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Multi-weight connected artificial neural network models in classification problems

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Abstract: Classification of objects in classification problems is an important problem in multi-weighted artificial neural network models, which has attracted the attention of many researches in recent years, processes based on extensive analysis of problems through mathematical models and artificial intelligence. we observed. One such approach is artificial neural network models, which simultaneously calculate the processes of working with several types of objects in a large image. Therefore, residual neural networks have grown significantly. In this article, we have considered the topics related to the issues related to the models of artificial neural networks. Later, we will learn about artificial neural networks, convolutional and residual neural networks and their common models. We have expressed our thoughts about the models mentioned in the problem of classification of multi-weight connected artificial neurons.

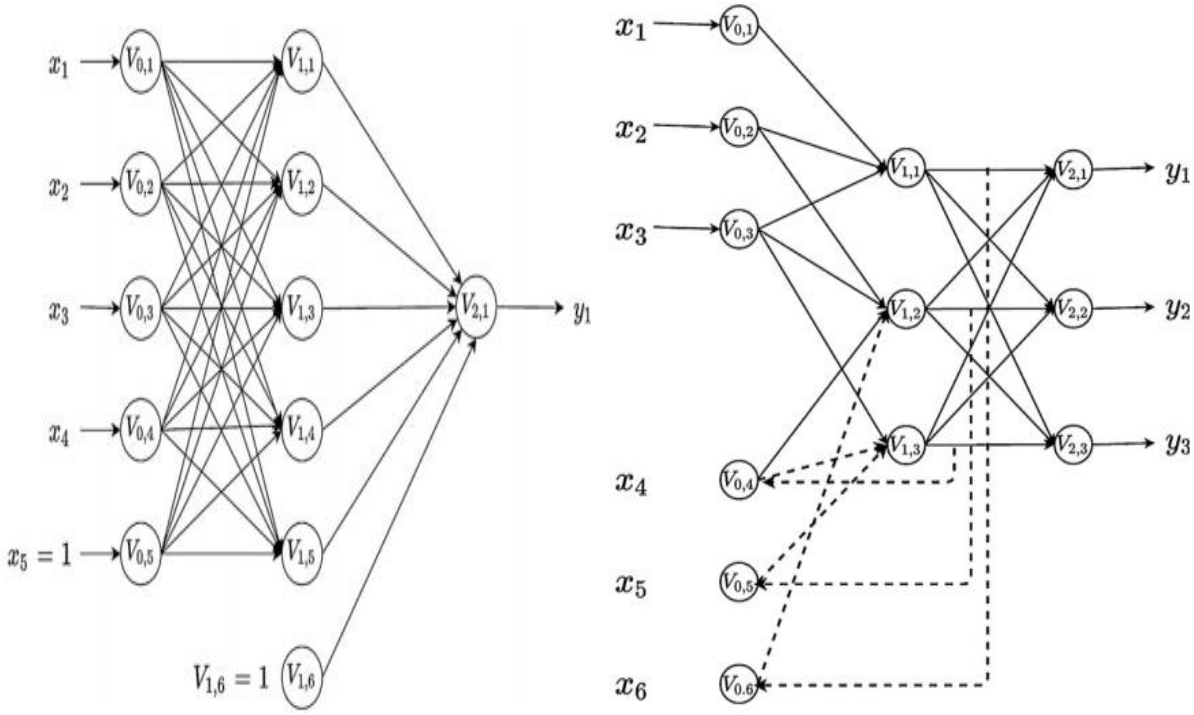
Key words: Object classification, artificial neural networks, artificial neural error, convolutional neural networks, residual neural networks, neural model.**Business-to-consumer (B2C)**

Introduction

Many neural networks, including many multi-weight connected artificial neural network models, have a layered topology. There are a few exceptions where the network is not clearly layered, but they can generally be interpreted as layered. This topology can be seen in multi-weight connected artificial neural network models, such as some associative memory networks. In classification problems, based on multi-weight connected artificial neural network models, we can divide into units as one-layer (multi-weight neural networks) where all neurons act as input and output. Thus, artificial neurons are abstract objects in classification problems. For artificial neural network models, the neural network can be characterized by the number of neurons, the number of layers are divided into neural network models based on the dimensions of the layer consisting of multi-weighted neural networks and the number. Neurons in each layer need familiarity to understand the problem of image-based classification. Learned neural networks may not be as sensitive to small changes in incoming signals. This intrinsic ability to see the image behind the noise and blur is critical to understanding images in the real world. This allows us to bypass the strict precision requirements of computers and pave the way for a system that works with the unimproved world we live in. It should be noted that the artificial neural network performs generalization automatically, based on its own structure, and not with the help of "human thinking" written in the form of computer programs. The directions of modeling and research of neural networks can be divided into two main categories. The first is to analyze the processes occurring in the nervous system, study the mechanisms of thought processes (based on formal logical models), simulate the structure and properties of the nervous system in order to understand its structural and functional

characteristics, and conduct research aimed at simulating and analyzing the biological and neurophysiological processes of the brain. includes. Here the main role is played by comparing the model of the neural network and its properties with the biological prototype, and analyzing the adequacy of the neural network by identifying the processes predicted by the model in the nervous system. The second category includes research aimed at implementing data processing using neural network models. In this case, only general features are obtained from the biological prototype, the main attention is focused on the analysis of the efficiency of the artificial neural network regardless of whether the processes occurring in the model correspond to natural biological prototypes for solving practical problems. The study of the properties of neural networks is carried out by theoretical analysis of a formal systematic mathematical model or taking into account its practical application, among which hardware (scheme) and software (neurosimulators) can be distinguished. The choice of the form of implementation is determined by the complexity of the chosen official model of the network, as well as the scope of its application. Hardware applications (neurocomputers) are characterized by a high speed of parallel data processing, but this process often has certain technical difficulties: less flexibility in terms of modification and sensitivity to external influences. Data for neural networks and neural networks is a simplified model of biological analog signals. When some experts talk about neural networks, they think of the human brain. Yes, this is close to the truth, but the human brain is extremely complex, so this is a very approximate comparison, since we are not able to completely recreate its mechanisms, even with modern technology. As a result, it is better to call a neural network a program based on the principle of the brain. A neural network is a collection of neurons. Each of these neurons receives information, processes it, and then transmits it to another neuron. And every neuron processes signals in the same way. Synapses that connect neurons are responsible for this. Each neuron is capable of having many synapses that weaken or amplify the signal. Neurons are able to change their properties over time. By the way, by correctly choosing the parameters of the synapses, we can get the correct results of changing the input data at the output. Studies have shown that the brain is incredibly complex, and a system of billions of neurons, each connected to hundreds or thousands of other neurons, has found that even the greatest human-made supercomputers do not stand a chance. This shows the perfection and complexity of human natural intelligence. Therefore, the study of artificial neural networks is one of the most important issues. Another interesting feature of neural networks is that neural networks are robust: even if a few elements do not work correctly or fail, the network can still produce correct results, but with less accuracy. Some types of neural networks have the ability to create an abstract image based on multiple input signals. However, it should be noted that artificial neural networks are not a panacea. They are not very suitable for tasks that require accurate and error-free mathematical calculations. Researchers still do not agree on the definition of a neural network. A neural network is a system consisting of many simple computing elements working in parallel. The result of network work is determined by the structure of the network, the strength of connections, as well as the type of calculations performed by each element. Neural networks are parallel distributed processors capable of independently extracting information from incoming data. The operation of such a network is similar to the operation of the brain, because knowledge is acquired through the learning process, and the acquired knowledge is not stored in a single element, but is distributed throughout the network. A neural network is a system consisting of a large number of simple

computing elements. The result of each element depends only on its internal state. All elements work independently of each other, that is, without synchronizing with other elements. Artificial neural networks are systems capable of receiving, storing and using knowledge. However, most researchers agree that a neural network is a system composed of many simple processors, each with local memory. The contents of such memory are commonly referred to as processor state. Processors have the ability to exchange digital data with each other. The result of the processor's work depends only on its state and the data it receives as input. Before using a neural network, a procedure called learning must be performed, during which the state of each element is adjusted based on the input data so that the network can calculate the correct answer. An artificial neural network topology represents the way neurons are connected to a shape. In other words, the topology of a neural network can be seen as the interconnectedness of neurons through their connections. The topology of a neural network, as described, plays a key role in its functionality and performance. Structure and textructure are used as general terms. It is proportionally related to the synonyms of network topology. More precisely, we can think of neural network topology from its classification or network of neurons, along with its interconnection structure connection.



Picture 1. Two-Layer Feedforward Artificial Neural Network via Multi-Weight Linked Artificial Neural Network Models.

$$\widehat{\boldsymbol{\beta}} = (X^{*\mathrm{T}}X^{*})^{-1}X^{*\mathrm{T}}y$$

$X^{*} = [1_n \; X], X = [x_1, \ldots, x_n]^{\mathrm{T}}$, $\widehat{\sigma^2} = \frac{1}{n}\left(y - X^{*}\widehat{\beta}\right)^{\mathrm{T}}\left(y - X^{*}\widehat{\beta}\right)$. Equality is always relevant to the approximate results of the neural network error rate based on these mathematical models.

In relation to artificial neurons, the loss function (also known as the objective function) is, in general, this function. Artificial multi-weight neurons intuitively match an event or the values of one or more variables to a real number. Currently, the problem of mathematical optimization of artificial neurons is sought, and these processes serve to minimize the loss function. With the objective function, the loss function or its negative, in this case, the objective is now the maximization process. The loss function works in the field of statistical machine learning. In classification problems, multi-weighted connected artificial neural network models are used to determine how close the estimated results produced by the artificial neural network are to the predicted values (the artificial neural error) or whether the neural model corresponds to the actual values. That is, it measures the quality of the loss function. We have provided information about the estimated values of the output of the network by calculating the distance score between the observed and predicted values through these studies. It is based on the observed error between the values obtained based on the actual and estimated results to measure how the results are.

Conclusion

In conclusion, we suggest that in classification problems based on multi-weight connected artificial neural network models, the predicted results of the artificial neural network model are consistent with the expected results. These errors are then averaged over the entire data set to provide just one. The number that shows how the artificial neural network works in relation to the main one is its ideal value. In search of this ideal value, you need to find the parameters. In classification problems, multi-weighted connected artificial neural network models are used to determine how close the estimated results produced by the artificial neural network are (artificial neural error), or the basis on which the neural model corresponds to the actual values. data was collected by studying its parameters.

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