

Digital Space of a Human: From Philosophy to Computer Science

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1 ABSTRACT

This paper continues the discussion of ideas published in our previous articles for CORP conference related to a concept of a man in a modern world. The greatest attention is paid to the concept of human digital space. This concept, in our opinion, is the key to understanding the role and the place of modern man in the digital era, which has created a number of serious challenges to a man himself and, with certain development, can threaten his basic foundations of existence as a human being.

The paper also draws attention to such a problem as interaction of people with each other and interaction of people with machines.

Keywords: digital space, human digital space, artificial intelligence, modern digital society, computer science

2 INTRODUCTION

This paper makes an attempt to highlight several issues that remained not fully disclosed in previous articles published in the proceedings of the CORP conferences (CORP-2016, CORP-2017) and IF&GIS-2017. First of all, we need to try to define the human digital space as universally (generally) as possible, based on the experience of classical philosophy. There are several ideas, or options, here. The first option is to employ the evolutionary approach. One can go from simple concepts of space to more complex ones. This is how, for example, the idea of space is formulated in linear algebra: point, line, area, volume, abstract spaces of various types. These are relatively familiar concepts and a familiar idea to us. The second option is to apply axiomatic approach, when, on the basis of certain provisions (which are assumed to be true – axioms), some abstract concept is formulated. In previous works, we defined the “digital space” of a person on the basis of the familiar concepts from algebra and geometry, but at the same time such concepts as “space” and “human digital space” were not combined into a single abstract entity.

3 DEFINITION OF SPACE

The concept of “space” is one of the fundamental elements of human thinking and cognition of the world and of oneself. Since ancient times, such concepts as “space” and “time” have attracted the attention of almost all outstanding minds of ancient and modern times. Here are a number of definitions from famous philosophers:

“Space is not an empirical concept which has been derived from outer experiences” I. Kant [1].

“Space is a necessary representation, a priori, that is the ground of all outer intuitions”.

“Space is not a discursive or, as we say, general concept of relations of things in general, but a pure intuition.”

“Space is essentially one, and multiplicity in it, consequently the general notion of spaces, of this or that space, depends solely upon limitations.”

“Space is represented as an infinite given quantity.”

“Consequently, the original representation of space is an intuition a priori, and not a conception.”

“I doubt that anyone will ever give a correct definition of what space is.” [2].

This is the view of subjective idealism, briefly stated.

“The primary or immediate determination of nature is the abstract universality of its being-outside-itself,—its unmediated indifference, space”. G. Hegel [3].

“Space is in general pure quantity”.

“Space, therefore, is a point, which, however, is non-existent, is complete continuity.”

“The unity of these two moments, discreteness and continuity, is an objectively defined concept of space, but this concept is only an abstraction of space, which is often looked at as absolute space”.

An example of objective idealism is given.

Everyone can choose an option that is convenient for them. In addition to an objective and subjective view of space and nature in general, there are many other ideas that can be found in special philosophical literature.

4 DIGITAL SPACE OF A HUMAN

The title of this section contains three concepts: “digital space” (there was an attempt to present it in previous works), “person” and “human digital space” (also defined earlier). The subject of this paper is the concept of a “person”. We will begin with it, although it is evident that the result will be a thesis and completely incomplete notion, very limited, but necessary for our brief study. A huge number of scientific and popular works are devoted to the study of a man as a complex phenomenon. Since the dawn of human civilization, man has been trying to understand who he is. Information about these works has reached us in the form of legends, myths, works of philosophers, sociologists and, of course, various religious concepts, primarily such well-known ones as Buddhism, Judaism, Christianity and one of the “young” religions – Islam. From a theoretical point of view, it is unfortunately not possible to formulate a clear concept of a “man” at this stage of the development of modern civilization (science, technology, theology). But, for our research, nevertheless, we must do this within the framework of the limitations that exist. This must be done because the object of our study is a man. The subject of our research is the human digital space.

4.1 Object of Research

The established concepts of a “man” today are the following: it is at the same time a biological and social being. But almost all mammals and some other species of the animal world also have this duality to varying degrees. Many religions celebrate the threefold essence of man: body, soul and spirit. This practically corresponds to such philosophical categories as individual, special and general. This, to one degree or another, is noted by such great philosophers as B. Spinoza, I. Kant, G. Hegel, R. Descartes and others.

The concept of “space” exists for almost all living beings. The living space of an animal is expressed in the form of metric measurements, usually in 2D or 3D views. The size of these spaces depends on several factors: the type of animal (mainly its physical size) and its significance: a living space within which the animal feels safe, space for hunting or obtaining food. If another animal crosses one of these spaces, the animal reacts: it either attacks (when its living space is violated) or runs away if it feels threatened. This is a reaction at the level of instincts and acquired experience. Animals such as lions and wolves train in packs in the wild. Narrowing the living space even for animals of the same species (a pack) causes aggression or, at a minimum, discomfort. In similar situations, a person reacts in almost the same way. Everyone knows the so-called “polar disease”, when people spend a long time in a closed space and they begin to have conflicts that are difficult to imagine under normal conditions. They begin to be irritated by all sorts of little things in each other that they would not pay attention to under normal conditions. Although, in modern world, in modern society, the concept of “normal conditions” is changing greatly. Take, for example, Southeast Asia and some countries. People in huge cities suffer greatly from the limited living space. This applies to almost all places: housing, work, public transport, promenades and entertainment, etc. These conditions have a strong impact on the person himself, on all aspects of his life. A person ceases to be a natural person, who he was previously throughout his entire existence.

But most of all, modern man is influenced by scientific and technological progress, especially by computer technology. At the beginning of the emergence of computers (the period after the Second World War), computers were created to help people. At the very beginning, they were seen as powerful calculating machines that relieved people of the hard and uninteresting work associated with arithmetic and mathematical calculations. The introduction of the first computers dramatically increased the productivity of scientists and engineers. It seemed that a little more and computers would come closer to the human brain... Although, in computing processes, computers immediately surpassed the capabilities of people. A lot of diverse literature appeared in which the future of humanity was painted in rosy, positive colours. True, there were works, for example by Joseph Weizenbaum [3], warning us that computers also pose a certain threat to humans. And so, at the very beginning of their appearance, computers were available only to the elect: scientists, engineers, who worked for government agencies, and computers were used in the educational

process at universities. Computers have also begun to be successfully applied in production and in the form of on-board computing systems, in aviation and maritime transport. But even then Moore's law began to work. The dimensions of computers and digital devices were rapidly shrinking and, finally, the Internet appeared as a response to the miniaturization and widespread distribution of personal computers. It was personal computers that gave a very serious impetus to the development of computers and digital technology in general. The appearance of personal computers is an almost revolutionary event, which signifies the fact that computers have ceased to be cult things that belonged to a select few, they have become available to almost any person. The widespread use of computers led to a sharp start in the development of various software. Like mushrooms after rain, the massive creation of companies producing various types of software began, from operating systems and development environments to application packages aimed at non-computer specialists. The advent of e-mail and various types of Internet applications has dramatically expanded the communication capabilities of not only software, but of the person himself. Man began to use personal computers in an "unconventional" capacity: as a means of communication, as a means of obtaining information on various subject areas.

The combination of a personal computer with a mobile phone has turned the computer into an integral element, a mean of modern man. This was a turning point. This turning point was marked by the release of such a product as the iPhone. Let us explain this idea in more detail. As was noted earlier, computers were created to help people. All trends in their development and improvement were aimed at meeting human needs. A huge amount of research has been launched into trying to imitate the functioning of the brain, i.e. a computer should be like a person, serving a human. But the situation has paradoxically changed. With the release of the iPhone, the computer industry set a new trend: a person should "move" towards the computer, and not vice versa. Not everyone understood this, and they still do not understand it. Another technology aimed at separating human from reality has appeared just recently. These are social networks. Along with computer games, social networks (SN) greatly deform human's consciousness. "Virtual reality" captivates, and human goes into another world that is more comfortable for him, which he creates for himself, or chooses an existing one, joining various groups in the SN. Instead of living in the real world, human begins to live in a virtual computer world, in which he can very quickly realize himself as he sees fit. The criterion for his self-realization is the number of subscribers and the number of "likes" collected. And here a real business arises, from which many make money without actually doing or producing anything. The virtual world has become a fertile environment for the development of all kinds of anomalies of the human essence; they seem to be in the shadows, clearly not visible, but they begin to influence entire groups of people. The virtual world and the SN have become a convenient platform for various types of criminal structures, in particular terrorist organizations. Terrorist organizations, sects and other negative aspects of modern life feel very comfortable, because there is a massive escape of people from objective reality to virtual reality. There is no need to study, take care of your upbringing, health, defend your role and place in the team, all this can be artificially created in a fictional world. Strange as it may seem, modern computer technologies have a negative impact not only on ordinary users, but also on specialists in the subject area called information technology (IT, Computer Science). And there is a deep reason here.

Its essence lies in the fact that consumer society is increasingly interested in specialists knowing more and understanding less. Almost all modern education emphasizes this idea. The absolute expression of this idea is the test education system and, for example, the unified state exam. The test training system combines two phenomena, two sides of the human personality: training and, at the same time, education. The student must know what the teacher requires of him and answer questions as the teacher requires. Understanding here is not only unnecessary, but also harmful. The student's attempt to understand cannot be met in tests, which are full of errors, inaccuracies and outright incompetence. Such an attempt is usually brutally suppressed by an ordinary teacher, and is perceived by him as an attack on the system into which he has comfortably infiltrated. Understanding requires teaching at a completely different level and requires a completely different level of qualification from the teacher. And, unfortunately, no one is interested in this. A university must have highly qualified teaching staff, who must be paid a decent salary. The question arises: where to find highly qualified teachers and where to get appropriate funding? Students already living in virtual reality do not strive to understand, because in virtual reality (VR) there is also no place or need for understanding, you just need to know which icons to press and remember the sequence of actions, i.e. some script. And here the most essential property of a person is touched upon, his freedom [5].

“A person is free if he must obey not another person, but the law” [6]. If a person obeys another person, then he is a slave. And lack of understanding automatically means loss of freedom and gaining dependence on another. “Freedom is a conscious necessity” [7]. But without understanding it is impossible to realize necessity in the full sense. Thus, we have every reason to form a new, digital slavery. This tendency was successfully noted and revealed by E. Fromm in his work “Flight from Freedom” [8]. The processes that take place in modern society, namely the voluntary flight from freedom, tend to accelerate, unfortunately. Those negative personality traits and properties, that S. Freud described in his works and were largely confirmed and revealed by E. Fromm, found new ground for their development, but the main part of them is, as it were, in the shadow, in the zone of VR, which for them displaces the objective reality. Such transformations are clearly visible when working with university graduates. The characteristic features of a graduate of a modern university (we are talking about specialities in natural sciences and Computer Science) are:

- lack (complete!) of basic technical education, which was available to students of technical universities of the USSR;
- lack of skills of independent work;
- only knowledge of the basics of their speciality (at best), an almost complete lack of understanding;
- most importantly, people do not understand what it means to understand. They do not have such a culture, they are not used to doing this, because they never did.

This leads to the conclusion: such a person is ineducable, it is impossible to educate him to the level of a developer, he is already only a user, in other words, he is an ideal consumer and nothing more. Apparently, the problem firstly arises in the family and then develops in kindergarten and school. In some universities, this trend is already forming into the corresponding type. Therefore, we can say that a system of social reproduction of consumers has been formed, where there is no system of reproduction of producers. In a broad sense. Especially of producers of intellectual products: new theories, technologies, works of art, etc. Only users and consumers.

What is the root cause of this state of affairs? Let us refer to a number of ideas of E. Fromm from his work “Flight from Freedom”. The first idea is that “... modern man is still worried and tempted to give his freedom to various kinds of dictators or to lose it, turning into a small cog in the machine, well-fed, well-dressed, but not into a free person, but into an automaton.” Unfortunately, this is a general trend, but what is the underlying reason for this trend? “The structure of modern society affects human in two directions simultaneously. Human became more independent, self-reliant and critical, but at the same time isolated, lonely, and afraid.” In such a situation, “free cheese” works very clearly. As a number of studies show, almost 80% of the population are internally ready to exchange freedom for pseudo-comfort. The main thing is to be “like everyone else.” But a person internally feels this contradiction; one cannot get rid of it, and VR is the best place to escape from oneself, from real freedom. Flight from freedom, from understanding, in practice takes on monstrous features.

There are a number of examples that many people have come across lately. We are talking about the problem of finding programmers, system architects and project managers. Lately, we have had to train specialists for ourselves, and not always successfully due to the effect of “non-educability.” Despite such a sad state of affairs on the market for IT specialists, there is a steady demand for such “specialists”. “If he (a Person) is in demand, he becomes someone; if he is not popular, he is simply a nobody” E. From. A person who has mastered a subject area at the level of knowledge, skills and abilities becomes highly demanded, even in such a subject area as IT. This state of affairs is due to another important point – the “washing out” of real owners. Hired managers, “effective managers” of large concerns, pursue their personal interests, because they are not the owners. “With the advent of the monopoly phase of capitalism, the relative weight of both tendencies of human freedom (from and for oneself) changed. Those factors that weaken the human personality benefit, and those that strengthen them relatively lose significance” E. Fromm. The situation is reminiscent of the 15-16th centuries. “The concentration of capital (not wealth) in certain sectors of the economy limits the possibilities for success of private initiative, courage, and intelligence.”

Now all the conditions have been created for an accelerated escape from freedom. It is very important for us to understand this in order to determine the conditions for the formation of the human digital space (HDS).

The HDS both interacts with real objectivity and shapes virtual reality. Let us consider the main trends that contribute to the escape of modern man into the virtual world, his readiness to part with his freedom.

Independence changes to the possibility of gaining strength, which the person himself is deprived of, this is the search for new “secondary bonds” as a replacement for the lost primary ones.

Note. The primary break is original sin, expulsion from paradise because a person knew good and evil and became equal to God. The birth of a child is also an element of the primary rupture.

The transformation of the individual into an automaton in modern society increases the helplessness and dissatisfaction of the average person. Modern society creates a number of objective preconditions that contribute to the abandonment of real freedom and withdrawal into VR. The main ones (according to E. Fromm) are the following:

(1) Person’s own ability to understand really important problems is deliberately hampered. He “drowns” in a mass of chaotic facts and patiently waits for the “experts” to figure out what to do and where to go. These “specialists” also act according to a template or instructions. A person has two feelings: cynicism and naivety.

(2) Destruction of the holistic picture of the world. Radio, cinema, newspapers, magazines, and the Internet have a devastating effect in this regard. In such conditions, few ordinary people, but also only a small number of entrepreneurs can take the initiative.

Such society is very fragile, subjected to strong influence from external and internal factors. The reliance of state leaders on the strength of the parties supporting them only on the basis of the expansion of their ideas is a big mistake and delusion. The depth of penetration of these ideas is fundamentally important. All these conditions and ideas that we defined above must be taken into account when determining the appearance of a modern person. To characterize such person, E. Fromm introduced such a concept as human character. “Not only a person’s thoughts and feelings, but also his actions are determined by his character structure” – S. Freud. This corresponds to our concepts of “profile” and “trace” formulated earlier [9]. We believe that such concepts as “profile” and “trace” should be defining when considering the concept of HDS.

Unfortunately, modern society is an aggressive environment for humans. “If he (the individual) insists on his uniqueness, then in a police state he risks losing not only his freedom, but also his life, in some democratic countries he risks his career, sometimes the loss of his job, and most importantly, he risks being isolated”. E. Fromm.

The next factors influencing a person's character are fame, power and wealth, which give the owner their sexual superiority with minimal physical data.

“Another serious source of defensive aggression is a person’s reaction to an attempt to deprive him of illusions” E. Fromm. This should be taken into account when trying to deprive a human of his VR. We must expect the most severe rebuff. Therefore, a simple, frontal solution will not work here.

And so, we have considered the object of our research – a man. Now let’s look at the subject of our research – the human digital space.

4.2 Subject of Research

Apparently, in mathematics it is hardly possible to find an appropriate interpretation of the known types of spaces suitable for describing the HDS. One of our earlier works looked at HDS from a naive point of view. In this article we have already examined what modern man is from a sociological and philosophical point of view. A generalized characteristic of a person can be the concept of a “character”. Character is a set of properties of a person that does not include his instincts. (E. Fromm). A character can be understood as a certain meta class, which includes two main classes “profile” and “trace”. These concepts were discussed in sufficient detail earlier.

But for this study, it is desirable to include those personality characteristics that S. Freud and E. Fromm spoke about, both static and dynamic. These are already hereditary characteristics, or the results of medical research (tests), as well as acquired characteristics received from relatives, colleagues, and friends. To obtain such data, it is necessary to prepare a list of them. This is interesting, for example, to obtain a social profile of a specific company by examining the characteristics of all employees. This is important for assessing each employee from the point of view of the company's interests. Let us pay attention to one interesting detail that

we did not focus on earlier. The very concept of HDS – what is the semantic load in it? The concept of “digital” here is a service concept; it is not an essence or a reason, but simply a form.

The essence lies primarily in the dual nature of man himself – he is a social and biological animal. For both sides, information is key. On the biological side, information is needed for survival; it is provided by the physical senses: vision, smell, hearing, etc. Each organ forms a certain physical space, within which any living organism receives information about what is happening in the external environment, i.e. outside his physical body. It's a matter of survival in the wild. The nature of obtaining information using various senses is very different; many principles are inherent even in technical systems, such as radar, acoustics, lidars, etc. As for technical systems, here we have a huge number of theoretical approaches that explain the principles of constructing such systems and the principles of their application in practice. There are also a lot of theoretical studies devoted to the study and assessment of the parameters of the environment as the surrounding physical space in which technical means of obtaining information operate.

Currently, we can measure environmental parameters, evaluate the capabilities of detection tools, and plan their use. Physically, the detection space has a very diverse representation and depends on many factors. In this work we will not dwell on these details. Theories, technologies and practice of application are discussed in detail in special professional works. Here it is important to say only that the detection space may be mathematically described (in most cases, but not all) quite accurately, although not entirely simply. The same applies to a person, to his physical level, to imagine the space for receiving information about the external environment with the help of his senses. But, from the very moment of the emergence of humanity, man was not limited solely to the individual capabilities of his senses. He received a lot of useful information for himself from other people and even from animals, being in a certain social environment. This is very important when participating in collective activities and especially when it comes to real time, for example, collective work (construction, agriculture), hunting, fishing, war, etc. At the current moment of research, different types of human spaces can be illustrated graphically, Fig. 1.

Figure 1 a) represents the space of receiving information by one individual from his sensory organs. From this Figure it is already clear that even at the initial level, the level of the individual, difficulties arise. We cannot imagine one, universal space of an individual, because sensory organs are very different from each other. So, vision, if you do not take into account obstacles, can be approximated as a sector (on a plane); in 3D form it is a segment of a sphere. This space is easy to approximate mathematically, although the discovery process itself is not trivial.

The hearing space is the reaction of the hearing sensor to noise (changes in air pressure), also may be simply approximated mathematically. But with the space of smell it is no longer so simple, because the smell spreads mainly by the movement of air masses, i.e. wind. At sea, information also spreads through wind, currents, and tides.

When a trace is discovered, the situation is perhaps the most difficult. The point is this. In the previous cases (vision, hearing, smell) we have a situation where an object deforming a certain type of field is in direct contact, i.e. must exist. Thus it must be physically present somewhere and the distance to it is determined by the environment and the capabilities of the senses. When a trace is discovered, the situation is different. The environment, as it were, “records” information that there was a certain physical object here, but this does not mean that it is here or somewhere nearby, it may no longer exist at all, even physically, but traces of it remain. And here, not only the fact of detection is important, but also the time when the trace was left. Interest in the trail depends on this.

Now, let's return to our previous discussions. An individual uses his senses in two ways. The first option, passive, is needed in most cases to observe and ensure your survival. The second option is active, when the individual wants to do something. But, first of all, in order to do something, the Individual must find and discover this something. This is the eternal problem of the hunter, with which the active phase of human development began. This is also a classic problem in the theory of search and detection of moving objects [10]. The theory of search and detection of moving objects is quite well developed, allowing one to estimate the search potential of the detector, search time and probability of success, i.e. probability of detection. It is also possible to obtain numerical estimates of the capabilities of various types of detection tools. You can also solve problems of search optimization and distribution of search efforts. For the case when an individual discovered a trace, the search task could also be solved, but it is necessary to know the time of existence of

the trace or the time of leaving a trace. These are not trivial tasks. The meaning of its solution generally depends on the initial data.

Let us briefly summarize the consideration of case a) Figure 1. Constructing a human information space even at such a simple level (physical abilities of an individual) is a very difficult task. It is impossible to imagine such a space in general terms, therefore, we have to consider different types of spaces and different analytics. It should be especially emphasized that we considered only the case of one individual.

Consider the case shown in Figure 1 b). This is the case when the interaction of two or more individuals located within the detection space of each (vision, hearing, ...) is considered. In this case, the ability to use one's physical abilities (vision, hearing, ...) increases sharply due to teamwork. This can be seen in examples from the wild, where it is clear that most animals are herd animals. This dramatically increases the survival rate of the species, regardless of whether it is prey or predator.

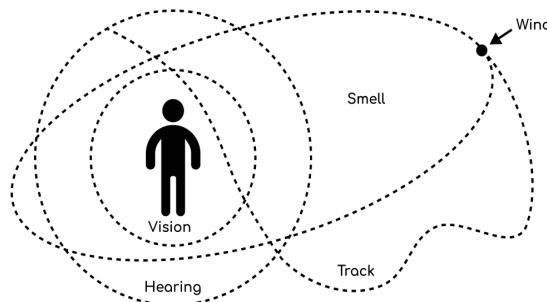


Fig. 1a: Types of human spaces. a) information space of one human

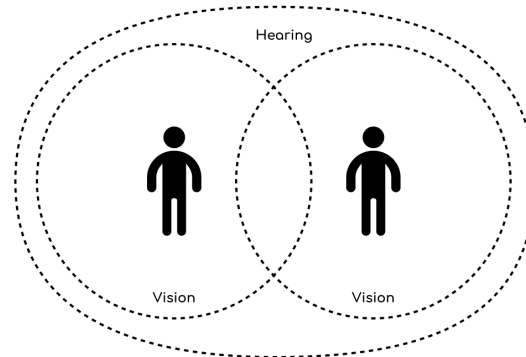


Fig. 1b: Types of human spaces. b) information space of human group (current time)

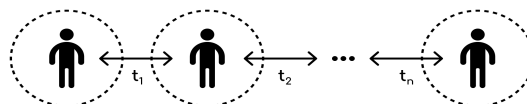


Fig. 1c: Types of human spaces. c) information space of social environment (current&relative time)

Figure 1 c) shows a case unique to humans, when a certain social environment is formed: family, clan, city, state. Here the information fields become almost unlimited, but not all information is available, the available

information is not always immediately available upon request, i.e. on-line. Here we are dealing with delay, when not only the information itself is valuable, but also the time of its receipt or delay. Unlike the animal world, the human social environment provides the individual with unlimited opportunities to obtain the necessary information. An important feature of the social environment is that it provides accumulation, storage and access to various types of information. At the very dawn of humanity, information was passed on from mouth to mouth and simply remembered. Then a written language appeared. The Talmud is one of the first books, according to some scholars. This book ensured such stability and vitality of the Jewish people. The fundamental difference between the digital human era and past eras is the following:

- most information may be accessible to anyone in real time, or close to real time;
- access not only to information, but also to any devices connected to the network is available;
- continuous monitoring of the environment and other important objects, including humans, is ensured;
- you can get a lot of services on-line (pay taxes, make an appointment with a doctor, get an initial consultation with a doctor, send tests and take much more);
- social networks, Internet services, artificial intelligence methods and tools (for example, ChatGPT) form parallel (virtual) reality. And the most important. An individual has the ability to control and customize this VR, which is now almost the most important incentive to escape from objective reality.

If we remember again that a person has two sides: biological and spiritual (social), then we can say that the biological side (its physical capabilities) can be formalized, because it is close to the technical means of detection that the natural sciences have learned to design, evaluate and apply. As for considering the social aspect of a person as an opportunity to receive diverse information, there are no established approaches, much less theories and practices. The complexity of this research lies in the fact that when we begin to use technical devices, such as the Internet, sensors, how to evaluate this information from the point of view of the individual's capabilities? Yes, there is an information field (space), but it cannot be connected to any of the physical spaces that we examined earlier, determined by the physical capabilities of the individual. The digital world, digital space, as it were, expands the capabilities of the individual to infinity, to the planetary level.

But how to formalize this? Let us turn once again to the concept of "space". From a philosophical point of view, space and time are independent categories. Some philosophers understand them as objectively existing (G. Hegel, for example), while others assume that these concepts are given to the human mind (I. Kant), that is, as if pre-established by God for the study of the external world as a phenomenon of some essence, a thing-in-itself that cannot be known. In mathematics, space can be formalized and defined as a certain set on which a measure can be specified (metric spaces). For simplicity of reasoning, we present the simplest types of space. For example, a linear space on which the Jordan measure is given. For ordinary consciousness, this could be a line, as an example. The elements of this space are points on the line, that is, the coordinates. And everything that is line can be given, defined by coordinates and vectors. If we consider a plane, then here we have two coordinates and every object on the plane can be defined by these coordinates. Using coordinates, more complex objects can be specified than in linear space. All objects can be specified by a set of coordinates, properties and a transformation system.

In this association, what is the digital space as a source of information?

It can be shown that the HDS can be attributed to a certain type of topological space. And the "split" of the "digital individual" does not have any decisive significance. Let us try to go from simple to complex, to imagine the space of a computer and a computer network. A computer's CPU is entirely determined by its memory, both permanent and RAM. RAM is stored for a relatively short time, until the computer is turned off. Long-term memory is stored much longer, until the end of the storage device's physical lifespan. Information in memory is stored in memory cells (zero or one) that are specially organized to allow recording and reading. For correct writing and reading, an addressing system is set over the memory, which can be simple, or can be quite complex. In general, an addressing system can be represented as a collection of linear spaces. The specific organization of the memory system depends on the design features of the hardware, the operating system and the purpose of the computer. We will not dwell here on such important

and fundamental aspects of working with memory as “dynamic memory”, pointer arithmetic, etc. Despite the complexity of organizing computer memory, it can be represented as a system of linear spaces, simple enough. This is what applies to a personal computer and smartphone. But it is almost impossible to imagine autonomous operation of a computer today. All of them (computers) have turned into certain elements of the global network. The most primitive capabilities that were obvious just recently are now impossible to implement locally. Cloud technologies contribute to this, because businesses are interested in reducing the cost of computer work. The global network, unlike a local computer, offers a number of new services, such as:

- on-demand services, almost everything is translated into this technology, even software development tools. The advent of online artificial intelligence is further shifting storage and analytics from local to the cloud. The local computer is increasingly becoming an interface and access point, rather than a place for storing and processing information. Let us pay special attention to this! cloud technologies and services. The previous point is primarily based on them.
- processing of big data, but this requires huge resources, which, as a rule, are not available on a local computer and their cost for private use is extremely expensive.
- robots and intelligent assistants.

This view of modern automation of society forms a number of analogies with theoretical proposals and examples formulated in the works of K. Jung.

4.3 Definition of a Human

We have examined the object and the subject of our research. At the same time, the object of research was presented by two sides, biological and social, while its essence was not formalized or defined. It turned out that we considered the individual as a device, as some element of a global, local or individual network. In principle, from a certain point of view it is correct and quite effective for solving a number of problems and understanding certain social processes. But a person is not a simple mechanical device and not a simple biological object. The problem of a human is an eternal problem that humanity has been working on for more than one millennium. The idea of human as a dual entity, biological and spiritual, is in some cases very superficial and not clear. This is a simple statement of phenomena, without an analysis of entities. In many religions and ancient teachings, human represents a substance consisting of several orthogonal entities, such as body, soul and spirit, which are integrated into a single whole for a certain time. This idea can be schematically represented in Fig. 2 as some coordinate system. But it should be noted that each coordinate depends on time, and the time function for each coordinate is different, very different from the others. For example, if the X coordinate (defines a physical body) has a clear definition area (beginning and end), then others, apparently, are not so simply defined and can have an infinite length, i.e. from $-\infty$ to $+\infty$. They can take the form of some periodic functions with variable amplitude and phase. Most likely, the functions will not be periodic. There may be other “nuances”. So, if the “soul” exceeds the maximum value, then, quite possibly, the development cycle of human ends and he no longer returns to the physical body.

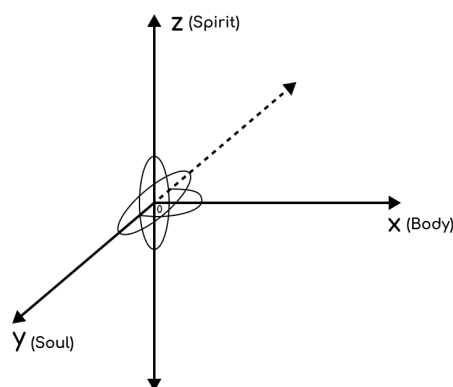


Fig. 2: Abstract diagram of the concept of man.

If the “soul” falls below the minimum level, then development stops and a complete “reboot” occurs. What this “reboot” is not yet clear. Maybe the essence changes, becomes no longer “human”.

The diagram in Fig. 2 represents one development cycle, limited by the life (existence) of the body. With this idea, it is clear that the substance of a human cannot be limited to one cycle (the existence of one physical body). Let us consider the relationship between three entities: body, soul and spirit, Fig. 3. Let us give a brief computer interpretation.

The spirit is pure transcendence, something beyond. Software developer, or source text, formulated and formalized plan, a human will (Arthur Schopenhauer).

The soul is the connection between the biological and the transcendental. Integration of “this” and “that” side. It is like software for hardware.

The body is a physical realization, a “hardware” for representation in the material world and the possibility of material interaction.

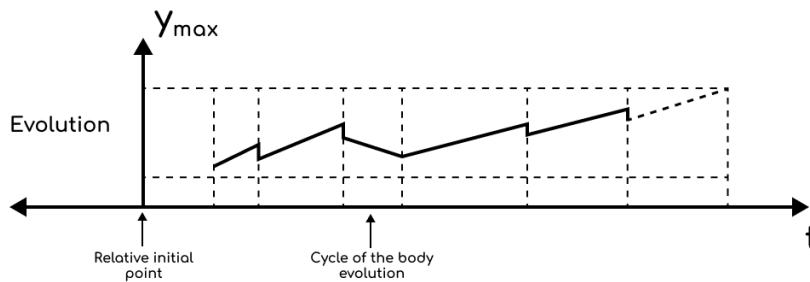


Fig. 3: The first approximation of the entities: “body”, “soul” and “spirit”. b) Soul

Let us consider the interaction of three entities: “body”, “soul” and “spirit”, Fig. 4. Note that this is a very primitive analogy for the general idea. An analogy with the development of software and hardware systems in practice. The developer of “software” for hardware installs it on a specific “hardware”, taking into account the specifications of the hardware on which the software is installed and taking into account the support of all elements and components of the hardware, such as the central processor, motherboard, peripheral devices, information input-output ports, and much more. The installed primary software (operating system, for example) is like a “representation of the Creator,” i.e. has many degrees of freedom and options for modernization and self-improvement, as well as for degradation.

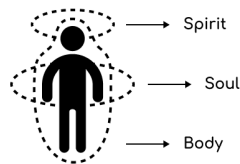


Fig. 4: Human interaction

Returning to Fig. 3, we should note that, considering human as an entity of three parts, these parts have the following properties:

The body is a property of singularity, i.e. it is unique and singular and cannot be repeated. The price to pay for this is limited existence.

The soul is special, i.e. inherent in a certain class, for example, the class of physical bodies. It may have no restrictions on existence.

The spirit is a common, basic idea (G. Hegel), does not depend on, but unites classes of souls and bodies. This is a certain invariant of a person that cannot change under any circumstances, it is eternal. This idea is expressed in a simple formula of a Russian officer of imperial Russia: life to the Tsar, glory to the Fatherland, honour to no one.

If we take into account the evolution of this approach, which was shown in Fig. 4, then in this case such concepts as “space” and “time” lose their original meaning. They exist only at the level of existence of the “history of the singular,” i.e. a specific physical body, and are given “pre-established” (I. Kant) to this body, so that it (a person, an animal) can exist on the scale of existence of one cycle of its body. In this case, there is no past and future, there is a series of experiments, evolution, or a spiral along which you can move in different directions; there is also no concept of “up” and “down”. Assuming that all cycles are “recorded” and “stored” in the “clouds”, there is no difficulty in “playing” any of them again, making certain changes. In our view, or in the view of one cycle, it means “turn back time”, i.e. back and also to the future. Thus, we can assume that our World is a huge, cyclical experiment, where there are no such familiar concepts as space, time, past, future, for humans there is only the present.

Note. The concept of “soul” can also be decomposed into the following three entities: reason, mind and the imaginary part, that which is “on the other side” and is connected with the “spirit”. By analogy with a computer, the mind is a connection, a mechanism for integration with the physical body. The mind is a functional, business analytics essence of a person.

This interpretation raises a number of questions.

- (1) What kind of global experiment is this?
- (2) How does the “spiritual” world relate to the “physical”, what is the fundamental difference?

If we turn to the Bible and the idea of original sin, we get the following in a simplified form. Adam and Eve lived in paradise, and then they tasted the fruit from the “tree of knowledge”, learned that there is good and evil, and thereby decided to approach the level of the creator, God. But what does this idea mean in terms of Computer Science knowledge and in terms of our previous interpretation? We will try to consistently answer the questions that have arisen. Initially, according to the Bible, it turns out that man was immortal, or simply lived in another World, quite possibly not material in our understanding. Then why did he suddenly move to the combined world and become physically mortal (from the point of view of the physical body)? It is quite possible that at some stage someone decided to “fit in” to the experiment without the knowledge of the “Administrator”, or this is an element of the experiment. Man has now become a full-fledged participant in the experiment on the physical level, a living participant with capabilities (some) close to the capabilities of the Creator himself. It is quite possible that before this there were many preliminary experiments with the concept of “living”, as a synthesis of the material and spiritual. And then, at a certain stage, a man and the entire living world were introduced into living nature as the main participant in the experiment. Modern robotics is also moving towards this.

We return again to our fundamental question: what kind of experiment? It is quite possible that people (humanity and the entire animal world) are a huge, distributed computer and/or a system of primary sensors. In the active phase, during the day, or during wakefulness, a man is a direct participant; at night, in the sleep phase, he works as an element of the “matrix”, his resources are simply loaded with activity that is not under the control of his consciousness. It is likely that we are not yet able to even approximately answer the question of what the essence of the experiment is. To do this, you again need to turn to primary sources, to the primary knowledge that was in the regions of Mesopotamia, India and the Himalayas, as well as to the primary versions of the Bible and the Koran.

We briefly examined the essence of man and his interpretation from the point of view of the natural science approach, from the point of view of Computer Science. The next issues that are interesting to consider are the division of a person into a man and a woman (will be discussed in our other work) and the interaction technology.

5 TECHNOLOGY OF INTERACTION

We have examined the probable levels of interaction between the constituent parts of a person: spirit, soul, physical body. At the same time, another question arises: how, on the basis of what “protocols” (Computer Science), do people interact with each other at various levels: spiritual (spirit, soul) and physical? A graphical interpretation of this idea is shown in Fig. 5. This also applies to interaction with other entities of the living world, as well as with the inanimate world. For simplicity of reasoning, let us turn to what a man himself created. For, according to I. Kant, man could not create anything other than what he represents himself and what the Creator “pre-established” for him. Let us turn to Computer Science, where any interaction is based on a certain “protocol” – this is a formalized system of basic concepts for the interaction on various levels of information processing: the signal level (interaction with the fields of the external world, living and inanimate entities), these are primary devices and sensors, the level applications, the database level and the level of visual interfaces for human interaction. The level of interaction between various elements of both hardware and software has apparently reached its maximum value. From the digital transformation of analogue fields of the external environment to a system of ontologies that represents the intangible world of abstractions and concepts of which the human intellect is only capable. We return again to the original question in the following form, based on a specific example: on the basis of what can a person learn to speak a human language? It is impossible to learn this from scratch. The proof of this is simple – not a single animal has learned to fully speak human language. Thus, a person has a number of physical features that allow him to speak. These features are already pre-established and belong to all people, regardless of race or nationality. Here we do not mean the physical characteristics of the human body that make it possible to form sounds and hear them.

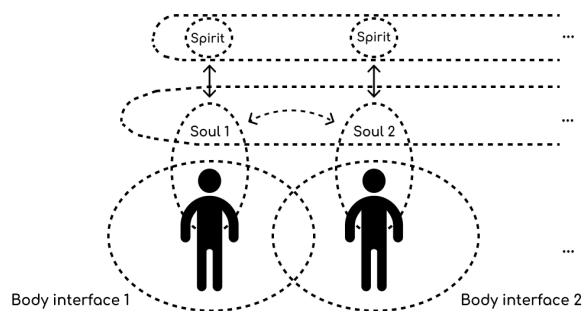


Fig. 5: Interaction between people

Carl Gustav Jung introduced such a concept as the “collective unconscious”, as a certain set of archetypes – some pre-existing, primary forms, abstractions [11]. It is logical to assume that people can interact with the physical and spiritual worlds through different, “pre-installed” archetypes. This is the basis that people, and even animals, can interact with each other, while many of the mechanisms of interaction are apparently not realized by them. Those people who can use and “see” archetypes become magicians, sorcerers, or, in extreme cases, hypnotists.

6 CONCLUSION

The authors’ views on the concept of man from the point of view of Computer Science in modern digital society presented in this work are far from complete, often naive and worked out thematically. We just wanted to draw attention to problems that seem obvious to us.

It should also be noted that we tried to give a definition of interaction space, which may not be clearly presented and understood by us. But it is necessary to take it into account, especially in the context of the concept of the HDS. It is absolutely clear that in terms of the possibilities and strength of interaction and influence on a person, no HDS can even come close to comparing with the mechanisms of social influence, which are still quite strong. But at the same time, one should not ignore the fact that the HDS can become a

space for the preparation, stimulation and launch of unconscious archetypes, both for a specific, immediate individual, and for an entire people (state), or a specific class of society.

The questions formulated in this article seem relevant to us and their relevance will only increase in connection with the trends that have now clearly emerged: the deepening of automation and its implementation in all spheres of human existence, the intensive introduction of artificial intelligence tools and methods and increasing people's trust in artificial intelligence, i.e. to the machines.

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