INFORMATION TECHNOLOGY FOR THE DEVELOPMENT OF A DECISION SUPPORT SYSTEM FOR OBJECT RECOGNITION ON DIGITAL SAR-SATELLITE IMAGES

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The paper analyzes the peculiarities of developing knowledge bases for recognizing objects on digital space images of SAR satellites in automated monitoring of the urban environment, as well as approaches to segmenting digital images based on deep neural networks. It is noted that more attention is being paid to the development of knowledge-based approaches to multicriteria analysis of complex systems based on new intelligent information technologies. Recently, software systems focused on the processing of digital space images have been developed and improved. Among them is ENVI, a system implemented on a modular basis. The latest version of the ENVI software package includes, among other things, processing and in-depth analysis of multispectral and hyperspectral images, correction of geometric, radiometric and atmospheric distortions, creation of high-precision digital terrain and terrain models, support for spatial raster and vector formats, interactive image enhancement, interactive decoding and classification, specification of the processing area, analysis of images in the radio range, etc. The software package can perform input data pre-processing, display, filtering, spectral analysis, terrain analysis, image correction, classification, three-dimensional model building, and topographic mapping with coordinate reference.

The possibility of using the fuzzy neural network Wang-Mendel for pixel-by-pixel classification of certain objects is analyzed and the architecture of the modified fuzzy neural network Wang-Mendel as a classifier for object segmentation on digital space images of SAR satellites is developed. Also, proposals for the implementation of an autoencoder classifier using a modified fuzzy neural network Wang-Mendel based on INMT2 for pixel-by-pixel classification of objects defined by and the creation of a generalized neural network model for their segmentation have been developed.

Thus, an information technology for the development of a decision support system for recognizing objects on digital satellite images of SAR satellites in automated monitoring of the urban environment has been built, which, based on functional modeling, formally represents the process of developing a decision support system using a fuzzy convolutional neural network model, which allows for the unification and standardization of the process of developing a decision support system of the corresponding class.

References:

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