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# NEURAL NETWORKS AS A TOOL FOR LEARNING WORDS THAT ARE CLOSE IN MEANING (USING THE CHATGPT PLATFORM)

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*The article explores how words with similar meanings work within neural networks, using the example of the ChatGPT platform. It also looks at the theoretical background for using these words from a psycholinguistic perspective. To understand the role of neural networks in modern linguistics, the author compares how native speakers perceive the similarity of word meanings (on the example of the pair of words CITIZEN – PERSON) and how artificial intelligence (AI) does it. The author uses subjective definitions and comparative methods to study this process. During the review, a number of examples are analyzed, as well as their comparison with definitions created by AI. The phenomenon of proximation is taken into account as a process that results in the acquisition of new knowledge about the world. Studying words with similar meanings seems quite relevant due to the need to update the content of lexicographic sources.*

***Keywords:*** *proximity of meaning, neural networks, artificial intelligence, proxonyms, subjective definitions.*

## Introduction

Neural networks have become an essential part of linguistic research in recent times. One of the key benefits of using neural networks in language studies is their capacity to adapt to intricate and irregular verbal structures. It goes without saying that new technologies provide the society with new opportunities in the sphere of communication and cognition [Zakharchuk 2024]. By employing neural networks, researchers can extract more precise information from texts and other linguistic data compared to traditional analysis methods. Neural networks excel at complex language processing tasks, enhancing the quality of results in linguistic research.

In general, a neural network is a type of machine learning or a computer program that simulates how the human brain works. It uses different types of connections, and the artificial neurons in the network are

created to look and work like biological neurons in the brain. Neural networks have come to be an important tool in linguistic research due to their ability to analyze and process language data. They find applications in various fields of linguistics, including text analysis, recognition, the development of intelligent agents, and machine translation systems [Burnashev 2023]. Neural networks allow you to create models that can translate texts into various languages, including non-standard and dialect options, thereby improving the quality of translation. A unique feature of neural networks is their ability to learn. They can even study on their own, without constant supervision [Trick 2022]. This makes them a powerful tool in various fields, such as image recognition, natural language processing, and more. Thus, we are interested in comparing the word meaning proximity processes occurring in the human mind with similar activities performed by artificial intelligence (AI).

It should be noted that when interpreting a word, it is impossible to be limited only by the framework of the lexical-semantic system of the language, since this process is due to a thorough analysis of what is behind the lexeme in the individual consciousness [Zalevskaya 2011]. Confirmation of this idea can be found in the works of John Locke, who wrote that words, if they do not represent our thoughts, are just bare sounds, and we can agree with them only to the extent that they correspond to the ideas that we have, and nothing more [Locke 1985]. In this very case, the new word is considered as a unit of an individual lexicon from the point of view of the psycholinguistic concept of the word developed by A.A. Zalevskaya [Zalevskaya, 2011]. This concept comes from a more general theory of human thought activity. At the same time, the word is a means of access to a single perceptually cognitive information base of a person, which is formed according to the laws of mental activity, but under the control of the system of norms and assessments developed in society, and the individual lexicon appears as a self-organizing functional dynamic system [Lebedeva, 2002]. According to the scientist, proxonymy is a complex phenomenon that can be represented in the language by nominations of various kinds [ibid].

## Materials and methods

Simultaneously with the formation of interdisciplinary approaches to the study of linguistic concepts, there was an intensive development of computer technologies, and with them digital research methods in linguistics: DiCoEnviro program, which provided the possibility of quantitive analysis, the Google Gram Viewer tool, which allows observing

the frequency the lexeme using at different times based on the cases loaded into its base, the Sketch Engine platform, which makes it possible to select the most common words based on reference lexical units [Khmelnitskaya 2023]. The development of digital technologies carries on which suggests the discovery of new functions. The purpose of this article is to determine the possibilities of expanding the psycholinguistic study of the words with similar meaning using neural network tools running on the ChatGPT platform [ChatGPTBot].

The urgency of this work lies in the significant importance of using neural networks equipped with Natural Language Processing (NLP) algorithms in linguistic research. Investigators can use neural networks to create models that can "understand" and "generate" text. These models can classify language elements, determine the tone of texts, and more.

The novelty of this work stems from the fact that ChatGPT is a relatively new tool built on the principles of AI and machine learning.

The research was based on the results of an experiment using the subjective definition technique, as well as the definitions proposed by AI based on the ChatGPT platform. More than 100 subjective definitions on the pair of the words CITIZEN – PERSON were studied, including analysis of the study results through information received from ChatGPTBot.

**Results and discussion**

We have previously claimed that the field of psycholinguistics is an essential part of linguistic analysis, and it focuses on the individual as the main user of the language system [Kondratenko 2017]. The focus of cognitive research on humans, which can reveal the underlying mechanisms of how words get their meanings, is influenced by the personal knowledge and experiences of native speakers. However, today we are watching a situation where neural networks help scientists analyze data more effectively, allowing them to better understand certain issues and achieve optimal results in modern language.

Particular attention is given to the theory of proximatics, which helps us comprehend the nature of words by studying the human beings and their perception of the world [Lebedeva 2002]. According to this theory, a person, being in the epicenter of dynamically unfolding events, determines the choice of using a particular word depending on a number of circumstances caused by both the situation of communication and the presence of his own understanding the world around him. What about neural networks, they contain the experience of all mankind, allowing us to

monitor the frequency of using lexemes at different periods of time based on corpora, to select the most common lexemes based on support lexical units, which allows expanding the vocabulary and frame structures for inclusion in dictionaries and to form a true picture of the field of knowledge.

Neural networks are composed of layers of interconnected "neurons" which are small computational units that enable the network to comprehend and generate text. By delving into the workings of these neural networks in language processing, linguists can gain a deeper understanding of how the brain interprets language [Bragg 2022]. In the field of AI chatbots, neural networks are employed to analyze the text provided by the user and recognize its meaning.

Hence, NLP algorithms, are employed by linguistics in order to comprehend and interpret language. This enables machines to learn how to process language in a manner that closely resembles human language processing. This is achieved by combining elements of linguistics with AI in order to develop a system that can grasp the underlying meaning behind words. For example, according to the experiment conducted among 50 people aged from 18 to 38 years, with the use of the subjective definitions method, the CITIZEN stimulus received 19% of the definitions – *a person/individual*. We can also distinguish more specific interpretations which can be divided according to the following signs: *law (a person endowed with rights; law-abiding person* - 22%); *resident of the country (person living in a certain territory; a resident of the state; belonging to a separate country; a representative of the state; responsible resident of the country; a person living in a certain country;* - 32%); *representative of the company* - 6%; *a patriot (a person living for the sake of the country; loving their homeland* - 6%). Even more personal definitions were received that can also be divided into categories based on the particular attitude to the stimulus: *a word that I like; sounds proud; high rank* – 5%. Among the individual reactions, there is a definition *Mayakovsky*. Apparently, this response reflects the cultural background of the person who provided it.

Before analyzing the examples generated by AI, it should be noted that ChatGPTBot was created using GPT (Generative Pre-trained Transformer) technology that allowed to develop a chatbot capable of generating unique new text responses founded on a knowledge base specifically designed for this tool [Bragg 2022]. In connection with this possibility, we were interested in finding new information that could expand the results of psycholinguistic analysis. Thus, the chatbot gave the following definition to stimulus CITIZEN (spelling and punctuation

preserved): *A "citizen" is a legally recognized member of a country or nation who has certain rights and responsibilities within that community. Citizens typically have the right to be participants of the political process, such as voting in elections, and are expected to obey the laws of the land. They may also be people provided with privileges and benefits.*

Thus, it is possible to distinguish the following phrases of similar meaning: *a legally recognized member of a country, a participant of the political process, a person provided with privileges and benefits.* Comparing these definitions with subjective definitions obtained from respondents, we can conclude that the chatbot generated definitions that are quite close to subjective definitions, mentioning the civil, political and legal aspects of the concept. In addition, chatGPTBot noted the presence of privileges and benefits, which was not recorded among the definitions given by native speakers. However, the definition generated by AI does not contain a personal subtext and emotional attitude to the word-stimulus. Therefore, as it is seen from subjective definitions, the experience of knowledge is closely related to the emotional and evaluative attitude towards awareness and capability of a person, i.e. human beings do not ignore what they hear or see. Consequently, the same objects, phenomena and concepts can cause positive and negative emotions in different people.

For instance, the subjective definitions of the stimulus PERSON indicate that, firstly the word is perceived on the basis of the presence of reason (24%): *the owner of the mind; a creature with intelligence; a creature capable of thinking; highly intelligent individual; someone who has to be reasonable*. 18% of definitions can be combined by personality/individual. Part of the respondents understood a lexeme as *a biological being* (9%), and a number of definitions are based on religious grounds (*image and likeness of God; descendant of Adam and Eve; God's supreme creation; God's creature* - 5%) and the social aspect (*social being; a representative of the company; member of society* - 9%). There are several definitions that are associated with the theory of evolution of C. Darwin: *the highest degree of evolution; the highest stage of development* - 4%; as well as self-representation - *me* (5%).

Let us compare received definitions with the explanation given by ChatGPTbot: *A "person" is a human being regarded as an individual with a unique identity, consciousness, and rationality. In legal terms, the word "person" can also refer to an entity that has legal rights and can enter into contracts, such as a corporation or organization. It can also be used in a more general sense to refer to any individual, whether human or fictional, with a distinct identity or personality.* As we can see, AI doesn't consider

the lexeme PERSON from the religious side and represents it from biological and legal points of view. On the contrary, subjective definitions show how we experience knowledge, which is closely linked to our emotional and evaluative attitudes towards information and our own abilities. In other words, native speakers do not remain indifferent to the information they perceive. Thus, subjective definitions confirm that the presented words serve as a way to connect information about the subject or phenomenon and its characteristics.

**Conclusion**

The analysis of subjective definitions and their comparison with the explanations generated by ChsatGPTbot confirms the fact that a person's desire to describe the properties of concepts expressed by the original words through a certain set of qualitative characteristics gives a large emotional and personal connotation to the word. The AI displays the superficial connotation of the lexical unit and rather resembles a dictionary entry. In turn, the obtained subjective definitions reflect the personal views of native speakers founded on their own knowledge base, experience, and cultural and historical heritage.

Experimental material indicates the presence of a knowledge experience due to an emotional and evaluative attitude to what a person knows about a particular subject or phenomenon, unlike AI, which is not able to capture the subtext hiding behind the main meaning of the word. Subjective definitions demonstrate the attitude of the participants in the experiment to a fragment of information linked to incentive words. Thus, the results of the experiment and comparative analysis reflect the presence in subjective definitions of words with a close value of reflecting the spiritual norms and value guidelines of the respondents. This indicates that in the individual lexicon, proxonyms constitute a voluminous and figurative system founded on the information base of the individual. The use of words with close meaning is an integral part of an individual's knowledge system about the real world with an actual process of communication and thinking.

As for the use of neural networks in linguistic research, it certainly verifies that there is potential for further development in this area. Due to the fact that ChatGPT technology, in addition to the function of determining lexical units, also provides a number of other tools, it is possible to continue research on its prospective benefit for analyzing words with close meaning.

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