Cultural sciences

INTRODUCTION TO PROMPT ENGINEERING: CONCEPT, TYPES, CHARACTERISTICS

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Abstract

The article discusses the basic concepts and principles of Prompt Engineering and proposes a classification of Prompt types, in terms of creative and applied approaches. Particular attention is paid to the characteristics of effective prompt engineering, including clarity and specificity of wording, context relevance, query structuring, flexibility and adaptability with hallucination minimisation and optimisation for specific AI models. The potential of prompt technologies to improve the quality and accuracy of interactions with AI models is also revealed.

Keywords: neural networks, artificial intelligence, intelligent systems, prompt, prompt engineering, promting, hallucinations

Introduction

In the era of rapid development of artificial intelligence and machine learning, prompt engineering is becoming a key technology for human-machine interaction. To date, many books have been written and various researches have been conducted on the topic of artificial intelligence (hereinafter referred to as AI), but this field remains one of the most popular and fastest growing areas of the early 21st century. AI continues to attract the attention of scientists, engineers, entrepreneurs and the public due to its enormous potential and potential applications in various spheres. Despite the significant amount of accumulated knowledge, the field continues to grow rapidly, opening new horizons for research and innovation.

Prompt engineering plays an important role in various fields, from the automation of business processes to the development of intelligent decision support systems. The technology involves creating and optimising text queries (Prompts) to get accurate and relevant answers from AI models.

The purpose of this paper is to provide a comprehensive introduction to Prompt Engineering, revealing its basic concepts, types and characteristics. To gain an understanding of Prompt Engineering as a technology applied to the efficiency and accuracy of working with AI models.

Language formation and self-learning of AI

Neural networks are mathematical models consisting of interconnected nodes (neurons). It was the development and improvement of neural network architectures that led to a revolutionary breakthrough in the field of natural language processing and content generation, which, in turn, made possible the emergence of industrial engineering.

In the context of cultural production, neural networks play the role of the 'creative engine' of intelligent systems (hereinafter referred to as AI-systems) capable of generating texts, images, music, and other forms of artistic expression. Prompt engineering, in turn, becomes a tool for managing this creative potential, allowing humans to guide and control the process of content generation.

Understanding this interplay between neural networks and AI is critical to thinking about how Prompt Engineering is influencing the transformation of the cultural landscape. This interaction underpins new forms of creativity, the changing role of the artist, and the redefinition of notions of authorship and originality in the digital age.

Natural Language Processing is one of the most important areas of AI. Speech and language are central to human intelligence, communication and cognitive processes, so understanding them is often considered the global and most challenging task of AI. Natural language is the language of humans - spoken and written speech as well as non-verbal communication. Natural language has an innate component that people develop through social interactions and learning. Since the 1950s, computer linguists have been trying to teach computers natural language according to naive ideas about how humans acquire it (starting with vocabulary, conjugation patterns and grammar rules) [1, p. 122].

Self-learning is used to develop AI in natural language processing. This approach is called 'sequence prediction' [1, c. 124]. Self-learning allows AI systems to continuously improve their understanding and generation of human speech without the need for constant manual programming or updating. Self-learning in the context of AI and natural language processing involves several key aspects:

1. Analysing large amounts of textual data to identify language patterns and structures.
2. Adapting to new language constructs and changes in language use.
3. Improving the ability to understand the context and nuances of language.
4. Developing skills in generating more natural and conceptually appropriate responses.
5. Continuous expansion of vocabulary and understanding of different subject areas.

Through self-learning, AI systems can more effectively cope with the diversity and complexity. of human language, which is critical to creating better and more versatile AI systems. This allows AI to not only better understand and interpret human speech, but also generate more natural and contextually relevant responses, which is a key factor in the development of natural language processing technologies.

Basic concepts of the topic

The interest of the scientific community and the amount of research on the topic of AI is confirmed by the dramatic dynamics in the number of publications on neurocomputing since the late 1980s. Neural networks as technologies in AI implementation have become a key tool for solving a wide range of tasks, from pattern recognition and natural language processing to content generation and decision making in complex systems. Their ability to learn from big data and identify complex patterns has opened new horizons in AI development, leading to revolutionary breakthroughs in various fields of science and engineering, including computer vision, machine translation and autonomous systems.

Neural networks are mathematical models consisting of interconnected nodes (neurons). It is the development and improvement of neural network architectures that led to a revolutionary breakthrough in the field of natural language processing and content generation, which in turn made the emergence of prompt engineering possible.

The concept of '*Prompt*' (from English prompt, induce, inspire). [2, p. 298] in the context of artificial intelligence and natural language processing is a text query or instruction that directs the generation of content by an AI-system.

In the Russian version, the concept of '*promt engineering'* (promting) is considered as a direction that studies the skills of preparing, creating and optimising prompts (promts) for neural networks, where a prompt is the input data that the user gives to the model to obtain the desired answer [3, p. 22].

Prompting is not a dull and monotonous action, but a full-fledged creative process containing pathfinding, new discoveries and unexpected solutions. In essence, it is the territory of finding options for answers to directions.

It is necessary to take into account the side effect when working with AI, if it does not know the answer, it can produce incorrect texts, which are called 'hallucinations'.

Hallucination is a phenomenon in which an AI model generates information that does not correspond to reality or to the original data presented in the prompt. This occurs when the model misinterprets the context or fills in knowledge gaps with fictitious information, passing it off as true. Hallucinations are a serious problem in prompt engineering as they can lead to unreliable or misleading answers, reducing the reliability and applicability of the AI system in real-world tasks.

Types and characteristics of prompt engineering

Hallucination is a phenomenon in which an AI model generates information that does not correspond to reality or to the original data presented in the prompt. This happens when the model misinterprets the context or fills in knowledge gaps with fictitious information, passing it off as true. Hallucinations are a serious problem in hint engineering because they can lead to unreliable or misleading answers, reducing the reliability and applicability of the AI system in real-world tasks.

Types and characteristics of hint engineering:

– creative, which involves the generation of artistic, musical, literary and other content; co-authorship of prompts to create works of art (paintings, sculptures, musical compositions, digital insolations, etc.). Accessible to a wide range of people, regardless of their professional background; encourages the emergence of new genres and styles;

– interactive, aims to engage and involve users, e.g. in games, collaborative activities; consistent refinement and finalisation of queries based on the responses received. This approach allows for incremental improvements in the quality of interaction with AI;

– archival-research, used for generating virtual tours, museum or gallery tours; it contributes to the education and reconstruction of historical events, as well as preserves and promotes cultural heritage, making it available for study and perception in digital format;

– social-collaborative, brings the community together to co-create thematic projects aimed both at cultural development and at solving social problems and supporting the community; promotes global cultural exchange and inclusiveness, bringing together people from different backgrounds and cultural traditions.

Considering prompt engineering as a technology that provides specific text and information handling tasks, we can categorise types of prompts as:

– basic – simple and direct queries that do not require additional context; they provide specific answers to a well-defined question;

– contextual – involves the inclusion of additional information that helps the AI model better understand the situation and provide more accurate answers; the question requires the inclusion of certain circumstances or background;

– role-based – here the AI is assigned a specific role or persona. This allows for more specialised answers that are relevant to a particular point of view or area of expertise. You can ask the AI to act as a historian, educator, doctor or lawyer: 'How would a historian explain this situation?', 'What would a doctor advise in this situation?', etc..;

– chained – a series of related queries aimed at solving complex problems. Each successive query is based on the answer of the previous one, which allows for a deeper exploration of the topic.

In describing the tasks of prompt engineering, it is necessary to understand the formats and characteristics when working with this technology. The characteristics of an effective prompt include:

– clarity and specificity: requests should be clearly stated and unambiguous to minimise the risk of misunderstanding the AI model;

– content relevance: inclusion of additional information that helps the AI to better understand the situation and provide more accurate answers;

– structured: queries should be logically structured to facilitate processing by the AI model;

– flexibility and adaptability: the ability to refine and finalise queries based on the responses received, thus improving the quality of the interaction with the AI;

– ethical and legal compliance when formulating queries to avoid undesirable consequences;

– efficiency: the ability to achieve the desired result with minimal time and effort;

– hallucination minimisation: the use of techniques that help reduce the likelihood of AI generating misleading information.

At the same time, the development of various types of prompt engineering raises a number of issues, among which is the rethinking of the concepts of authorship and originality in the era of AI-assisted creativity. Prompt engineering becomes a catalyst for synergetic effect, where artificial intelligence acts not just as a tool, but as a full-fledged co-author, which leads to the emergence of hybrid art forms combining human intuition and machine efficiency.

Conclusions

Prompt-engineering is a key area of AI interaction, enabling textual queries to be optimised for accurate and relevant answers. Different types of Prompts, such as creative, archival-research, social-collaborative, as well as basic, contextual, role-based, interactive, and chaining, provide flexible tools to solve a variety of problems and improve the quality of AI interactions. Effective prompt engineering requires clarity, structure and relevance of queries, and the ability to adapt and refine based on the responses. It is important to consider ethical considerations and minimise the likelihood of generating misleading information, to ensure the reliability and accuracy of the responses. Therefore, it is recommended to monitor and cross-check the information received. As a result, prompt engineering becomes an integral part of modern interaction with AI, contributing to its effective utilisation.

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