AUTOMATED INTERPRETATION OF SATELLITE IMAGERY: EXPERIENCE AND PROBLEMS

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Remotely-sensed data find an effective use in monitoring geospatial information. Interpretation possibilities of satellite images and accuracy of extracted information play an important role in the process.

Visual expert interpretation still remains the most reliable, though, time-consuming way of feature recognition. The existing methods of automated classification and spectral analysis are helpful to make the process much easier.

The most common way of satellite imagery automated interpretation is a multi-spectral imagery classification with the use of sample data sets. This method proved to be useful when processing medium (30-100m) and low resolution images (worse than 100m). However, the improvement of the spatial resolution results in more detailed contents of satellite images. It becomes more obvious with very high resolution imagery (1m and better): extreme diversity of objects and variety of intensity characteristics lead to getting high noise ratios for classifications and mixing object types. In this case, in order to improve the interpretation quality complementary data are used, such as digital terrain models, structure and texture parameters.

The paper covers the results of the experiments, conducted in FGUP «Uralgeoinform» and devoted to the problem of automated interpretation of satellite imagery with a medium, high and very high resolution. The experiment included images from three satellites: Landsat 7, SPOT 5, Ikonos. Objects of different types went through recognition: hydrographical features, roads, urban built-up areas, forests, clearings, deforested areas, etc. The interpretation was made using ENVI software.

To reveal the interpretation possibilities of different ground objects, SPOT 5 images were analyzed with the help of supervised/unsupervised classification algorithms. Ground object detection properties were studied using these algorithms and selected spectral ranges.

Also, terrain changes at the regional level were detected on the basis of Landsat 7 satellite imagery, acquired at different times, and local changes of urban built-up areas were recognized using Ikonos satellite data. The “change detection” function was applied at this stage.

The experiment allowed to bring out the problems, associated with the automated interpretation process and estimate advantages and disadvantages of different methods of automatization. In general, the findings let us speak about the utility of practical applications of satellite imagery automated interpretation.