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Российская урбанистика и вызовы  
современности: нейронные сети в  
дискурсе цифрового города

Russian urban and challenges of modernity:  
neural networks in digital city discourse

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**Аннотация.** В контексте адаптации отечественной урбанистики к актуальным трендам развития, науки, техники и общества исследуются перспективы проекта «Умного города», где устойчивое развитие и повышение комфорта жизни человека оптимизируют экономические процессы. Акторно-сетевая теория стала актуальной в вопросе исследования города как «живой сети», где не только человек является активным модификатором реальности, но и вещи, а в нашем случае – технологии нейронной сети задают тенденции в городском дискурсе и изменяют природу взаимоотношений.

**Ключевые слова:** урбанистика, дискурс, цифровой город, нейронные сети, большие данные, умный город, акторно-сетевая теория

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**Abstract.** In the context of the adaptation of domestic urbanism to current trends in development, science, technology and society, the prospects of the Smart City project are explored, where sustainable development and increasing the comfort of human life optimize economic processes. The actor-network theory has become relevant in the study of the city as a “living network”, where not only a person is an active reality modifier, but also things, and in our case, neural network technologies set trends in urban discourse and change the nature of relationships.

**Keywords:** urban studies, discourse, digital city, neural networks, big data, smart city, actor-network theory

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**Introduction.** Modern urbanism is a rather labile science, which is reflected in the immediate reaction of its representatives to current changes in society and technology. Digital technologies transform previous methods of interaction in urban discourse and force us to reconsider traditional approaches to solving problems in economics, politics, education, and culture.

In connection with the introduction of information and communication tools into the daily life of the city, the landscape of the urban space is also changing. The priority direction in the development of urban systems has become the Smart Sustainable City (SSC) project, which involves sustainable development and increasing the comfort of human life, optimizing economic processes. At the same time, the theorists of the “Smart City” identify one of the most important factors of development in the infrastructure of urban space, namely social. N. Komninos [11] proposes a system consisting of the trinity of “smart technologies”, “smart management” and “smart communities”, in which communities should be able to influence urban policy and decision-making. After all, since the times of ancient city policies, the city has set the dynamics of development due to the high concentration of people in a relatively small territory, streamlining the chaos of opinions and interests, developing acceptable methods of management through intellectual achievements. A modern person needs not only a comfortable environment and economic well-being, but also the realization of his cultural identity, maintaining communication and creating communities of interests. Thus, the “Smart City” project pursues a tradition of continuity, preservation of the humanistic values of “freedom and equality” and, on the basis of this, becomes an innovative platform for the formation of urban communities.

**Materials and research methods.** The article uses the actor-network theory of Bruno Latour [4] as a methodology for social research into the interaction of humans and technology in urban discourse. Within the framework of this methodology, it is proposed to abandon M. Weber’s traditional scheme of social action and implement a material turn in considering things and technologies as equal actors creating new socio-technical relationships. The systems approach made us look at the city as a system of interconnected elements in which innovative projects are implemented. General scientific methods of analysis and synthesis made it possible to form a theoretical basis for the study, in particular, the analysis of scientific publications on the problems of the “Smart City” and neural networks [10] made it possible to synthesize a conclusion about the promising opportunities and contradictions of the new sociocultural reality.

**Research results and their discussion.** Neural networks are the new driver of large-scale digitalization in the Smart City. Artificial neural networks are mathematical models inspired by the structure of the human brain, capable of processing large amounts of data according to a specific algorithm. At the same time, the system copes quite independently with self-learning, automatically improving its accuracy, and makes its own decisions based on the information received, without additional programming by people. Smart cities are only expanding the use of neural networks using sensors, providing authorities with a huge amount of information. By analyzing the data obtained, we can identify trends and patterns for effective urban management and provision of services to citizens.

The need for security, environmental problems, increased load on transport networks, an increase in the number of urban residents, global consumption of goods, services and information, the need for rational urban management - these are challenges that require modern solutions that save time and energy. Using neural networks in the city, statistical data and economic indicators can be processed, which will allow modeling the values of growth factors, carrying out predictive analytics of the environmental situation, the main characteristics of traffic flows, predicting the impact of transport on the ecological state of the city, effectively managing traffic flows on the city road network, ensure the safety of citizens using video surveillance data and facial recognition systems. These are just a few examples of how neural networks can be used to technically solve urban problems, and the possibilities are only growing.

In order for the necessary results of the requested information to be correctly and correctly displayed, large amounts of training data, the so-called Big Data, are required. Algorithms for analyzing data such as messages on social networks, queries in a search engine, recordings from CCTV cameras, data from cellular operators allow us to provide a clear picture for future optimizations, saving resources and business development. As an example, outdated methods of measuring the population density of a given area provide only truncated information because only local residents are counted. In turn, neural networks are able to analyze all users of urban

infrastructure, including temporary workers, migrants, tourists, citizens visiting cultural centers and restaurants in the area. All this data is useful for assessing the profitability of objects, goods and services, and the economics of small businesses. V.N. Alekseev [1, p. 177] describes examples of the positive effect of introducing artificial intelligence technologies into economic processes on the investment climate of cities. However, not only economic indicators are subject to datafication, but also various aspects of social life are transformed into numerically measurable data. In addition to the three values identified by Big Data developers, such as speed, volume, diversity, they expanded them to seven, adding credibility, vitality, value and changeability to the list. Thus, the system began to include axiological metrics. Big data collection tools capture, in particular, a person's online activities, values, preferences, choices and interests, and, in general, behavior and attitudes. Using special algorithms from the entire data array, the neural network selects the necessary ones and offers relevant information for a specific user, while ignoring other, possibly also significant, areas of life, narrowing the user's picture of the world. Relying on algorithms, modern man is increasingly immersed in "digital ontology" and is subject to a kind of supervision, then control of his actions, and ultimately his own consciousness is transformed. However, human thinking, meaning generation, value guidelines, cause-and-effect relationships cannot be reduced to numerical correlations and statistical data.

Thus, the pairing of online and offline practices in the city has become the norm, which expresses even greater coherence between technology and people. The use of big data intersects with the invasion of neural networks into the personal life of a city dweller, since he unwittingly, and sometimes voluntarily, makes his personal information available, cementing his connection with virtual technologies. The founder of the philosophy of technology, E. Kapp, argued that technology is a projection of human organs, and tools are anthropomorphic technology [12, p. 23]. In the case of neural networks, a similar process of anthropo-technogenesis is clearly comparable to the human brain. As in the human brain, the key element in neural networks is the neurons that process and transmit information; connections between neurons through which signals are transmitted; learning system based on experience and data, both can change their parameters and connections, improving their performance, etc. And if previously technology enhanced a person's physical efficiency, now neural networks are trying to imitate human cognitive abilities (self-education, making independent decisions), replacing human intellectual activity. Immanuel Kant's famous slogan "Have the courage to use your own mind" [3] in order to "come out of the state of your minority, in which you find yourself through your own fault," remains relevant in the context of the use of digital tools in decision making. However, despite these similarities, the human brain is much more complex and functional than neural networks.

It is important to note that the city, as an advanced technology platform, strengthens the relationship between virtual communications and personality, persistently offering a techno-civilizational model of the development of man and machine. The ease of building a neural network in urban space is ensured by the accelerated pace of development of technological innovations, the equipment of cities, and the "innate" predisposition of cities to quickly perceive innovations. The famous philosopher and media theorist M. McLuhan, who rethought the nature and essence of the influence of technology on society, proposed an important understanding of the city as communication. He argued that every city resident participates in the changes and development of urban discourse. From his point of view, the city, considered as a network, is transformed from a simple physical space into a media communication environment. [6, p.140] McLuhan believed that online communities reproduce the values of rationalism and optimism, while the city acts as a space of freedom. Technological tools that rapidly change and evolve transform traditional living conditions into innovative ones, change generally accepted forms of life experience and create a need for new skills and methods of interaction [5, p. 53]. The digital environment is becoming an important communication channel where the socialization of process participants occurs, who, in turn, transpose the vector of value relations and create new ones. Due to the fact that online communication has significantly changed the methods and forms of communication, the principles of interaction are also changing. For example, anonymity promotes

openness in expressing one's position; the absence of time and spatial restrictions allows you to expand the geography of communication; new language tools of neural networks give the tools freedom in choosing a language and self-presentation. In addition to traditional values, new digital values are openness and accessibility of information, inclusivity and its accessibility for everyone, regardless of race, nationality, disability, age; ethical use of technology, including respect for the rights of other users, combating disinformation. But there is also a downside to these phenomena: dependence on technical tools, the desire for profit, pleasure, consumption, the elusive value of human physical communication, and a loss of ontological certainty.

In a “smart city,” a new type of identity is being established, where urban discourse is a channel that integrates two worlds: virtual and physical. In the virtual world, through social networks, a “digital twin” is being created, while the real “I” is increasingly alienated in the physical world, which gives rise to a changing identity. Urban culture offers freedom of expression, a kaleidoscope of perspectives, variability in professional fulfillment, the opportunity not to be tied to traditional patterns of behavior, autonomy, however, this gives rise to the problem of finding a stable identity. “Smart city” as a product of the information society transforms human communication and changes standard forms of interpersonal interaction. Discreteness and fragmentation of information flows in network connections, which replace real relationships with simulated ones, lead to changes in individual and social consciousness. In the process of virtualization and rapid technological development, the boundaries between a “real” person and his “digital twin” are blurred. This could potentially lead to the de-anthropologization of the participant in communication: in the future, the very essence of human participation in communication may be questioned. Understanding the nature of urban discourse, J. Baudrillard noted that highly urbanized spaces are aimed only at investment and profit, the constant growth of megacities is akin to a cancer and is aimed at eliminating unprofitable objects [2, p.115]. One of the key theses of the French philosopher is that city life leads a person to emotional emptiness and civic isolation. And the new round associated with the introduction of ChatGPT into professional spheres updates the position that people rely more on artificial intelligence (than on their own), adapting it to themselves and making life more comfortable, but at the same time losing sight of improving their cognitive abilities and skills communications.

A new type of technogenic civilization has formed a new sociocultural reality, where actors and actants, people and neural networks interact. Technogenic interference in the emotional-volitional sphere of people leads to the fact that the human cognitive system and his consciousness adapts to technogenic modes of existence. With the high pace of technology development in the scientific community and in everyday life, the idea of technological determinism is increasingly taking root, according to which the source of changes in social life is not the person himself, but the technical process. Understanding this phenomenon, in the 1980s a sociological approach was developed, known as “actor-network theory” (ANT), proposed by French sociologists Bruno Latour, Michel Callon and the Englishman John Law [4]. There has been a postmodern turn from the traditional scheme of social action by M. Weber, where a person associates an action with a certain meaning, which is focused on the behavior of other people, to the “material”, to things, “non-humans”, technological inventions as active actors capable of interacting online. In the context of ANT, it becomes possible to study the city as a “living network”, where not only a person is an active modifier of reality, but also things, and in our case, neural network technologies that set trends in the city and change the nature of relationships. B. Latour did not try to create a practical method to explain the processes of the information society, where technologies become more active and more tasks are assigned to them, but, in our opinion, the ability to analyze and verify ANT in relation to the “Smart City” and neural networks is quite relevant. We stand in solidarity with I.B. Orlova [8, p.129], who believes that the theoretical provisions of ANT actualize modern social practices of the new digital reality. The method of defining a network as a discursive phenomenon that realizes itself in real and virtual discursive spaces, mediating and integrating these spaces, helps to understand the specifics of network identity within the city.

According to B. Latour, things can “omit, allow, provide, facilitate, allow, offer, influence, interfere, make possible, hinder” [4, p. 103]. Thus, elements of a smart city, such as data, technology, and urban infrastructure can be considered as actors that make adjustments to the course of action of other agents.

Social communications, framed in a technogenic shell, through social networks, video calls, chats, etc., are perceived as a sociotechnical network connecting the real and virtual worlds. Social connections are understood as formed by heterogeneous elements belonging to different orders and creating a single heterogeneous sociotechnical network. Thus, as Latour predicted, there is a rejection of traditional schemes in the form of a priori oppositions: human - non-human, living - inanimate, cultural - natural, facts - artifacts. In the city paradigm, the actor-network can be the metro, sewerage, telephone network, since they also give us information. Thus, in a “smart city” the metro network moves into a digital reality, where a person uses an electronic metro application, and in this situation, the integration of networks and virtual interaction through sensors is enhanced, when an individual uses, for example, GPS maps while driving a car along the road transport network. Thus, a complex urban socio-technical network is being built, which can be self-governing.

An example of an assemblage of a network of objects and people determined by each other's actions can be the interaction of a person and a robot in an urban environment. In 2019, the Yandex company began testing a robot courier that works autonomously, charting its own route, receiving an order, becoming part of the city system [9]. In 2018, the launch of an unmanned taxi began in Innopolis (Tatarstan), and later it appeared in 2019 in the Moscow road transport network. A significant part of the functions previously performed by people is transferred to robots, who are delegated the role of actors influencing society. According to ANT, this indicates a decrease in the status of a person as an active figure, and technology ceases to be just a tool, increasing its status. There is an “anthropomorphization of technology” and at the same time a “cybernetization of people” [7, p. 119]. Thus, ontological ideas about the social, anthropocentric world are transformed. In accordance with ANT, the focus of attention in urban space is shifting to material objects and technological inventions, which act as unifiers and organizers of interaction.

**Conclusion.** The digital transformation of urban space entails significant changes in communication, behavior and human activity. In urban discourse, a big data collection system and neural network algorithms are an effective tool for managing households and optimizing economic processes. However, in the process of digitizing big data, various aspects of the private, social and cultural spheres in the lives of citizens are also analyzed. A person trusts his personal data, making daily choices, indicates his own preferences and values, translating them into digital reality. Thus, a “smart city” as a product of the information society also transforms the identity of a city dweller by involving his personality in the innovation process. Neural networks in urban space expand human capabilities, sometimes replacing intellectual activity, simulating human cognitive abilities. In such conditions, Latour's actor-network theory becomes more relevant than ever for studying the nature of interactions between humans and technologies in the discourse of the city, since it includes in scientific analysis not only social relations between people, but also introduces material objects and things as actors. Using the example of the introduction of modern big data technologies, artificial intelligence, mobile apps in megacities and large agglomerations, we observe the process of technology's influence on the nature of relationships, where not only a person is an active modifier of reality, but also things, and in our case, neural network technologies.

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