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*Effectiveness conditions of speech acts in the interaction between humans and artificial intelligence*

Summary

The aim of this doctoral dissertation is to characterize the specific type of speech act that occurs in the human-artificial intelligence interaction and to present the aspects that may adversely affect its effectiveness. The dissertation is an integrated reflection in the field of pragmatic linguistics, media linguistics and computational linguistics.

The work begins with a discussion on the most important aspects of the speech act theory and their criticism. Then Mikhail Bakhtin's dialogical concept of language, as well as the most important achievements of the functional views on the use of language, are discussed. Thanks to this, it is possible to define the basic conditions for the effectiveness of the speech act. The most important of them are: the existence of a generally accepted conventional formula that has a specific effect, knowledge of the broader context, compliance with the cooperation rule and the accompanying maxims, sufficient knowledge about the world, grammatical correctness, following the rules of politeness.

The next step is to try to define the concept of communication and its special type, namely mediatized communication. The results of this characterization make it possible to identify whether there are other aspects within this type of communication that may adversely affect the effectiveness of the speech act. The analysis showed that the language of mediatized communication is not merely a simple reflection of everyday face-to-face communication. There is a mutually conditioning relationship between these two forms of communication. Mediatized communication is characterized by greater social diversity of its users than in the case of traditional communication. We can also speak of very high user anonymity. Moreover there are no time or territorial restrictions in this form of communication. Mediatized communication also brings with it certain challenges, which result mainly from the largely limited sensory perception. In order to increase the effectiveness of speech acts, this type of communication has developed some compensatory strategies that have been created to replace non-verbal and paraverbal messages. These include: the use of shortcuts, emoticons and emojis; writing down non-verbal reactions; the use of caps and phonetic notation; multiplication of letters and punctuation marks; omitting diacritical marks; reduction to lowercase. As the

subsequent analysis shows, these strategies improve interpersonal communication, but they are a large barrier for artificial intelligence.

Next, it was necessary to answer the question: what characterizes the special speech act that takes place in human-artificial intelligence interaction. For this purpose, the most important issues regarding natural language processing are presented. Artificial intelligence should be defined in the context of this work as the ability of a system (for example a computer program) to correctly interpret data from external sources, to learn from them and to use this knowledge to perform certain tasks in a human-like manner, and to achieve goals by flexible adaptation to the prevailing conditions. However, the findings made on this basis showed that artificial intelligence — similar to the human mind — is based on many levels of natural language analysis. During the creation of various application types, such as dialogue systems, phonological, morphological, lexical and syntactic aspects as well as semantic, pragmatic and discourse analysis are taken into account. The best results are achieved by applications that combine the results of the analysis of several levels and are based on hybrid solutions (symbolic and statistical methods).

Taking into account the theoretical foundation of the above-mentioned fields, the experiment was started. As part of the experiment, 1,259 text messages were categorized into 19 most popular types of speech acts, which were distinguished on the basis of linguistic analysis. This analysis was as follows. First, utterances showing the same or similar features were grouped. During the reconstruction of the intentions, the meaning of the words and the meaning of the whole utterances were taken into account. When such analysis did not give satisfactory results (for example because of the ambiguity of the utterance), the wider context (real or potential) was taken into consideration. The next step was to create a system of rules on the basis of which the model assigned specific intentions to utterances and then gave a short answer. Finally, the model's results were compared with the categorization derived from the linguistic corpus analysis.

Thanks to this, it became possible to answer the question about the linguistic competence of artificial intelligence. It turned out that artificial intelligence usually has no problem with the analysis of semantics and syntax. It is able, in most cases without difficulty, using rules based on conventionalized phrases typical for the given speech act, to assign an utterance to a specific intention only if it results from the conventional meaning of the used words. However, it has problems with the analysis of utterances that can be used with many different intentions, and utterances whose meaning does not directly arise from the conventional meaning of the words,

i.e. with pragmatic analysis. The reason for this is usually the lack of access to specific knowledge about the world, which would make it possible to place an utterance in a wider context, which often also makes it challenging for the human to correctly interpret the intentions. A factor that may make it more difficult for artificial intelligence than humans to analyze semantics and syntax is the lack of grammatical and spelling correctness, i.e. omitting diacritics or punctuation marks and making graphical errors or spelling mistakes in such utterances. While artificial intelligence can in many cases obtain similar results to humans in recognizing intentions, its ability to generate responses is much more limited. Summarizing, we can only speak about limited linguistic competence of artificial intelligence.

Thanks to the identification of the characteristics of this special speech act type which takes place in the human-artificial intelligence interaction, it was also possible to formulate conclusions and postulates for the future. These include: the need for close cooperation between linguists and programmers in the process of developing artificial intelligence, the need for artificial intelligence to analyze a broader context, or the need for combining the analysis of various signals (not only the text, but also audio and video signals) in order to include non-verbal and paraverbal messages in the analysis. The study also confirms that the assumptions of pragmatics (including the study of language in use) are helpful in the analysis of mediatized communication. Thanks to this, emphasis is placed not only on the analysis of formal aspects of this communication type, such as syntax or lexis, but also on the conditions necessary for the effectiveness of the speech act.