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NEURAL NETWORKS AND THEIR MAIN PROPERTIES

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Abstract
Neural networks are one of the areas of research in the field of artistic intelligence, based on attempts to reproduce the human nervous system. At the same time, it allows you to simulate the work of the human brain, creating the opportunity to study and correct errors of the nervous system.In this article, the issues of neural network modeling are considered on the example of automatic processing of aeronautical data.

Keywords: biometric signals, digital signals, signal processing, expert system, artificial neural networks

Annotatsiya.
Neyron tarmoqlariva ularning asosiy xususyatlari asoslangan sun‘iy intellekt sohasidagi tadqiqotlar yo‘nalishlaridan biri. Bunda asab tizimining xatolarini o‘rganish va tuzatish qobiliyatini yaratish orqali inson miyasining ishlashini taqlid qilish imkonini beradi. Neyron tarmoqlari va ularning asosiy xususiyatlari ko’rib chiqilgan

Kalit so‘zlar: biometrik signallar, raqamli signallar, signallarni qayta ishlash, ekspert tizimi, sun‘iy neyron tarmoqlari.

Аннотация
Нейронные сети и их основные возможности искусственного интеллекта, основанное на попытках воспроизвести нервную систему человека. При этом он позволяет имитировать работу человеческого мозга, создавая возможность изучать и исправлять ошибки нервной системы.В данной статье рассматриваются вопросы нейросетевого моделирования на примере автоматической обработки аэронавигационных данных.
Ключевые слова: биометрические сигналы, цифровые сигналы, обработка сигналов, экспертная система, искусственные нейронные сети

INTRODUCTION

It is known that as a result of the creation of new algorithms in physical phenomena, biological processes and other fields, the rapid development of the economy is observed. In this regard, it creates the necessary conditions for a high demand for engineers in the field of artificial intelligence with programming skills. The rapid development of information technologies has given impetus to the improvement of air navigation systems in civil and military aviation. The aeronautical data received by the equipment of users of satellite radionavigation systems allows to solve the problems of managing aircraft and various military objects at a qualitatively new level.

RESEARCH MATERIALS AND METHODOLOGY

Start: Work begins with research on the chosen topic. Currently, diagnostic and scientific investigations are being carried out, which will help to determine how much the subject has been disclosed. The work is identified, the selected research object is shown here. The extent of revealing the selected topic is checked to the extent that it is covered in science and literature. Theoretical part: Before experimenting, the topic, hypothesis, confirmation and rejection of the hypotheses of other scientific researchers are recorded. Concepts are described, definitions are given,
assumptions are made. The theoretical part is very important because it is the necessary foundation. When the topic is revealed theoretically, a hypothesis is made, they start experiments.
Experience: This practical component is experience. A number of experiments are carried out to express the purposeful action. When an experiment is carried out, the hypothesis is confirmed or rejected. Sometimes special equipment is required.
An experiment is the creation of known, controlled conditions for a test object, studying its reactions. An experiment is designed to confirm a hypothesis in practice, and an experiment reinforces it. 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, to think
It includes studies aimed at studying the mechanisms of processes (based on formal logic models), simulating the structure and properties of the nervous system to understand its structural and functional properties, simulating and analyzing biological and neurophysiological processes of the brain.
Here, the main role is played by the comparison of the neural network model and its properties with the biological prototype, the analysis of the adequacy of the neural network by determining the processes predicted on the basis of 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 focus is on artificial, regardless of whether the processes occurring in the model correspond to natural biological prototypes for solving practical problems.
focuses on the analysis of the efficiency of the neural network
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 depends on the complexity of the selected official model of the network,

it is also determined by 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. served as a conceptual basis for the use of "general position" models (transversal models) representing the concept of The typicality condition for modular systems is that all modules have maximum capacity under given constraints and all inter-modules

means that the connections are not degenerate. it is shown that it is densely located in the space of models. Limiting the class of models to a subclass of transversal ones makes it possible to significantly simplify the study of complex systems at the level of structural images. According to time modeling, neural networks are divided into real-time and discrete-time networks. Discrete-time networks are often characterized by recurrent relational systems and are easily implemented in software, allowing them to be widely used as a means of solving practical problems of aeronautical information processing. The conducted analysis served as a conceptual basis for the use of "general position" models (transversal models), which represent the fundamental concept of typicality in system modeling. The typicality condition for modular systems is that all modules have maximum capacity under given constraints and all inter-modules

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RESEARCH RESULTS

Modern high-precision navigation systems are based on the use of inertial navigation systems, which can be supplemented by satellite correction systems and systems for navigation in the geophysical fields of the Earth. For example, the on-board automatic flight control system of the Airbus 320 aircraft includes seven flight control computers, totaling more than 130 components From this in addition, these components receive information from multiple sources, including side and rudder pedals, inertial air data reference units, landing gear interface control units, flight control computers, accelerometers, and more. Given this complexity, the amount of work load on the crew and flight safety in general depends to a large extent on how reliably the information system works. It is necessary to use the problematic structural methodology of hybrid systems synthesis to solve such problems. The choice of this methodology is related to the fact that it allows solving complex practical problems that constantly arise in the process of aeronautical data processing, without simplifying them. It also allows for the creation of self-organizing models where each element evolves and receives information and knowledge from other elements.

DISCUSSION

Achieving the functional stability of the navigation complex in certain flight modes of aircraft can be solved by using automatic processing tools and complexes. In this case, the state of the system is

determined by the values of the input and output signals of the modules. In the design of modular neural networks for aeronautical information, the system model should represent a set of project solutions and be representative (typical) within the given constraints. When the process of systematic modeling of neural networks is analyzed, all dynamics and all non-linear properties are summarized in modules. Generally, artificial neural networks mimic the properties and structure of natural neural networks, such as image processing and point detection, time series analysis, navigational signal processing, semantic data acquisition and processing, approximation, prediction, optimization of complex systems, organization of associative memory, etc., of researchers evaluating the effectiveness of using neural networks in various applications

attracts attention, and neuroscience has close interdisciplinary relations with various fields of scientific knowledge (neurophysiology, physics, mathematical modeling, psychology, statistics, synergetics).

CONCLUSION

The multi-level model based on neural networks proposed in the article allows automatic processing of aviation data in the configuration "information user - process - environment" and is based on the integration of modern information technologies for data collection and analysis. In short, the agent-based approach to intelligent data processing used in the creation of such a neural network is at the level of users of aeronautical data, the process of its collection and analysis, parallel operations

allows to ensure its implementation, and also implements it. Sharing the development of necessary solutions between specialized networks, knowledge management, proactive

it is possible to organize a transition between management processes and ensure the integration of various information systems, methods, modes of data preparation and analysis within the framework of one model.

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