

NEURAL NETWORKS IN PRACTICE

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The paper presents a short analysis of neural networks studies. The author examines neural networks potentials to work with digital data in different spheres of our life. It is pointed out that new applications of neural networks are worth defining.

Can a computer replace our brain? Most of us would like to have the brain as precise and fast as a computer. Nowadays scientists are doing their best to create computer programs that act like a human. This is possible thanks to neural networks. Neural networks have a structure that resembles the human brain; they imitate biological neurons of the human brain with the help of multiple nodes. They perform simple operations on the data and then pass the results to different “neurons” via links. That gives them the ability to learn by themselves without human intervention.

Major researchers in this sphere are big companies like Google and Microsoft that have spent billions of dollars on these investigations. Enormous amount of startups focused on neural networks are under development. Are such huge costs justified? What are the existing applications for such an exceptional technology and does it really have unique benefits in comparison with conventional programs that are worth investing money and time if you are not a CEO of a huge company?

It is common knowledge, that neural networks are excellent at working with patterns. Image colorization, for example. It is a problem of adding colors to black and white photographs. It was previously done by human hands because of high difficulty of the task. Now neural networks can recognize the objects in the picture and color them just like a human. Google Photos uses neural networks for item classification of objects within a photo. You can search for certain types of objects and this service will show you photos with them.

Neural networks can work with different types of information. Imagine that you have a factory producing some type of a product. Neural network can measure quality of it due to different factors in order

to decide which batch has flaws and should not be sold. In airplanes or cars the autopilot can be neural network that takes information from vehicle's sensors and modifies the speed and trajectory for maximum safety. Neural networks have great potential for security. Suppose your bank conducts thousands of operations. It is important to have an easy way of identifying whether the transactions are spurious or not. Neural network can recognize suspicious transactions fast and send a message to a bank employee for closer investigation. Neural networks can examine clients' earnings and credit histories. They help to decide if the clients are capable of paying loans.

Many types of everyday routine work have certain patterns that neural networks can recognize and carry out in millions of ways. In medicine, they can assist in diagnosing diseases according to symptoms, in economy – forecast crises or the stock market fall, in the military field – recognize enemy ships or aircrafts. Email programs protect you from spam and scan emails all thanks to neural networks. Most likely, you have neural networks in your phone right now. Different types of software such as voice and handwriting recognition are common nowadays and they use this technology. Neural networks have achieved top results in automatic translation of images. They are used to identify characters in the image, which can be turned into a text, read or translated, and the image will be recreated with the translated text. This technology is called Instant Visual Translation.

This is only a fraction of applications of this technology. Since 2011, the annual volume of investments in the field of AI has increased by 16 times. All in all, neural networks have made computer systems more useful and independent by making them more human. There is a great potential for research and development in this sphere, which is open for new ideas and is definitely worth investing. In our opinion, this technology will change the world when the time comes.

References:

1. A journey inside a Neural network by Ramin Hasani. [Электронный ресурс]. – 2019. – Режим доступа : https://www.ted.com/talks/ramin_hasani_a_journey_inside_a_neural_network/up-next
2. Rashid T. Make Your Own Neural Network / Rashid T. – Лондон : CreateSpace, 2016. – 222 с.
3. Aggarwal C.C. Neural Networks and Deep Learning: A Textbook / Aggarwal C.C. – Нью-Йорк : Springer, 2018. – 512 с.