

NEURONET: BASICS, APPLICATION AREAS AND PROSPECTS

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Annotation. The article discusses the basics of neuronets, as well as describes diverse areas of their application, ranging from image recognition to healthcare. The development of neuronets plays an important role in shaping artificial intelligence and many other technologies.

Keywords: neuronet, neural networks, artificial intelligence, application areas, future prospects, Midjourney

Introduction. The importance of neuronets research is primarily related to their high application potential. Nowadays neuronets are widely used by people of different ages and occupations. For example, it's becoming more common to use chatGPT and other neuronets for various purposes: from generating ideas for school lessons [1] and creating designs [2] to finding a romantic partner [3]. Yet many people still don't understand the relevance of neuronets. So, a brief and clear explanation of neuronets essence will be given in this article, as well as their possible prospects for the future.

Main part. A term “neuronets” is an informal name for “neural networks”, which researchers define as “computational models inspired by the structure and functioning of the human brain”. They consist of interconnected nodes, or artificial neurons, organized in layers (Figures 1 and 2). These networks can learn and make decisions by recognizing patterns in data, enabling them to perform tasks such as language processing, image recognition, and decision-making without explicit programming [4].

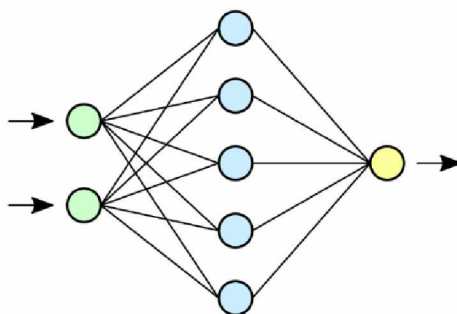


Figure 1 – The scheme of a simple neural network

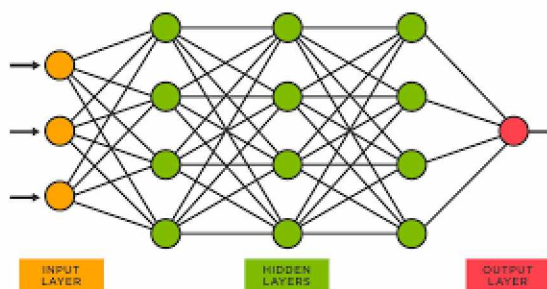


Figure 2 – The scheme of a simple neural network

Neuronets are successfully used in various spheres, showing high efficiency and demand. Their unique ability to learn from large amounts of data makes them a powerful tool in solving complex problems, bringing a high level of efficiency to various areas of human activity.

One of the most common applications of neuronets is text and image generation. Currently, there are three most popular image generation applications: DALL-E, Stable Diffusion and Midjourney. We will focus on the last one.

Midjourney is a research company and the neuronet of the same name developed by it, which creates images based on text descriptions [5]. Users can create images by sending commands to the bot in messengers (Discord or Telegram). All that needs to be done is to enter the “/imagine” message and after the request “/prompt”, enter a text description of the desired image. After all this procedure a user is asked to choose the best of four images generated by the neuronet and get an image in high graphic resolution.

We decided to experiment with the chatbot “Midjorobot — Midjourney v6” in the Telegram messenger. To work effectively with “Midjorobot” and obtain high-quality visualization, it is important to formulate requests correctly. The text description of our request was the following: “a student of IT major, high quality, detailed, picture”. The result of our experiment with the chatbot “Midjorobot” is shown in Figures 3, 4 and 5.



Figure 3 – a generated image by the chatbot “Midjorobot — Midjourney v6”



Figure 4 – a generated image by the chatbot “Midjorobot — Midjourney v6”

According to the Midjourney, a typical IT student is a guy, wearing glasses, dressed casually, often with a laptop.



Figure 5 – a generated image by the chatbot “Midjorobot — Midjourney v6”

Speaking about healthcare, scientists admit that neuronets play a crucial role in diagnosing diseases, analyzing medical images, and predicting patient outcomes. Their ability to process and

interpret large volumes of medical data aids healthcare professionals in making informed decisions and improving patient care [6].

Neuronets are also actively used in the field of autonomous vehicle designing. The development of self-driving cars relies heavily on neuronets for tasks like object detection, path planning, and real-time decision-making. Neuronets contribute to enhancing the safety and efficiency of autonomous transportation systems [7].

In finance, neuronets are employed for risk assessment, fraud detection, and stock market predictions. Their ability to analyze vast financial datasets helps businesses make informed investment decisions and manage risks effectively [8].

The future of neuronets holds exciting prospects as scientists and researchers continue to explore new architectures and algorithms to enhance their capabilities. Improving the interpretability of neuronets' decisions is a critical area of research. Ensuring clarity in how neural networks come to specific conclusions is essential, especially in such application areas as healthcare and finance.

Enhancing the ability of neuronets to generalize from one task to another will contribute to their broader applicability. Transfer learning, where a model trained on one task is adapted for a related task, is a promising avenue for achieving this.

As neural networks become more widespread in various aspects of society, addressing ethical issues related to bias, privacy, and security becomes paramount. Ensuring fairness and accountability in neural network applications is crucial for their responsible deployment.

Conclusion. Neuronets have emerged as a transformative technology with a wide range of applications, from healthcare to finance. As we delve deeper into the intricacies of neural networks, addressing challenges and ethical considerations will be essential to unlock their full potential. The future promises continued advancements, making neuronets a key player in shaping the landscape of artificial intelligence and technology.

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