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Editorial introduction

Language, Mind, and Computation in the Metaphors of Cognitive Science

Pavel Baryshnikov (✉) 

Pyatigorsk State University, Pyatigorsk, 9 Kalinin Avenue, 357532 Pyatigorsk, Russia

pnbaryshnikov@pgu.ru

Abstract

Is the meaning of the text accessible to machine learning algorithms? With the success of computer science, such questions are turning from philosophical into scientific and theoretical. Mind, behavior, and the machine have been conceptualized differently at different times and in different research programs. This concerns questions of intelligence, technology, and language: what is consciousness, can it be artificially reproduced? What is language from the point of view of information theory and data models? Can a language be expressive without the problem of the relationship between ontology and semantics? How significant are the common characteristics of brains and computers? And do such characteristics exist, or is computationalism in cognitive science just the result of scientific metaphor creation? The authors of this issue of the journal *Technology and Language* answer these questions from various disciplinary positions. What do computer metaphors in cognitive research point to: the properties of the objects being studied or the properties of the methods? This is the key question that inspired this issue which is dedicated to the history of the development of computer methods in cognitive science and the role of metaphor in this process. The main theme is the relationship between computer technology and the theory of knowledge which is expressed through metaphorical vocabularies of philosophical and scientific discourse. The authors explore questions about the nature of consciousness, the relationship between mind and body, free will, and the possibility of understanding human activity in terms of machine intelligence. These topics are relevant today due to the rapid development of artificial intelligence and the need to understand its impact on society. This issue is suitable for specialists in the field of cognitive science, philosophy, history of science, as well as for anyone interested in the interaction of technology and human consciousness.

Keywords: Computer metaphor; Cognitive science; Computational methodology; Language usage

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Редакторская заметка

Язык, разум и вычисления в метафорах когнитивных наук

Павел Николаевич Барышников (✉) 

Пятигорский государственный университет, проспект Калинина, 9, 357532 Пятигорск, Россия

pnbaryshnikov@pgu.ru

Аннотация

Доступен ли смысл текста алгоритмам машинного обучения? Подобные вопросы с успехами компьютерных наук из философских превращаются в научно-теоретические. Разум, поведение и машина осмысляются по-разному в разное время и в разных исследовательских программах. Это касается вопросов интеллекта, техники и языка: что такое сознание, можно ли его искусственно воспроизвести? Что такое язык с точки зрения теории информации и моделей данных? Может ли язык быть выразительным вне проблемы соотношения онтологии и семантики? Насколько значимы общие характеристики мозга и компьютеров? И существуют ли такие характеристики или компьютеризация когнитивных наук это лишь результат научного метафоротворчества? На эти вопросы с различных дисциплинарных позиций отвечают авторы настоящего выпуска журнала “Технологии и язык”. На что указывают компьютерные метафоры в когнитивных исследованиях: на свойства изучаемых объектов или на свойства методов? Вот ключевой вопрос, который стал основанием для появления этого номера. Этот выпуск посвящен истории становления компьютерных методов в когнитивных науках и роли метафоры в этом процессе. Основная тема – взаимосвязь вычислительной техники и теории познания, которая выражается через метафорические словари философского и научного дискурса. Авторы исследуют вопросы о природе сознания, соотношении разума и тела, свободе воли, а также возможности понимания человеческой деятельности в терминах машинного интеллекта. Эти темы актуальны сегодня из-за быстрого развития искусственного интеллекта и необходимости понимания его влияния на общество. Этот выпуск подойдет для специалистов в области когнитивных наук, философии, истории науки, а также для всех, кто интересуется вопросами взаимодействия технологий и человеческого сознания.

Ключевые слова: Компьютерная метафора; Когнитивные науки; Вычислительная методология; Языковой узус

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The history of the formation of computer methods in Cognitive Science is the result of an amazing confluence of sociohistorical circumstances and theoretical and technological metaphor creation that took place in the second third of the 20th century. Of course, in the history of philosophy, mechanistic analogies have been encountered earlier (“the world machine” by Nicolas Oresme and Nicholas of Cusa, the clockwork mechanism of the “world machine” by Gottfried Wilhelm Leibniz, the “man-machine” by Julien Offray de La Mettrie and Thomas Hobbes, and many others). The mysterious connection between the history of computing and the theory of cognition is expressed through the metaphorical vocabularies of the philosophical and scientific discourse of this or that epoch. The origin of computer metaphor in Cognitive Science is traditionally associated with Alan Turing's (1950) famous article “Machine Computation and Intelligence” published in *Mind*, in which Turing asks: “Can a machine think?” This work served as a kind of manifesto for the translation of the purely engineering anti-essentialist idea of machine imitation of human intellectual activity into the field of philosophical speculations about the nature of consciousness, the relation between mind and body, and free will. Given that in the mid-twentieth century the positions of behaviorism were still strong, the computerized version of mechanicism with its strict mathematical notions of computability and algorithmic structures made it possible to formulate reverse questions: “Can human behavior, thinking, and consciousness be the result of algorithmic computation?” or “Can human activity be understood in terms of machine intelligence and consciousness treated as an emergent property of the brain's multi-agent network structure?”

It would not be an exaggeration to say that the whole history of the formation of Cognitive Science in the 20th and 21st centuries is an attempt to provide reasonable answers to these questions. This attempt produced an entire dictionary of metaphorical systems, and linguistic customs introduced these “dictionaries” into the everyday life of science to such an extent that it has become difficult to distinguish a figure of speech from a strictly scientific concept. Conceptually clarifying this relationship and grounding the symbolic components of computer metaphor is the driving idea that inspired the authors of the studies published in this issue.

Let us consider a summary of each of the articles, starting with the opening paper „Body and Mind through the Lens of Mechanistic Metaphors: A History of Meaning Aberrations” (Baryshnikov, 2023). It continues the author's series of publications devoted to the mechanistic profile of computer metaphor rooted in the philosophy of Cognitive Science. The author argues that the semantic transfer of the properties of mechanisms or machine calculators to representations of the structure of the body and the working principles of the mind points to figurative universals that have persisted in recent computer metaphors. Despite the rapid growth of knowledge and technology in computer science, the computerist approach to explaining the nature of mind and consciousness continues to retain archaic mechanistic features. It can be said that these considerations are another stone in the foundation of the theory of scientific metaphor creation. The heuristics of scientific metaphors even in the most advanced fields of knowledge are often associated with archaic images. Are we not inheriting epistemological relics of the past



with linguistic imagery? - is one of the questions that prompted the author to write this text.

Svetlana Pesina's (2023) article “Anthropomorphic Metaphors as a Cognitive Model for the Conventionalization of Thought” adopts a linguistic orientation. The paper demonstrates the advantage of the invariant approach in describing the semantics of anthropomorphic metaphors compared to the traditional approach. The author comes to the conclusion that the constant emergence of new anthropomorphic metaphors and semiosis processes is carried out with the participation of invariant semantic components. According to this point of view, cognitive and linguistic processes cannot be considered in isolation from human embodiment and principles of corporeal conceptualization.

Igor Nevvazhai's (2023) study “The Problem of Measurement in Quantum Physics and the Description of Consciousness” takes the reader from the linguistic plane to the field of philosophy of science. The specificity of the measurement procedure in the world of quantum processes is that the consciousness of the observer becomes a kind of “metaphorical prism.” In the history of physics many interpretations of physical measurement have been proposed that are based on the analysis of “influence” of consciousness on the results of measurement in quantum mechanics. The purpose of this paper is to demonstrate that the problem of measurement in quantum physics is to find a way to describe the activity of consciousness in the process of measurement as well as the “influence” of consciousness on the physical world. In other words, the author points to the primacy of semiotic procedures in attempts to describe strictly paradoxical phenomena of quantum physics.

The text of Anna Kolovskaya and Andrew Ilin (2023) “Ontology of Artificial Intelligence Ontology as a Field of Engineering” can be characterized as an apologia of metaphorical heuristics. The authors consistently review classical ontologies (structured systems of concepts) in the field of theoretical doctrines of language and come to the conclusion that the formal-conceptual language of rationalism needs to be revised. Such a transformation requires different tools from what the neural network computing revolution can offer today, namely semantic tools such as symbols and metaphors. Whether modern AI will be able to generate the principles of metaphorization of the image of the world is a question that still awaits an answer.

In the article “The Phenomenological Justification of the Information Model of Consciousness” Svetlana Kuskova (2023) analyzes the foundations of the information theory of consciousness. She does so by confronting an approach in Russian philosophy that is represented by the works of David Dubrovsky with Charles Sanders Peirce's framework for a non-Cartesian phenomenology. The result of the reasoning is the statement that the philosophical foundation of the information model is not a certain version of materialism, but phenomenology without reference to subjective experience. It is worth noting that her paper can serve as a comprehensive exegesis of the complex, metaphorically and conceptually rich content of Dubrovsky's texts that are devoted to the problem of informational causality, the nature of subjective reality, and the ontology of the ideal. Such an interpretative approach only enhances the value of the author's analytical work.



This special issue concludes with Grigory Tulchinsky's (2023) paper with the title "Subjectivity as Problem and Focal Point for Interdisciplinarity" which is difficult for English-speaking readers. Despite the complexity and high topicality of the author's style, the text summarizes the whole set of problems discussed in the previous articles. According to the author's position, subjectivity is the core of civilization, the "central processor" that generates cultural metaphors. And this core is threatened today by the high level of imitateness of artificial intellectual systems. The author urges not to forget the communicative technologies of the past, which put subjectivity at the foundation of culture: "Digitalization standardizes - reproduces, consolidates and formalizes [...]" while "[...] the acquisition and transmission of knowledge is always linked to the possibility of 'embodying' meaning in communication with a teacher, a leader, group work." (Tulchinsky, 2023, p. 83). The result of the reflections is a statement about the necessity of professional humanitarian expertise under conditions of unprecedented scale of socio-cultural and (post)anthropological engineering.

Thus, all articles included in the special issue "Language, Mind, and Computation in Metaphors of Cognitive Science" are organically united by one narrative motif. The authors demonstrate the diversity of approaches to the study of metaphor and its role in the formation of scientific and cultural concepts. The works clearly demonstrate both heuristic and "myth-making" functions of scientific metaphors, leading researchers of the nature of the human mind to dangerous analogies, behind which lurks the imagery not only of the language of science, but quite likely also of new ideological programs.

In conclusion, it should be noted that all articles of the issue were created under the direct or indirect influence of the authors' joint work within the framework of the First All-Russian Conference "Consciousness, Body, Intellect, and Language in the Age of Cognitive Technologies" (Lektorsky, 2023). The interest in this topic on the part of representatives of various theoretical directions confirms the fact that metaphors in cognitive research are not only a characteristic of the language of science, but also an effective cognitive tool.

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СВЕДЕНИЯ ОБ АВТОРАХ / THE AUTHORS

Павел Николаевич Барышников,
pnbaryshnikov@pgu.ru, ORCID 0000-0002-0729-6698

Pavel Baryshnikov, pnbaryshnikov@pgu.ru,
ORCID 0000-0002-0729-6698

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