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CARTOGRAPHIC STUDY OF WATER RESOURCES USING HIGH-RESOLUTION SATELLITE IMAGES.

Ibragimov Lazizbek Toshpulat ogli
Senior Lecturer, Samarkand State Architectural and Construction Institute, Samarkand, Uzbekistan
Babaxanova Dilnavoz Yokubjonovna
Master of the Samarkand State Architectural and Construction Institute. Samarkand, Uzbekistan
Narzullayeva Shahnoza Nomozboy qizi
Master of the Samarkand State Architectural and Construction Institute. Samarkand, Uzbekistan

ABSTRACT

In modern research practice, thematic decoding is carried out both using visual instrumental methods and using automated methods. Visual interpretation of spatial images is aimed at identifying and classifying surface latitudes, topographic objects, areal and linear changes, geomorphological objects (landforms and geomorphological processes), as well as obtaining widely developed features at high latitudes.

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Introduction

One of the main purposes of visual decryption is to control the results of automatic decryption, which is usually performed interactively, that is, under the constant control of the decoder. The visual decoding technology is based on the landscape indication method [1]. The theoretical foundations of this method are: the dependence of the nature of the photographic image on the geometric and physical properties of relief objects; the interconnection of the components of the geographic landscape; existing laws of distribution of objects and events in time and space. The essence of the method lies in the analysis of the geographical interconnections of the components of the complex. On the basis of clearly distinguishable patterns of some objects, a conclusion is made about the nature of what is hidden or incomprehensible.

An important advantage of visual decoding is the ability to compare the objects under study with surrounding objects, to analyze their spatial and logical location, which is important in the development of digital systems at this stage [2], for example, there are examples of identifying buildings under construction and constructed, water treatment facilities, industrial facilities, pipes etc.

It should be noted that the results of decoding a visual password are largely subjective, and, despite this visual decoding, it still remains an important, in some cases expert method for decoding

E-mail address: editor@centralasianstudies.org

spatial images.

Currently, in connection with the widespread development of automated software systems for processing remote sensing data, digital methods of classification and analysis of spatial images are increasingly used, which not only improve the quality and reliability of the results of thematic decoding, but also allow them to be instantly and substantially implemented with significant savings in human labor. resources. ...

Automatic decryption is one of the processes of processing digital remote sensing data on a computer, including entering images into a computer, decrypting a thematic password, and expert evaluation of the data.

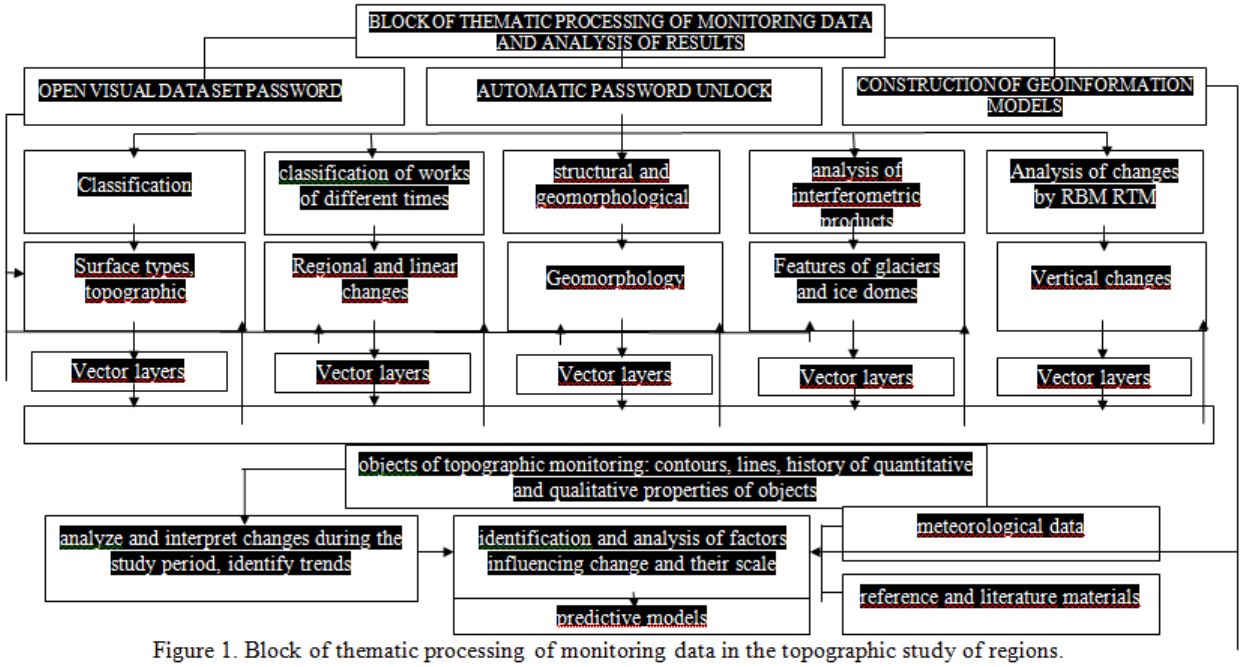

Figure 1. Block of thematic processing of monitoring data in the topographic study of regions.

Currently, the following programs are widely used for thematic interpretation of space images, which allow working with Earth remote sensing data: ERDAS IMAGINE, ENVI, ARCGIS, GLOBAL MAPPER [3].

The most effective way to solve the problem of determining the degree and quantifying changes in surface water bodies involves the use of aerospace data, on which most of the space images of the studied areas of the earth's surface are obtained. However, the analysis of images of different objects is usually performed on multispectral satellite images of the same area at different times, which determines a very large amount of manual work using only visual or visual-instrumental processing methods. However, the correct implementation of automated thematic processing of the investigated spatial images significantly depends on the mathematical apparatus and programs used to solve the tasks.

Our analysis of the literature has shown that many researchers widely use statistical approaches to create modified algorithms for detecting and analyzing objects to improve the reliability and accuracy of detecting and localizing objects, among which similarity functions are often used.

«... the minimax multiplicative similarity function provides the highest localization accuracy when searching for objects in static images, but is most sensitive to the effects of noise; the use of

similarity functions of minimax additive or minimax average additives to search for objects in static images, distorted by impulse noise, makes it possible to ensure the minimax probability of false signals and defects, as well as high accuracy of object localization in the image in comparison with other functions such as correlation; it is recommended to search for objects in distorted images with low-level Gaussian interactions based on the minimax complement or minimax mean complement similarity function, because in this case they have improved contrast compared to others and are the most optimal mean correlation function with high Gaussian interactions ...».

Conclusion

In this case, the author used well-known methods of processing spatial images: the transformation method, the method of basic components, cluster analysis, and others. Panchromatic spatial images were processed, which were grouped at the first stage of processing (k-means method), and then the classified images were analyzed. Analyzing the results, the author comes to the conclusion that, in general, the methods under consideration allow detecting changes in images, but due to different shooting conditions (time of year, time of day, weather conditions, etc.), these methods are used to detect changes in images, but not are always effective. At the initial stage, it is necessary to perform the procedure for equalizing the brightness of the investigated space images.

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