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Principles of requests' formulation to artificial intelligence technologies as a component of interaction strategies

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Abstract

Importance. In light of the rapid integration of artificial intelligence (AI) systems in both practical and research applications, the formulation of queries assumes a pivotal role in human-machine interaction strategies. This article delves into the realm of Large Language Models (LLMs) and systematically explores effective prompting principles, highlighting their significance in enhancing the accuracy, consistency, and controllability of AI-generated outputs. Our objective is to construct a comprehensive taxonomy of query types within the framework of interaction strategies.

Materials and Methods. To accomplish this, we employ methods of analysis and synthesis of existing theoretical and practical materials related to this subject. These materials are drawn from studies conducted over the past three years, exploring various approaches to optimizing human-machine communication.

Results and Discussion. The findings of the investigation reveal that there exist several types of inquiries at the initial phase of engagement with the model. Following these queries, a dialogue ensues to validate the accuracy of the provided responses. The algorithm for effective interaction with the machine necessitates specific skills that can be evaluated based on specific criteria and the metrics of the obtained response.

Conclusion. Establishing standardization for query generation processes is crucial for ensuring the secure and responsible utilization of AI in large-scale applications. Consequently, the development of interdisciplinary programs focused on crafting strategies for interacting with AI should be prioritized in future research endeavors.

Keywords: computer mediated discourse, interaction strategies, prompting, artificial intelligence

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Принципы формулирования запросов технологиям искусственного интеллекта как компонент стратегий интеракции

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Аннотация

Актуальность. В условиях ускоренной интеграции систем искусственного интеллекта (ИИ) в прикладные и исследовательские практики формулирование запросов выступает как критически важный компонент стратегий интеракции человека и машины, а именно большой языковой модели (LLM, Large Language Model). В исследовании предпринят систематический анализ принципов построения эффективных запросов (prompting) с акцентом на их роль в повышении точности, воспроизводимости и управляемости выходных данных систем генеративного ИИ. Цель исследования – разработка таксономии типов запросов как компонента стратегий интеракции.

Материалы и методы. Использованы методы анализа и синтеза существующих теоретических и прикладных материалов по теме. Материалом послужили исследования последних трех лет, посвященные различным подходам к эффективному взаимодействию человека с машиной.

Результаты исследования свидетельствуют о наличии нескольких типов запросов на этапе первичного обращения к модели, обязательно сопровождающихся дальнейшим диалогом для проверки надежности предоставленного ответа. Алгоритм успешной интеракции с машиной включает в себя обязательные умения, которые могут быть оценены по определенным критериям и метрикам полученного ответа.

Выводы. Стандартизация процедур составления запросов является необходимым условием для обеспечения безопасного и ответственного применения искусственного интеллекта в масштабируемых приложениях. В качестве направления для дальнейшего исследования выделено создание междисциплинарных курсов по развитию стратегий интеракции с ИИ.

Ключевые слова: цифровой дискурс, стратегии интеракции, запросы к генеративному искусственному интеллекту

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IMPORTANCE

R. Li, one of the founders and CEO of the Chinese company Baidu, which develops artificial intelligence, claims that over the next decade, half of the jobs in the world will be associated with the creation of intelligent systems capable of generating relevant prompts. At first glance, it may seem that the development of artificial intelligence in real time is the prerogative of information technology, and not a humanitarian discipline. However, creating hints using artificial intelligence is a practice aimed at working with natural language [1]. Query formulation becomes an integrated component of the information and communication competence of a specialist in practically any field.

According to the Federal State Educational Standard for Higher Education 3++, the development of meta-subject skills and abilities is an integral part of goal setting in the discipline "Foreign Language". In this regard, it seems reasonable to form the skills of conversational communication with the machine [2]. Moreover, the interactive environment of interaction with the bot allows you to create a communicative situation as close as possible to the situation of real communication. Therefore, it is important to classify strategies for effective interaction with a machine, including in a foreign language.

MATERIALS AND METHODS

An integrated approach was used in this study: a review of relevant publications and practical materials was carried out. The sources are the works of the last three years devoted to the methods of effective interaction between man and machine. We note the limitations associated with possible lan-

guage and publication selection and rapid updating of the field.

THE THEORETICAL BASIS

In an era when the Internet has become an innumerable source of textual information, digital discourse has become a separate branch of linguistics. Digital discourse (computer-mediated discourse) is defined as the totality of all types of computer-mediated communication carried out through digital devices when people exchange messages online. Digital discourse includes a variety of forms:

- text posts and messages in oral and written register;
- use of visual aids and video conferencing;
- communication in augmented and virtual reality (including online games) [3].
- In the accompanying document to the "General European competencies of foreign language proficiency" from 2020, communication in a digital environment (online interaction) in a foreign language is highlighted in a separate paragraph. It refers to online interaction that is difficult to assess using traditional competence assessment methods based on oral or written communication. For successful communication on the Internet, it is necessary to observe several important principles:
 - redundancy of information;
 - verification of the recipient's correct understanding of the message;
 - paraphrasing;
 - emotion management¹.

Note here that from this list of principles for making requests and maintaining a

¹ Council of Europe. Common European Framework of Reference for Languages: Learning, Teaching, Assessment – Companion Volume // Council of Europe Publishing. Strasbourg, 2020. URL: <https://www.coe.int/lang-cefr>

dialogue with the machine, the first and third become key. Communication in the digital environment is assessed in the CEFR Companion Volume on two scales, which include a number of skills: a scale for assessing the level of mastery of the components of communicative competence (online conversation and discussion) and a scale for assessing the level of mastery of interdisciplinary skills for achieving goals in collaboration (goal-oriented online transactions and collaboration)². In other words, the level of mastery of digital discourse is assessed, on the one hand, as a subject result in the discipline "Foreign language", on the other – as a meta-subject result and part of the professional competence of a specialist.

Let's consider the implementation of the skill scales listed in these data in relation to interaction with a machine, where there is no interaction in a group, the boundary of synchronous and asynchronous communication formats is violated, and the skills of speech and target interaction come to the fore (based on the technical characteristics of generative artificial intelligence systems):

- the ability to constantly communicate with a digital assistant (due to the availability in a mobile format);
- the ability to prepare messages and comments, including evaluative ones, to clarify previous requests (by saving the history of correspondence);
- the ability to use and respond to embedded media, including for transmitting the emotional component (through multimedia support);
- collaboration on projects (through neural network processing of big data);

- resolution of communicative difficulties (due to speech processing algorithms with large language models).

RESEARCH RESULTS

The basic parameter for distinguishing requests to generative AI can be considered requests aimed at generating images (text-to-image) and texts (text-to-text). Working with visual models is based on several key principles that should be considered in order to achieve the desired result:

- limitation on the number of objects (no more than 2–4 elements);
- use of epithets (to create the atmosphere of the image);
- choice of style (for example, realism or expressionism);
- indication of the author (to preserve the unity of style);
- definition of resolution (for example, HD or 4K) [4].

As for text generation, in this case the recommendations are more variable and take into account the methods of dialogue to solve the problem in cooperation with AI. Before proceeding to classify the strategies of interaction with the machine, let us list, first, the metrics of the success of this interaction (that is, we highlight the criteria for evaluating the effective formulation of requests):

- reliability (LLMs should calibrate inaccuracies and update actual data);
- the ability to generalize (the LLM part focuses on small details, since they can be tuned to data from a specific area; in addition, they may be sensitive to minor changes in the text or use false correlations);
- open-mindedness (LLM may discriminate; for example, DeepSeek's Chinese models and Qwen are more familiar with Russian culture than Perplexity) [5; 6].

² Council of Europe. Common European Framework of Reference for Languages: Learning, Teaching, Assessment – Companion Volume // Council of Europe Publishing. Strasbourg, 2020. URL: <https://www.coe.int/lang-cefr>

Secondly, let's highlight the genres of queries by issue:

- a question with a definite answer;
- data synthesis and analysis;
- argumentation;
- text classification;
- text creation [7].

Finally, here are the recommendations that have become almost universally accepted over the past three years for queries that require a text response:

- formulate thoughts accurately, avoiding ambiguity;
- indicate the numerical characteristics of the intended response, such as the volume of words, the number of examples, etc;
- provide context (role and recipient) and examples;
- ask again, clarifying the facts;
- to rephrase, requiring additional data [8–11].

So, regardless of the genre, based on the analysis of research and recommendations for making requests to AI, we summarize the types of requests that can either be used separately or combined into an algorithm for primary access to the machine, which requires MANDATORY secondary access, usually involving 2–3 additional requests (Table 1).

The criteria for evaluating the initial request relate to the basic recommendations and classification of existing types of requests, which are ideally combined into a common algorithm of four micro-skills. The further success of solving the problem with a large language model depends on secondary queries in order to ask again, clarifying the facts (metrics of reliability and impartiality), or to rephrase the question by requesting additional data (generalization ability). For self-reflection and control, at the first stage, criteria for evaluating the primary request itself can be used (they are in

close correlation with recommendations), and at the second stage, an indicator of user success is an assessment based on the metrics of the generated model response.

Moreover, we would like to emphasize that, according to our previous research, micro-skills of paraphrasing belong to cooperation strategies and turn out to be one of the least developed strategies of interaction in a foreign language even among university students (with a score of 7/22 points in a constitutional experiment among graduate students of Moscow University). At the same time, the micro-skills necessary to apply for clarification of facts are developed by the target audience at the level (15–17/22 points), which indicates the presence of mainly psychological difficulties associated with clarification when communicating personally with a person [12]. Here it turns out that working with AI can help students foreign language overcome these difficulties by automating skills and abilities in a dialogue format with a machine. However, all micro-skills require gradual development in both native and foreign languages. Moreover, sometimes we observe the transfer of skills from a foreign language to our native language – this serves as an additional incentive for the integrated formation of professional competence.

Additional dialog techniques can be applied to improve the result of interaction with the machine at the stage of secondary handling. These include the following:

- the AMA (Ask Me Anything) method is an approach to the formulation of a request to the model, in which the model is explicitly instructed to act as a universal expert or interlocutor, ready to answer any questions (used for brainstorming, initial problem research, etc.);
- chain-of-thought involves step-by-step reasoning before reaching a final

Table 1

Types of queries

The algorithm of the initial appeal		
Micro-skills	Types of primary requests	Criteria for evaluating a request
1. Specify the role	Role-based prompt	Accuracy
2. Set a task	Target request (zero-shot prompt)	
3. Give context	Illustrative request (few-shot prompt)	The presence of an example
	Contextualized request (contextual prompt)	The presence of a recipient
4. Specify the format	Instructional prompt	The presence of clarifying verbs in the imperative mood and the presence of numerical characteristics
The algorithm of secondary treatment		
Micro-skills		Metrics for evaluating the model's response
5. Ask again (clarifying the facts)		Credibility and impartiality
6. Rephrase the question (requesting additional data)		The ability to generalize

Source: compiled by the author.

answer. This is how the model reveals the intermediate steps of thinking (which is useful for logical calculations, hypothesis testing, etc.).

The Socratic method is widely used in pedagogy and philosophy in order to develop critical thinking and the ability to introspect. This method consists in posing a series of questions aimed at exploring complex ideas, which contributes to the formation of an individual's own understanding of concepts. The fundamental principle of this method is the idea that knowledge cannot be obtained ready-made, but must be discovered in the process of active discussion and dialogue [13; 14].

CONCLUSION

The theoretical significance of this study lies in the analysis of regulatory documents for comparing the described competencies with the relevant skills and abilities due to the exponential spread of communication with a machine as a component of digital discourse in general, and communication competence in particular.

The practical significance, in turn, includes a developed taxonomy of strategies, skills, and criteria for evaluating them during primary and secondary visits to generative assistants.

A promising area for further research is the development of assignment formats and modules for courses in the discipline "Foreign Language" aimed at forming strategies for interacting with a machine simultaneously as a subject and meta-subject result within the framework of developing a specialist's professional competence.

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