

Название публикации:

Intelligent recognition of electrocardiograms using selective neuron networks and deep learning

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Аннотация:

Proposed basic elements of neuron networks – selective neurons and selective perceptron. Shown the efficiency of the use of these elements of neuron networks for many known applications of neuron networks: image recognition, neuron games, object management and other applications, related to processing large amounts of data. Describes the known image recognition methods, based on the use of neuron network on the neurons of the McCulloch-Pitts. Considered convolutional neuron network deep learning, neuron network type cognitron and neocognitron, allowing to image recognition, resistant to deformations, noise. Proved the efficiency of image recognition using selective neuron networks using selective neurons. Neuron networks of this type do not require the calculation systems of weighting coefficients that provides a significant reduction of computation in the design. Justified the selective application of neuron networks for the intelligent recognition of contour images of standard electrocardiograms (ECG) and complex cardiogram for rhythm disturbances of the heart. Developed an intelligent system for recognition of medical curves. The system was made on the basis of selective neuron networks, deep learning and convolutional transformations of special type. Despite the limited number of neuron layers, the developed system has allowed to obtain good quality diagnostic. With appropriate additional training, the system can be equipped with a large number of the reference standard ECG and the accuracy of diagnosis can be improved. It is planned to conduct the study of intelligent recognition methods ECG in the direction of the expansion of the database of diagnosed ECG, increasing the reliability of the recognition.

Ключевые слова:

Convolutional transformations, Deep learning, Diagnosis by ECG, Diagnostic accuracy, Intelligent diagnostic system ECG, Neuron networks, Selective neuron networks, Biomedical engineering, Convolution, Deep learning, Diagnosis, Education, Efficiency, Electrocardiography, Image recognition, Intelligent systems, Neurons, Calculation systems, Diagnostic accuracy. Intelligent diagnostic systems, Intelligent recognition, Large amounts of data, Neuron networks, Recognition methods, Weighting coefficient, Neural networks