CLASSIFYING AUDIO SIGNALS WITH NEURAL NETWORKS

Naim Nodira Abdujalolovna
Tashkent University of Information Technologies
Kholimtaeva Ikbol Ubaydullaevna
Tashkent University of Information Technologies

ABSTRACT

Artificial intelligence has fundamentally transformed human activities around the world and is now penetrating deeper into the field of art. Today, an important issue is the possibility of achieving the ability of machine intelligence to reproduce some aspects of creative behavior. The article contains information on how artificial intelligence can change the perception of contemporary art.

Keywords: *neural networks, Google, artificial intelligence, machine, information.*

АННОТАЦИЯ

Искусственный интеллект коренным образом изменил человеческую деятельность во всем мире и теперь все глубже проникает в сферу искусства. Сегодня важным вопросом является возможность достижения способности машинного интеллекта воспроизводить некоторые аспекты творческого поведения. В статье содержится информация о том, как искусственный интеллект может изменить восприятие современного искусства.

Ключевые слова: *нейронные сети, Google, искусственный интеллект, машина, информация.*

INTRODUCTION

Artificial intelligence, originally a branch of computer science, entered all aspects of social life due to its unique capabilities in modeling, expanding human intelligence, and gradually became a part of all spheres of life. In recent years, its artistic performance and application has tended to overtake the limits of human thought, and even in some creations it has revolutionized and subverted human art. Will artificial intelligence really make a breakthrough in the creative field in the near future?

In the field of science and technology, the term "artificial intelligence" plays a prominent role, and its recent advances have made AI more popular for the concepts of artificial intelligence and machine learning. The role of artificial intelligence has allowed machines to learn from experience in order to complete tasks more efficiently. The neural network is one of her achievements, inspired by the structure

of the human brain that helps computers and machines become more human-like. A neural network is either system software or hardware that works in a similar way to the tasks performed by neurons in the human brain. Neural networks include various technologies such as deep learning and machine learning as part of artificial intelligence (AI). Artificial neural networks (ANNs) are a key tool in machine learning. These are systems inspired by the functionality of neurons in the brain that will replicate how we as humans learn. Neural networks (NNs) are both an input and an output layer, as well as a hidden layer containing units that change the input to output so that the output layer can use the value. These are pattern-finding tools that are plentiful and difficult for programmers to extract and train a machine to recognize patterns. Most business applications and commercial companies use these technologies. Their main purpose is to solve complex problems such as pattern recognition or face recognition, and several other applications include speech-to-text transcription, data analysis, handwriting recognition for verification processing, weather prediction, and signal processing. The ANN works in much the same way as the human brain. Once we have made the necessary connections, we can replicate how the brain works using silicon and wires that act like dendrites and neurons. Since stimuli from the external environment are perceived by the dendrites in the same way, electrical impulses are created at the input, which pass through the neural network.

DISCUSSION AND RESULTS

Neural networks have a remarkable ability to extract meaningful data from imprecise data, which is used to detect trends and extract patterns that are difficult for both a computer and a human to understand. A trained neural network can be made an "expert" in the information that has been given for analysis and can be used to make predictions.

Some of the advantages of neural networks are listed below

- Self-organization: An ANN can generate its own representation of the information it receives during training.

– Real-time operation: ANN calculations can be performed simultaneously, and some special (hardware) devices are produced that use this capability.

– Adaptive learning: the ability to learn to solve problems is based on the data given for the training set.

– Over-coding of information through fault tolerance: a semi-destructive network leads to a deterioration in the corresponding performance. What's more, some networks will be able to retain data even if the network is severely damaged.

ANN includes a huge number of parallel processors arranged in layers. The first layer receives raw data as input, similar to the optic nerves of the human eye performing visual processing. Each successive layer receives raw input as output from the previous layer, much like optic neurons receiving signals from those close to it. The final layer generates the output.

Neural networks are adaptive, meaning they can change themselves according to learning and work in parallel to provide more information about the world. [28–31] If the network generates the “desired” output, then there is no need to change the trained input, and vice versa. If the network generates "unwanted" output resulting errors, then the system modifies the trained input to improve the results. From a technical standpoint, one of the biggest challenges is the amount of time it takes to train networks, which often require an acceptable amount of processing power even for complex tasks. The second most important issue to consider is that neural networks are black boxes in which the user groups the trained data and gets the answers. They are allowed to customize the responses, and the downside is that they do not have access to an accurate decision-making process. It is for this reason that researchers are actively working, but artificial neural networks play a very large role in changing everyday life. As a highly competitive world, we have a lot to gain from neural networks. Their ability to learn by example makes them strong and flexible. Moreover, we do not need to develop any algorithm to perform a specific task. We do not need internal mechanisms for solving this problem. They are well suited for real-time systems as they respond quickly with better computational time due to their parallel architecture. Neural networks also contribute to other areas of research such as psychology and neuroscience. In neuroscience, it is used to study the internal mechanisms of the brain and to model the parts of living organisms. The most interesting aspect of neural networks is that there is a possibility that "conscious" networks will one day emerge. Some scientists argue that consciousness is a "mechanical property" and that conscious neural networks are realistic and possible. Neural networks have huge potential and we can get the most out of them by collaborating with fuzzy logic, computing and AI.

In 2015, Google implemented the "Deep Dream" program, which allows machines to display the interpretation of art [4]. They set up the program in such a way that it not only categorizes images, but also enhances what is observed in the images. Then these machines showed their interpretation of art. "Deep Dream" uses artificial neural networks that simulate the human brain and nervous system,

highlight graphics in a picture, and enhance and express abstract artistic concepts. In fact, what Google really wants to achieve is neural network recognition logic.

The surface neural network can recognize contours, while the internal network can recognize details like textures, brush strokes, and so on. All the algorithms that correctly recognize images are artificially fine-tuned to mimic human neural networks, and "Deep Dream" skips this step and recognizes images directly.

As the gap between humans and artificial intelligence continues to narrow, it becomes increasingly difficult to find the characteristics that make humans unique. In the future, artificial intelligence will be able to perform various complex and precise operations, express emotions, and even learn. Perhaps art will no longer be exclusive to humans. In many areas of art, machines will surpass humans, and they will always be able to "learn", make constant progress and gradually expand their advantages over people. Undoubtedly, many scientists do not consider artificial intelligence painting a kind of art, and the works they created cannot be called real creativity, since art is seen as the author's understanding of the objective world and the representation of his subjective emotions. While artistic activity is a creative process, it is full of perceptual colors. And of course, the most important distinguishing feature of human creativity is emotions. The machine is not able to convey feelings, its vision of the world, it is rational, and all its logic is based on big data.

CONCLUSION

In a few years, artificial intelligence, which was originally a little smarter than a mouse, will reach a level that humans cannot understand, in other words, no matter how deep thoughts and complex expressions, this will not be a particular problem for a really powerful artificial intelligence. But this does not mean that art will be monopolized by artificial intelligence. In ancient times, the ancestors of mankind took stone tools in their hands and painted pictures of hunting, war, dances and sacrifices on the stone wall, and also used primitive art to express their thinking in the primitive era. Later, the advent of paper and pen greatly enriched this art form. Words and images mattered more, and printing allowed art to infiltrate the homes of the common people. Nowadays, technological progress has led to the development of media that are able to determine what kind of content is most suitable for this era. Artificial intelligence in painting will really turn art upside down. But since the advent of art, it has not disappeared due to the birth of brushes and paints, has not disappeared due to the emergence of keyboards and screens, and will not disappear due to artificial intelligence, it will simply continue to exist in a different form. As the French writer Flaubert said: "The farther, the art becomes more and more scientific,

and science more artistic: having parted at the base, they will meet someday at the top." It is possible that in the near future mankind will be lucky enough to observe the final combination of science and art, but it is still impossible to say whether it will fully justify itself.

REFERENCES

1. Turing A. M. Computing machines and mind. // In: Hofstader D., Dennett D. The Mind's Eye. - Samara: Bahrakh-M, 2003. - S. 47–59
2. Tariq Rashid. Make Your Own Neural Network. - 1st ed. -: CreateSpace Independent Publishing Platform, 2016. - 222 p.
3. Lee R. Big Data, Cloud Computing, and Data Science Engineering. Cham: Springer. - 2020. - 214 p.
4. Samsonovich O. O., Fokina E. A. Artificial intelligence — new realities // International Journal of Applied and Fundamental Research. - 2018. - No. 5–1. — S. 257–263;