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DIGITAL TWINS IN THE INFORMATION SPACE AS A REFLECTION OF A PERSON

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Abstract. The article considers the phenomenon of the influence of information and communication technologies on human life and the growth of the scale of this influence in the modern era, characterized by the ubiquity of the Internet. The research proves that the growth in the number of Internet users, intensification of human immersion in the network, improvement of Internet technologies, have led to significant changes in social life. The development of electronic services and provision of round-the-clock access to them have led to a significant increase in online sales of almost all types of everyday goods. In addition, the continuous improvement of electronic devices with a wide range of opportunities for users has led to a qualitative development of the infrastructure of interaction with the Internet. Under these conditions, the information space forms conditions and opportunities for the creation and preservation of digital doubles of a human, partially or fully reflecting his or her physical and personal characteristics. As technologies develop, these digital doubles can become more independent and closer to their originals not only in the information space, but also in the physical world. In this regard, the author notes the threats of such development and argues for the need to carefully analyze the possible consequences of the widespread use of digital doubles in order to ensure that their development is for the benefit of human beings.

Keywords: information society, information space, virtual space, digital twin

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Currently, we live in an information society. According to the definition given in the Decree of the President of the Russian Federation dated 09.05.2017 N 203 "On the Strategy for the development of information society in the Russian Federation for 2017 - 2030 years" [7], it is a society in which information and the level of its application and accessibility cardinally affect the economic and socio-cultural conditions of life of citizens. A significant increase in the volume of data, the sources and means of distribution of which are industrial and social objects, various electronic devices, leads to the formation of new technologies [2].

The progressive development of information and communication technologies has led to significant changes in people's lives, primarily due to the widespread use of the Internet. However, the changes occur not so much due to the actual appearance of the network, but due to the ever-increasing direct involvement of users both in the process of expanding its demand and the process of its technical development. Although this document enshrines the possibility of preserving familiar, non-digital forms of services, the convenience of using electronic services together with the possibility of receiving them 24/7 has led to the fact that, for example, in the field of trade, online sales of everyday goods for 2022 in Russia increased by 43.5% [8]. The purchase of new, more advanced devices with advanced capabilities constantly develops the infrastructure of access to the Internet by its users. From them, application developers receive funding through online stores, which contain, among other things, free versions of software offered by enthusiasts. According to [8], 83% of companies in the world have already implemented the BYOD (bring your own device) format, which implies the use of personal devices (often more advanced and productive than those offered by the employer) in the workplace. Along with the proliferation of Internet access devices, mobile access is also expanding: 73.1% of users connect to the Internet from a mobile device, of which for 27% a smartphone is the only connection channel [13]. According to [13] as of January 2023, the global average daily time spent using the Internet was 6 hr. 30 min. In Russia, this duration was 7 h. 57 min. The same source cites the following data: with a population of 144.7 million people in Russia, there are 127.6 million Internet users and 106 million active users of social networks. Thus, the Internet turns from a technological solution into a new environment of social life, forming an information space, which (according to the definition given in [2]) is a set of information resources created by the subjects of the information sphere, means of interaction between such subjects, their information systems and the necessary information infrastructure.

"Information space" as a concept is used along with "virtual space", "cyberspace", "virtual reality", etc. To date, taking into account the novelty of the phenomenon and, in particular, in relation to everyday life, the semantic differences between its multiple definitions have not been fully defined. In [4], devoted to the consideration of the concept of "cyberspace", "information space" is presented as a description of the phenomenon with an emphasis on the technological component; however, taking into account the fact that, as it was shown above, technologies are becoming a part of social life, and according to [2] information and communication technologies have become the main

technology of social development in the era of digital economy, the "technological component" ceases to be a distinctive feature. Therefore, with some assumptions in the present material below we should consider the above concepts as synonyms.

The authorship of the concept of "digital twin" (DT) is most often attributed to Michael Greaves, a professor at the University of Michigan. In his paper [11], he describes it as follows: "the concept of a virtual, digital equivalent to a physical product or digital twin was introduced in 2003 at my university in a course for Michigan State executives on product lifecycle management". There he cites the concept itself: "[the concept] has three main parts: a) physical products in real space, b) virtual products in virtual space, and c) data and information connections that tie virtual and real products together."

With the development of the Internet, the transition to web 2.0, characterized, in particular, by a shift in emphasis from content creation to interaction, communication, building social networks [8], and, consequently, social ties on a new basis, the theme of interaction between the real and the virtual, information is moving from the realm of science fiction to everyday life. In 2018, Henk van Houten (at that time Executive Vice President and Chief Technology Officer of Philips) published the following text on his blog "A digital version of you? If digital twins offer so many possibilities to keep physical systems and devices "working", can we apply the same concept to humans? [...] More on this in my next article!" [8]. That paper which was published later, presented a digital model of the heart that could be customized to the personal characteristics of patients and used in prescribing treatment. In other words, technologies have reached a new level, which required new designations reflecting the peculiarities of their application and, most importantly, it is gradually becoming possible for an individual not only to interact with the new information environment, but also to become a part of it.

Human connection to the virtual environment, contact with it has recently been considered only in fantasy works, but even today the inhabitant of a large city is constantly in interaction, along with the physical, and with the information space. To define new forms of interaction, new concepts are beginning to emerge: "digital footprint", "digital shadow", "digital profile", which, although, in essence, fit into the concept of a digital double, emphasize new semantic nuances. Moreover, these terms are not exotic neologisms within the framework of subculture or fashion, but are concepts essential to the information society, designed to reflect the relations that are characteristic of interaction with the information space, and these are not relations "in general", but the result of individual interaction. In this connection, one more circumstance is very important: staying in the information space is always accompanied by the procedure of gaining access, which, in particular, is conditioned by its technological basis. Organization of access to the information space, as well as to the information system, is usually divided into four stages: registration, identification, authentication, authorization. The actual process (act) of registration is the creation of the DT in the information space. The other stages are aimed at establishing correspondence and connection between the real and virtual.

Registration in the information space involves the transmission of a certain amount of information necessary for an individual to fulfill his or her target role. Based on the conclusions [1], that human is constantly acting in different roles, depending on life situations and helping him to survive them, and, in the end, his social role is a kind of self-contained game to overcome obstacles and implement the intended, let us turn to computer games as an opportunity to choose a virtual representation to implement the desired behavior in the information space.

Despite the fact that the topic of computer games is quite well covered, let's cite Blizzard Entertainment's data on the launch of one of its products. According to Blizzard, users spent 20,814,758 hours in the Diablo 4 early beta, which took place between March 17 and March 20. Some players are joking around and trying to find out how many hours players spent in connection queues and how often they were thrown out of the game due to bugs. 17,586,363 deaths were recorded. Ashawa killed almost 4.3 million players, and died just over 33,000 times [2]. Note that the game features not only players and their virtual representations, but also fully virtual characters.

It is noteworthy that some participants further share memories about their adventures similar to sketches of real events. Thus, in [6], one of the game users describes his first encounter with a virtual character as if he had visited a real event. According to the description, the user is oriented in the virtual space in the usual way: time, spatial coordinates, and landmarks are given. In addition, he is not alone. In the same place there are other users who are identified by the player as humans, i.e. interaction in the information space for the player should be distinguished mainly by the absence of muscular effort, because the achievement of the goal will be among humans as well. But who were they in reality and what the kind of reality is? Temperament, style of behavior, manner of communication all was projected through their game characters inside the virtual space of the game to other characters and already through them to other players. That is, humans communicated and solved their tasks through their digital doubles.

Let's move on to another type of games - the Olympic Games, which until recently were not only not associated with virtual space, but were opposed to it as an attribute of exclusively real space. In 2021, an experiment was conducted, (the results later were considered as successful), to organize the Olympic Virtual Series, in which 250,000 people from 100 countries participated. The program included baseball, auto racing, cycling, rowing and sailing [6]. In 2023, Singapore hosted the Olympic Cybersports Week. A report on table tennis posted on the International Olympic Committee website [13] highlighted three exhibition matches among top-level masters, with a 17-year-old competing against a 50-year-old, which, it was emphasized, is very rare in elite table tennis. The unusual form of the competition attracted a large number of spectators. The rules remained exactly the same as in real table tennis, with the exception of the physical table, ball and rackets, which were replaced by virtual reality headsets and consoles.

Compared to the first example, physical effort is already required, but the game itself is completely virtualized. And although live humans competed, everyone saw his opponent only in virtual space, i.e. as a digital double. The audience could observe a double spectacle: live people in virtual reality headsets on the stage and at the same time their digital doubles with virtual rackets playing a virtual tennis ball [11].

Returning to terminology, it should be noted that on the website of the International Olympic Committee in relation to sports in virtual space can be found not only "virtual", but also "e-" (e-sport), which in Yandex translation turns into cybersport. This once again testifies to the unsteady terminology and the degree of novelty of the phenomenon, which has no analogues in the physical environment.

Sports games can also be fully simulated with replicas of real athletes who are recreated based on their actual game practice. Interestingly, this can create conflict situations. For example, the soccer simulator FIFA 23 received an update that added the Women's Champions League and all 12 teams of the National Women's Soccer League to the game. However, the athletes were extremely unhappy with the way they were recreated. So soccer player Sarah Gorden believes that no one even watched the women's league matches. The fact that she was given a speed rating of 48 out of 100, when in real life she is one of the fastest soccer players [11].

Of course, a computer character is not a full-fledged digital double, but it turns out that it still retains a connection with the prototype. And here it is not the physical human features, inherent in him as an object of physical space, that come to the fore, but the personal ones, which if they have a physical impact, then only indirectly.

In this regard, it is interesting to consider the property of information space, which consists in the long-term storage of its contents without degradation. Human is not an eternal substance. But, if he used to leave a memory in his creations, then with the development of information technologies one can see their creator together with the fruits of labor. The simplest example can be musical performers. Earlier, with the passing away from life, the master remained alive only in memory and retelling, then, with the advent of sound recording, the results of his work became available, with the advent of image recording everyone can see and hear masterpieces performed by the never aging world's best masters at the peak of their fame as if being at a concert sitting in the front row. In this case, of course, we had in mind works of world significance. But, nowadays, a family concert, which is of interest only to an extremely limited circle of people can also be preserved for posterity. And its importance will be not in its artistic properties, but as a record of the personal qualities of close people, revealed in their action, in live movement. And this live movement is important in itself as a reflection of personality in any form, and that is its value.

With the development of information space, its multimedia capabilities, the use of its advantages for communication, all its users inevitably lead to the reflection and fixation of personal characteristics. And if archives of photo and video fixation assume passive fixation and reflection of human personality, new technologies based on artificial intelligence allow to "revive" personality, to create the possibility of simulation

of live communication even after the physical death of the prototype computer model. New terms "afterlife", "information body" are emerging. The RBC website in the "innovations" section published the material titled "Online cemeteries and personal mausoleum: RBC Trends podcast "What has changed?" [8], and in the section "Industry 4.0" - "Death tech: how technology 'revitalizes' the dead" [13]. The most important ethical phenomena of life become part of technological development, partly just a curious example of the possibilities of high technology.

In this regard, the experience of creating so-called "deepfakes" - image synthesis techniques based on artificial intelligence - is interesting. Being the most accurate copies of living people (who in some cases are themselves interested in maximum accuracy), they can exist in the information space both in close connection with the prototype and completely autonomous. In 2022, the website of Deep cake company contained the following message: "We have created a digital double of Hollywood A-lister for advertising a telecommunication brand". It was about Bruce Willis, whose image was then used in the advertising of a cellular operator. That is, human characteristics, their personal traits in the information space can be alienated and used by third parties. And it may not necessarily be a complete image, as separate parts of personal features, such as voice, may be used. So the actor James Earl Jones, who voiced Darth Vader in "Star Wars" transferred voice samples and the rights for it to Lucasfilm. Now the character can be voiced by artificial intelligence with their help [13].

The information (digital) space by virtue of its peculiarities and certain demanded scenarios of use provides conditions and opportunities for the creation and storage of digital doubles of a human in the form of partial or as complete as possible reflection of his individual physical and personal features. With the development of technologies, the doubles will be able to gain more and more independence and to correspond more and more precisely to the original, and at the same time to become more and more significant not only within the information space, but also for the real physical world. At present, it is necessary to think as carefully as possible about the possible consequences of the wide spread of such phenomena in order to develop them exclusively for the good.

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