

## ABSTRACT

### **Krivtsov S. O. Research cognitive properties of artificial neural networks in computer vision systems.**

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The thesis deals with improving the reliability of computer vision systems. After researching the existing methods for solving problems of computer vision using artificial neural networks a model of information-analytical system of recognition and classification objects from video stream has been developed. For the task of pattern recognition the following methods is used: a method of converting a color image to black and white for the possibility of its binary representation, the two-pass method of sequential scans for determining connected regions and method of separation useful objects from accidental. Method of affine transformation stretching\compression is used to normalize the image before performing classification. The problem of objects classification is solved by the following varieties of artificial neural networks: Rosenblatt's perceptron with classical method of training by the  $\delta$ -rule, frame-similar neural network with training by the backpropagation method and modified Hebbian neural network. Method of determining the optimal result from several varieties of artificial neural networks has been developed and applied to improve the quality of classification. Also, software implementation of the developed model of information-analytical system of recognition and classification objects has been made. The experimental research, the results of which proved the efficiency of using the method for determining the optimal result in the developed model, has been carried out.

Keywords: artificial neural networks, computer vision, Rosenblatt's perceptron, Hebbian neural network, classification of objects, pattern recognition, the  $\delta$ -rule, backpropagation.