space image processing in order to highlight areas with vegetation the NDVI feature is widely used for classification of segments. It develops on the basis of spectral information which starts from infrared spectrum wavelength. However, NDVI does not allow the forest to be unambiguously separated from the investigated field and texture information should be used for this as there are many small shadows on forest areas that distort the picture in the process of processing of space data. For the time being the machine learning algorithms application in classification of satellite imagery has achieved a significant progress and based on tree-based classifiers have been widely recognized as one of the best instruments in data processing. In the same time period an object-oriented image analysis technique was developed with offering important improvements in classification over traditional pixel-based approaches under certain conditions. One of the most promising algorithms for classification of satellite images of machine learning is the Random Forest (RF) classification which was firstly proposed by Breiman-Cutler. Within the framework of offered research work was used the RF algorithm in the object-oriented classification of Azersky satellite images for mapping of land for agricultural use purposes in the north-central part of the country, Azerbaijan based on reference data collected during field measurements from more than selected for investigation 120 field sites. Factors such as mean spectral response, spectral variability, texture, and shape characteristics were included as a feature set for object-based classification. The multi-resolution segmentation method was used to create objects as a segmentation algorithm. It has been analyzed and optimized the combined approach based on the random forest classifier (RF) and object-oriented analysis and applied it to Azersky multispectral satellite data in order to develop land use maps of selected agriculture area. In the beginning stage the RF classifier was optimized by reducing the number of input variables. In the next stage of processing an experiments were conducted for the data type (spectral, textural) and quantifying their impact into classification accuracy. The results of such approach demonstrated that optimization of the random forest classifier allows to reduce the number of input variables and thus reduces data running time. Classification results were improved with a hierarchical classification approach, achieving an overall accuracy of 90.3