The Nature of Intelligence: A New Look at the Foundations of Sociology

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Abstract: The development of artificial intelligence (AI) stimulates interdisciplinary research aimed at establishing the essence/nature of intelligence. Without an adequate answer to this question, discussions about which systems should be attributed to AI and which should not remain pointless. This paper shows that human intelligence should be considered primarily as an attribute of the Homo Sapience species as a whole. The existence of a global communication network, formed as a result of information exchange between its relatively independent fragments localized within the brain of individuals has been proved. Human intelligence is a kind of projection of information objects that appear in the global network on its local sections. These objects have their own non-trivial behavior, which is only indirectly related to the behavior of individuals. It is these objects that arise at the transpersonal level of information processing that largely determine the properties of society as a whole. The nature of these objects is analogous to the nature of individual consciousness. The consciousness of each person is the result of the exchange of information between neurons of a separate brain, the same exchange within the global network (or its relatively independent fragments - states, ethnic groups, etc.) generates transpersonal information objects, at least possessing many signs of consciousness and intelligence. The existence of these objects allows us to fully translate sociological research into the language of mathematical theories Moreover, the fact that information exchange is now largely moving to telecommunications networks makes it possible to study them quantitatively. An opportunity to provide a natural science justification for the concepts of geopolitics is justified too. These concepts initially considered states as analogs of organisms with their own non-trivial behavior. The proposed approach makes it possible to find quantitative regularities that express the concept of geopolitics.

Keywords: Artificial intelligence, Information processing, Telecommunications networks, Geopolitics

Introduction

The geopolitical map of the world is in motion again. The face of human civilization is changing dramatically, which does not require extensive evidence. Suffice it to mention that the epidemiological crisis of 2020 has caused more than serious consequences for the world economy. Some authors compare the consequences of the crisis with the consequences of the world war, which seems quite justified, at least if we talk about the degree of restructuring of logistics chains and other purely economic factors.

There is also no doubt that the rapid development of infocommunication technologies has an increasing impact on the processes of the geopolitical level and this factor has much more serious consequences for civilization as a whole than it may seem at first glance. We emphasize that the Internet factor has long been considered by various authors as a means of restructuring the social fabric.

This factor is used by political circles in various countries to achieve certain goals. E-Commerce has the most significant impact on trade flows and this factor has only increased in the context of the pandemic. Moreover, in connection with the covid-19 pandemic, we can already talk about a change in the nature of educational migration. Thus, a significant part of schoolchildren in Kazakhstan are switching to distance learning in Russian schools – education, become distance learning, ceases to depend on geography.

All these factors are on the surface, however, as shown in this paper, there is another and very serious factor related to the influence of the telecommunications industry on geopolitics, which has not yet received sufficient attention.

Specifically, this factor is related to the fact that sociology can actually become a fully mathematized discipline. In this regard, it is appropriate to recall that the founding father of sociology, Auguste Comte, originally viewed sociology as "social physics", from his point of view it should have become a mathematized" positive " discipline. Comte's aspirations were not fully realized. Mathematical methods of sociology, are in use nowadays, but this is mainly related to the processing of statistical data, data from sociological surveys and so on.

The rapid development of the telecommunications industry radically changes the position of sociology in the system of scientific knowledge. As shown in this paper, there is a basis for building mathematical models that make it possible to make the behavior of states predictable in the long term. In this sense, mathematical sociology is quite close to mathematical geopolitics, which can also now be consistently justified on the basis of the concept of intelligence proposed in (Angeli, et al., 2010; Suleimenov, et al., 2019).

The essence of the noosphere from the point of view of information theory

Let's start with from the arguments used in (Angeli, et al., 2010; Suleimenov, et al., 2019). In these works, it was shown that it is impossible to reveal the nature of human intelligence if we consider it as a purely individual trait. The conclusions made in these works suggest that intelligence is rather an attribute of the entire species of Homo sapiens as a system integrity. It is this circumstance that most significantly affects the interpretation of the basic provisions of geopolitics. The fact that intelligence is distributed to a certain extent makes it necessary, firstly to modernize the foundations of geopolitics and secondly to give them a consistent scientific justification. In this regard, it is appropriate to recall that many authors still consider geopolitics as a kind of protoscience, the subject field and tools of which are still in the process of formation.

The analysis of the essence of human intelligence carried out in the works cited above (Angeli, et al., 2010; Suleimenov, et al., 2019) is based on a generally obvious circumstance. Indeed, consider two people entering into a dialogue. It is generally assumed that in this case, two interlocutors communicate with each other, however, this is an approximation and very rough. In fact, we are talking about the exchange of signals between neurons that are part of the brain of each of the interlocutors. It should be emphasized that the nature of the functioning of a neural network does not depend on the nature of the signals exchanged between neurons, it is only important that they are able to move from one state to another. This allows us to assert that in this example of a dialogue between two interlocutors, in fact, a common neural network is formed. Continuing this logic, it is easy to conclude that there is a global neural network, which with certain reservations can be identified with the noosphere, understood in the spirit of V. I. Vernadsky (Suleimenov, et al., 2020). At the next step of reasoning, it is easy enough to demonstrate that the conclusion about the existence of a global neural network identified with the noosphere allows us to look at the basic provisions of geopolitics in a significantly different way.

Recall that one of the basic provisions of geopolitics was originally an analogy between states and organisms. The founding fathers of geopolitics believed (Oldfield & Shaw, 2006; Dittmer & Dodds, 2020) that the state is a kind of integrity that has its own pronounced reactions to certain external irritants, its own non-trivial behavior and all that allows it to be put in accordance with the body. This kind of view, as the modern literature on geopolitics shows (Bassin, 1987; Flint & Zhu, 2019), is perceived by many as a kind of metaphor, as an illustration of the fact that the state is still a kind of systemic integrity. If we use the ideas about the formation of a global neural network, it becomes clear that the consideration of states by analogy with an organism is not a metaphor. These are system wholes that knowingly have their own non-trivial behavior only because there is a transpersonal level of information processing.

Elementary considerations arising from the general theory of neural networks (Philo, 2017) clearly show that the information capabilities of the enclosing neural network far exceed the information capabilities of its individual parts taken separately. In other words, the information capabilities of a neural network depend non-additively (non-linearly) on the number of neurons included in it. Consequently, the fact that interpersonal communications generate a common neural network leads to the emergence of quite specific transpersonal information structures. The simplest (from the point of view of clarity) of such transpersonal information structures is any of the natural languages. Somewhat simplifying, we can say this. Any of the natural languages is recorded not so much in the memory of individuals as in the collective memory of the corresponding people.

You can use an elementary analogy: in the human body, some cells may die, but new ones take their place, and this does not stop the body from being a whole.

Similarly, information processing systems that are native speakers of any of the natural languages represent a kind of system integrity, regardless of how each of its individual elements behaves, that is, each of the individual people. Moreover, natural language as a means of interpersonal communication is a factor that structures the corresponding segment of the noosphere. Even at this stage of research, it can be clearly stated that the structuring of the noosphere is actually carried out by natural languages. These are its relatively independent fragments that were formed in historical time and each of which has its own non-trivial behavior. Thus, the ideas of geopolitics can really be completely reformulated in the language of information theory, if we start from the conclusion about the existence of transpersonal information structures and transpersonal information entities, the simplest example of which is any of the natural languages.

The subject of sociology from the point of view of geopolitics and information theory

The interpretation used of the basic provisions of geopolitics necessarily entails a revision of what is currently called sociology. However, we should rather say that there are all the prerequisites for a return to the original ideas of Auguste Comte, according to which sociology should be considered as social physics. For this purpose, there are not only theoretical grounds associated with a new understanding of the essence of intelligence (Angeli, et al., 2010; Suleimenov, et al., 2019), but also obvious grounds related to the role of telecommunications networks in modern society. The interpretation of sociology or rather its subject field from the point of view of information theory suggests that the main object of study of this discipline should be a consistent mathematical description of the totality of interpersonal communications as a whole.

They form both the society and everything that allows us to consider sociology as a discipline directly bordering on geopolitics. Of course, the importance of considering interpersonal communications and the importance of forming social networks has been noted by sociologists before, but at this stage of research, these factors should be given much more serious importance, primarily because these factors ensure the formation of transpersonal structures that largely determine the behavior of society as a whole.

Indeed, human consciousness as a whole, speaking somewhat exaggeratedly, commands all the actions of the individual components of this system, the movements of the limbs, the behavior of other organs, and so on. Similarly, if we recognize that transpersonal information structures exist, then we should consider such well-known factors as, for example, the dictates of the environment differently. We are talking about the fact that the transpersonal information structures can be written a kind of program that becomes executive for individuals.

In this sense, the transpersonal structures under consideration are the bearer (or embodiment) of the socio-cultural code that determines the behavior of society as a whole. Previously, the Humanities considered such phenomena through the prism of ideas about public consciousness and other not fully defined matters. Using the information theory of socio-cultural codes and a distributed neural network formed by all members of a given society, all these concepts can be given a consistent scientific interpretation.

Moreover, it can be argued that at least in part, society in this interpretation acquires subjectivity, it behaves as a kind of integrity. In any case, this is true if we talk about situations where a given society is cemented by a well-defined communication structure and/or related factors, which can include the presence of certain religious or political doctrines, and so on. We emphasize that in this regard, the role of political or religious doctrines can also be described in quantitative language, specifically, we are talking about the extent to which these doctrines are able to cement society in terms of increasing the intensity of information exchange. From the point of view of physics, it is appropriate to use the following analogy: in modern physics, the vast majority of interactions are interpreted as exchange, so the interaction between charged particles is interpreted as the exchange of photons. A similar situation can be seen in the example of what connects society, but it is not about the exchange of particles, but information.

Thus, we are talking about the fact that sociology should study (at the level of quantitative theories and mathematical models) a kind of analog of the collective brain, which has its own non-trivial behavior. Quantitative experimental study of such structures has been very difficult until very recently. It is enough to mention the fact that so far opinion polls are more than a costly event. However, due to the fact that interpersonal information exchange is now increasingly shifting to online social networks, it is possible to study the collective effects that lead to the formation of transpersonal information structures as a system integrity.

First of all, in order to carry out the study of these objects, of course, an appropriate methodology is needed. The huge amount of data that can be found in online social networks must be systematized in one way or another, and the methodology here is the base. Only with the appropriate theory can a systematization be carried out that will reveal the patterns in a huge amount of experimental data. Of course, currently there are such concepts as data mining, but, at least from our point of view, such concepts reflect the weak methodological training of their authors. These concepts are intended to be a substitute for an adequate theory, adequate methodology, to replace an adequate philosophical construct. Roughly speaking, the authors of such concepts try to replace methodology and applied philosophy with computer programs.

Of course, this approach can lead to individual results, but nevertheless, to solve large-scale problems that are associated with rethinking the position of sociology in modern society, first of all, you need a theoretical understanding, and this kind of theoretical understanding must be given in the spirit of the mid-XIX century, when philosophy was really a tool for generating new meanings. This tool, obviously, cannot replace computer programs, and even more so concepts such as data mining.

The question of the essence of intelligence from the point of view of geopolitics and sociology

The basis of this kind of methodology can only be a consistent interpretation of the essence of intelligence. Indeed, if we recognize a certain subjectivity for the state or society, in the sense that certain information entities with certain signs of independent consciousness are formed in the complementary neural network, then the question arises as to how this subject relates to the subjectivity of individuals.

Roughly speaking, we are talking about which actions of people are determined by their personal aspirations, and which are determined by the executable program that is recorded in the transpersonal information structure. At first glance, this thesis completely contradicts the ideas of free will, however, even a superficial look at history shows that very often people really obey the dictates of the environment, and the mechanisms of formation of this dictate are still not fully studied and their consistent interpretation can only be given from the point of view of the formation of transpersonal information structures.

Moreover, if we start from the idea of the formation of transpersonal information structures, it is impossible not to recognize that intelligence is a specific feature. Since childhood, a person learns certain norms, ideas, rules, this was obvious even without the idea of neural networks, but in the light of the above, well-known facts acquire a completely different sound.

Specifically, we are talking about the fact that the intelligence of an individual is a well-defined projection of those information structures that are "sewn" into an encompassing neural network, and the most obvious example here is natural language. A person who acquires a certain language automatically acquires a certain style of behavior. Intelligence is formed by language, and the language environment forms a person, moreover, intelligence finds its expression exclusively in language. It can be emphasized once again that our proposed interpretation allows us to provide a consistent scientific justification for the thesis that was once put forward by Umberto Eco: "It is not we who speak the language, it is the language that speaks us." We are all the embodiment or representation of certain transpersonal information structures, and our behavior is closely related to them. This implies the need for a dialectical analysis of the contradictions that, as it turns out, carries the very concept of society. This is not just a mechanical sum of individuals, it is something that generates a certain, perhaps very remote, analog of consciousness.

In this regard, it is appropriate to emphasize that there have already been works that discuss the problem of the emergence of" spontaneous " intelligence in telecommunications networks (Frankle, Carbin, 2018). Indeed, if the exchange of information between brain neurons (that is, from the point of view of information theory, rather simple objects) can lead to the appearance of such a non-trivial entity as consciousness, then why can't other information entities appear in online social networks?

There is absolutely no mysticism here, here we are simply talking about objective laws that follow from basic ideas about information. Let's return to the question of subjectivity. As stated above, this issue is far from trivial, subjectivity in a certain sense is redistributed between transpersonal information structures, more precisely, States and other transpersonal entities, on the one hand, and individuals, on the other.

The solution of this question is far beyond the scope of this work, but its very formulation allows us to show that the problems of sociology, and even more so its problems when translated into mathematical language, cannot develop further without revealing the essence of intelligence and its mathematical description. In order to move forward, it is necessary to understand the nature of intelligence as a kind of information processing system and the nature of its interaction with other information systems as clearly as possible. The relevance of this question can no longer be doubted, because online social networks, modern telecommunications environments, in fact form quite specific human-machine systems, their behavior is even more non-trivial than the behavior of society as such.

In fact, we are already talking about the fact that society has ceased to be what sociology studied at the end of the XX century and has become something fundamentally different. It has become a human-machine system, the characteristics of which, in a sense, become manageable, and the processes that occur in which occur in real time. In other words, the contours of the future mathematical sociology are already quite visible, we are talking about a kind of synthetic science that arises at the intersection of information theory, geopolitics, classical sociology, and Queuing theory, as well as other theories that are currently developed for the analysis of telecommunications environments.

Conclusion

Thus, this paper shows that at present there are all the prerequisites to radically revise the basic provisions of sociology. First of all, we are talking about the fact that society as a distributed neural network forms well-defined transpersonal structures that largely control its behavior. The appearance of these structures, due to the development of the theory of neural networks, can be described using specific mathematical models. Evidence for this can be given, including at the level of qualitative consideration. Specifically, as shown in this paper, it can be argued that intelligence is an attribute not so much of the individual as of the species Homo sapiens as a whole.

Therefore, the behavior of society cannot be considered without considering the fact that there is a transpersonal level of information processing, in which, among other things, Executive programs can be recorded that control the behavior of individuals to a certain extent. Moreover, there are grounds to assert that subjectivity is distributed in a certain sense, that is, it is redistributed between transpersonal information structures and the individual's consciousness in accordance with the laws of dialectics. Further work in this direction requires correct formulation of the concept of human intelligence and disclosure of its essence.

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