

## **Abstract**

This thesis is on the topic: "Study of object recognition methods at Earth remote sensing images". Full size - 85 p., the number of pictures - 40, tables - 1, expressions - 62, literature list size - 22.

### **Purpose**

The purpose of this thesis is to study in detail different object recognition (OR) methods at Earth remote sensing (ERS) images, to understand its advantages and disadvantages, to estimate a possibility of its usage in different situations. Tasks of study was also to estimate error rate of OR methods.

### **Relevance**

ERS is widely used in Earth surface, ground and water object shapes changes analysis, analysis of objects location, cartographic databases improvement.

The OR processes of two shots of the same territory but with different characteristics, that were made in different time against different weather do differ in complexity and methods that should be used for correct recognition. So to solve OR task, one should know OR methods, algorithms and effectiveness of each of them according to the situation.

### **Results**

In the thesis important recognition factors were analysed: factors that influence on ERS accuracy and feature groups usable in pattern recognition. It was mentioned that statistical and geometrical features are in great use.

There are two groups of recognition tasks: simply classification; specific objects search and localization. First group methods study are methods that are based on statistical approach. Discriminant function usually is a Gauss probability function assumption. Also questions of how to estimate classification error rate was studied. Clustering as an alternative recognition way was introduced.

Iterative approach that is based on neural networks (without back link) was introduced as an alternative to statistical approach. New areal objects recognition algorithm was created.

### **Scientific originality**

The scientific originality of thesis is an attempt to gather advantages of digital image processing methods (DIP), multispectral statistical approach, pattern recognition and decision support systems (DSS) development. Areal object algorithm was introduced for the first time.

## **Thesis results usage**

Thesis results were used during development of object recognition block of "Earth remote sensing workstation" in the "Technical project of System and Information processing centre". It was developed by "Institute for information registration problems" of National Academy of Science of Ukraine in the international contract with Republic of China. Areal object algorithm was used. OR methods analysis made it clearly to understand how to use classification methods during development in the future.

## **Future development proposals**

Theoretical conclusions on classification methods are ready to be used in practice. It would be great to enhance areal object algorithm in terms of accessory criterion for the object expansion.

## **Keywords**

PATTERN RECOGNITION, EARTH REMOTE SENSING, SHOT, RECOGNITION FEATURES, CLASSIFICATION METHODS, TRAINING, CLUSTERING, STATISTICAL APPROACH, NEURAL NETWORKS, IMAGE, AREAL OBJECT, LOCALIZATION ALGORITHM.