

Sociological Considerations on Human-Machine Interactions: from Artificial Intelligence to Artificial Sociality

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Abstract

Both business people and policymakers have praised the potential of Artificial Intelligence, internet and new communication services for bringing new prosperous life in the XXI century. A number of scholars and people in academe have yet different visions regarding artificial intelligence and artificial sociality potentials. This paper aims to discuss some hot issues in current sociological production dealing with Human-Machine-Interaction (HMI). Sociologists have a good reason to worry that today children's face-to-face social skills are declining in advanced countries. One major concern is that nowadays the youth spends increasing time in front of screens and decreasing time in front of people. But the discomfort about declining social skills is difficult to assess empirically because it is challenging to measure "social skills" with confidence. It is also not trivial to formulate productive theoretical and methodological framework for studying artificial intelligence and artificial sociality through the lenses of sociology and social sciences in general. These, among others, are the questions that paper brings to forum. Specific data and materials for a discussion and for formulating conclusions come from the on-going empirical research that has been started at St Petersburg State University in 2017.

Keyword: Social interaction, Artificial intelligence, Artificial sociality, Human-machine interaction

1. Introduction

The paper will offer basic ideas and preliminary results of an on-going research project that has been managed and conducted by a research team at the Russian-American research Laboratory (TANDEM – www.tandem.spbu.ru) in collaboration with the Chair of Comparative Sociology, St Petersburg State University. The paper is developed in a context of issues relating to the processes of internationalization of artificial intelligence (AI) research and instrumentalist policies which are transforming social sciences today in the world.

We will begin with a brief overview of the general scholarly literature on relations between human beings and algorithms published recently in the world. Then we are going to observe the current state of affairs in sociological understanding of AI and human-machine interaction. In what will follow we will try to answer the question: have social sciences gloriously returned to studying human interaction in the time of ‘artificial sociality’? For the desk part of the research and documentation we have relied on a general search of the literature on the relevant topics in English and in Russian. We have also exploited the recently published research on how the problem of human interconnectedness is framed and developed in sociology, as well as philosophy, anthropology and psychology [Rezaev, Tregubova, 2017].

2. Artificial Sociality

The starting methodological point of the research is based on the idea that current study of human interaction is advancing by dissolving disciplinary boundaries and promoting transdisciplinary research between philosophers, sociologists, psychologists, cognitive neuroscientists, computer scientists, and engineers, to name a few. Nowadays, the success of the scientific exploration into the secrets of human interaction lies in the studying human-machine-interaction and it would be enhanced by establishing software mechanisms to improve reproducibility of scientific results as well as by developing new techniques for a traditional social sciences research.

The theoretical basis of this paper is an assumption that the specific characteristic of a human being is sociality [Wolfe, 1993; Turner, 2002]. Human sociality is characterized by the ability of Homo sapiens to enter into social interaction that implies meaning-making, complex emotional dynamics, as well as formation of relationships and sustained communities, and, simultaneously, a construction of Self. Despite the fact that over the past decades intensive work has been done in order to understand certain aspects of interactions involving machines, the question how to separate genuine human “sociality” and the “sociality” of machines / with the participation of machines is not even explicitly formulated in the scientific literature.

'Homo Sapiens' is the classical definition of a human being (at least since the Enlightenment) that is focusing on reason as the distinct characteristic of the species. However, from the mid-XX century till now human privilege on reason is contested by 'artificial intelligence' that is itself a creation of

human reason. Moreover, machine's inclusion in everyday life of people questions 'human exceptionalism' not only as rational, but also as emotional and interacting beings [Schaeffer, 2007]. One of the main trends in the development of AI is that it is becoming increasingly social. From the beginning it was focused on solving instrumental problems (such as computations); today AI is the medium and the participant of human interaction. Machines are able to complete more and more tasks, such as winning chess, poker, go and cybersport competitions, communication with human (Siri), trading at finance markets, etc.

It is really a truism to say that technology nowadays is increasingly embedded throughout society, and is becoming commonplace in almost everything we do. Current social reality shows that the boundaries between humans and technology are shrinking to the point where socio-technical systems are becoming natural extensions of a human being. Sociologists have a good reason to worry that today children's face-to-face social skills are declining in advanced countries. One major concern is that nowadays the youth spends increasing time in front of screens and decreasing time in front of people. But the discomfort about declining social skills is difficult to assess empirically because it is challenging to measure "social skills" with confidence.

These new phenomena could be labelled as 'artificial sociality'. They embrace three quite different yet related types of phenomena. The first one is human-human interactions that proceed through machines – for instance, in social networks. The second is human-machine interactions: from programmers to computer service, from users at work to playing games children. The third is a computer-computer (screen-to-screen) communication. The social nature of AI could be conceived in two ways. "Strong" artificial sociality does not yet exist; it would be in the ability of the AI to interact spontaneously and be emotionally involved in interaction. "Weak" artificial sociality is an empirical fact of the participation of AI in various social interactions. In this sense, it is expanding more and more today.

The development of artificial sociality led to new phenomena that affect the ability of people to interact and to sustain relationships. The variety of these phenomena permeating everyday life raises attention of scientists, journalists, artists, entrepreneurs, and common users. Social sciences accumulate data and describe new phenomena; nevertheless, in our view, they are not yet able to grasp them at a conceptual level. How is AI designed to solve instrumental problems interact / communicate with another AI and with a person? How is the process of interaction organized? How do people perceive AI? What are human emotions, and what are their analogues in the case of AI? How can engagement and synchronization with the partner be achieved for the machines? What are the similarities and differences in language performance for human consciousness and AI? Does the way of framing and solving problems for the human mind change because of artificial sociality? What about the usage of language and non-verbal images? What emotions does a person experience, and how do they change during the "learning" skills of interaction with the machine? How does the perception of one's own body change? The list of questions could be continued.

The smartphones and human made devices that extend human intelligence are everywhere: informing, guiding, quantifying, and entertaining people. The very important thing is that these devices are connecting people with each other, they guide the terms and power of their interactions in everyday life. Thousands of useful apps are created by the developers around the world. The apps are at our fingertips. But while anyone can deploy an app to one's gadget, apps rely on functionality provided by the underlying platform and operating system. The platform software is responsible for energy of the device, determines what network connection to use to balance speed and cost, accurately and efficiently determining the device's location, and other tasks that this way or another influence relations between humans and machines. Thus, the most important thing is to study software with regard to a HMI.

3. AI and the Social Sciences

There are several specific features that characterize current state of affairs in AI studies.

First, despite of the claim that such studies have to be multi- and interdisciplinary, most knowledge about AI comes from engineering and computer sciences. The field as a whole might be described as multidisciplinary in the sense that scholars from, say, psychology, communications, engineering, computer science, and other disciplines study AI and are interested in one another's work. Nonetheless, research is still done predominantly from each investigator's own intellectual tradition. Researchers typically don't go beyond the classes of variables of concern to their discipline. Furthermore, the interdisciplinary character that needs to be accomplished in studying AI, establish a number of problems for the research. Scholars from different disciplines bring to the field various assumptions, various research practices, and different understanding of the same concepts and theoretical schemes. Thus, the differences are in place at the very basic level of studying AI. For example – the very concept “intelligence”, obviously the most fundamental notion for the field – has different meanings and interpretation for different scholars and that complicates the further research.

The thesis that we want to advance here is, therefore, that AI as a field of study has to evolve novel perspective of anti-disciplinary subject that cut across disciplinary boundaries. It is the field that inherently has to build bridges between engineering, natural sciences, social sciences, and humanities.

Second, in comparative perspective the far greater publications are coming from engineering and computer sciences, and, to a lesser extent, by philosophy and psychology. The views concerning AI in society have changed drastically over the last half century. During the immediate post-World War II period the importance of AI seemed to be of interest only for philosophers and meta-theoretical discussions about a reality of such a thing as artificial intelligence per se. By that time, a generation of philosophers had systematically documented and supported two contradictory conclusions: 1) AI can be and will be a reality very soon; 2) AI cannot be and never will be a reality. This situation has been changed in the last quarter of the XX century. AI has become a subfield for computer science that

involves the design of computer programs and automated equipment, such as industrial robots in ways that at least resemble human thought processes [Barr, Feigenbaum, 1982; McCorduck, 1979].

Current field is dominated by three major disciplinary frameworks. These “big Three” are computer science, psychology and philosophy. Each of the disciplines is characterized by specific research questions and modes of explanation concerning human sociality under “the end of human exceptionalism”.

Third, there is no professional connectedness among social science scholars who study AI. What is most striking about sociological literature on AI is how small it is. This is not a coherent literature in the sense that papers reference each other and a body of well-established findings is understood. To expand and extend this literature, the sociological study of AI needs a broader empirical and theoretical base.

Most papers produced by social scientists that deal with computers and society look at the role of information in human history, discuss the social context and consequences of information technology, introduce readers to the ways computers work, debate the effects of computers on individual health and psychology, detect issues of privacy and security. This way or another to the social scientists computer on the one hand is a society’s technological product, and on the other hand it is a source of technological progress and hence a source of social change. That was the case in the XX century when debates about post-industrial society flourished all over the world, this continue to be the case in the XXI century when ideas of ‘digital society’ and post-human evolution spread across scholarly disciplines.

There have appeared new notions in sociological discussions in recent years. However, these notions are basically limited to quite a narrow circle of technical terms that have been introduced to our daily life, such as “Internet”, “networks”, “cyber”, “and digital”, “social media, new media”. Sociologists adopt these terms for their study and just add them to the word “society” and continue discussions under rubrics respectively: “Internet Society”, “Network Society”, “Digital Society”, “Cyber Society”, “Social Media Society”, “and New Media Society”.

Therefore, it is not trivial to formulate productive theoretical and methodological framework for studying artificial intelligence and artificial sociality through the lenses of sociology and social sciences in general. We believe that the new ways of studying new systems of communications and information production, storage, and distribution have to be developed in the social sciences. The very essence and role of the computer as a media tool has to be reconsidered by the social sciences. In fact, computer and software revolutions brought to fore a number of absolutely new scholarly disciplines, which, what is interesting, cannot be studied without new computers and software. These disciplines are (to name a few) Internet studies, cyberspace studies, digital humanities, new media studies, game studies. These and other newcomers to the science definitely need more attention from theoretician in sociological and other social disciplines. Unfortunately, these disciplines continue to be of interest basically to schools of management and sales practitioners.

4. Sociology of Human Interactions' Perspectives on AI

Examination of social interaction as a crucial phenomenon that characterizes social existence has its implications on interactions between human beings and machines. We argue that sociology is able to provide new frames and to pose new research questions that are fruitful for the field. How exactly are changing the forms of interaction and relations between people? Do people (individual groups, societies) become more or less social? Are there qualitative and quantitative changes in human emotions, attachments, relationships? What is the impact of the broader context - state, culture, language, type of capitalism - on how the mode of 'artificial sociality' changes people's everyday lives? How do technological changes interact with the social transformations of modern societies - individualization, urbanization, changes in family and friendship, etc.?

The most influential theoretical resources that reflect on interactions of non-humans are communication theories, actor-network theory, science and technology studies, human-computer interaction, and philosophy and anthropology of technique. All these approaches, in spite of huge differences between them, share one limitation: they are not able to "catch" specific characteristics of human interaction. Communication theories analyze all types of interactions as information exchanges, while other approaches make too strong arguments neglecting 'human exceptionalism'. Thus, these theoretical frames could not help make conceptual distinctions between human interactions, human-machine interactions and interactions between the machines that are conceptualized either as exchange of signals or as heterogeneous networks.

We are working within a framework of 'sociology of human interactions' [Rezaev, Tregubova, 2017] – theoretical findings developed by Erving Goffman, Garold Garfinkel, Randall Collins, Jurgen Habermas, Anne Rawls, Jeffrey Alexander. Sociology of human interactions, on the contrary, provides theoretical foundations to consider the question of how these types of interactions differ from each other and, as a consequence, to inquire into a problem of distinction between human consciousness and artificial intelligence. This conceptual framework is characterized by intentionally anthropocentric position in current theoretical debates. We inquire into specific features of human interactions (emotionality, sociality, spontaneity, etc.) and thus consider anthropocentrism as an advantage.

Further, AI is the creation of the human mind, whose action is rooted in interaction with other people. AI is the product of communities of scientists, more precisely - mathematicians and programmers. The way these people think, how they solve problems, on what objects they concentrate their attention, how they understand what is wrong and what is good in a society seems to have an impact on what AI is today and in what directions it will be developed. Thus, for sociologists is important to answer the question how the worldviews and understanding of what is society for of the "creators of the creatures", their specific ways of thinking – strictly logical and utilitarian - (those that predominate in communities of engineers and hard scientists), determine what the AI is today

We also agree with scholars who argue that for the theoretical understanding of current interconnectedness between society and AI, society and computer applications, it is important to

address “software” as a theoretical category. Without addressing software itself, researchers are “in danger of always dealing only with its effects rather than the causes: the output that appears on a computer screen rather than the programs and social cultures that produce these outputs” [Manovich, 2013: 9]. An understanding that the Software but not a Computer or a Network is a new medium that connects people and AI is the first premise for this paper. Transition from physical and electronic communication and media technologies to the computer software established a new stage for social analytics. New social/quasi-social formations require new forms of inquiry. Accordingly, having software as a focus of new studies in the area of communications and information technologies bring researchers to the necessity of developing new methodological orientations. The question is who are to develop new methodologies? How will sociologists grapple with issues related to studying computer-mediated communication or communities that exist only in electronic forms?

The second argument advanced here is about control. The social science scholars have become used to the idea that communications and communication systems are set in a society to help with information exchange, to carry conversations and establish links between those who do not see each other. However, there is another role that communication systems play in a society. That is the role of control. The role of communications (communication systems) as control infrastructures generally pre-dates their role as media in a modern sense. The early postal networks in Chinese, Persian, and Roman empires were tools of administration under direct control of military authorities. The first modern global network based on electricity in British Empire also was oriented first toward extensive control by political authorities and then toward trade and personal communication. The very first telegraph systems were designed to control the movements of trains, the radio to control the movements of ships. Global computer communication systems of today are primarily used to control the flows of money, to control aviation traffic, and movements in space. Modern computer software and AI are indispensable tools to control the flows of goods.

The third thesis of our paper is this: capitalist bureaucracy, a creation of the second half of the XIX century, and complex techniques of information and communication systems control that started to flourish in the second half of the XX century, have constructed a foundation for a new technological control by AI in the XXI century. Exactly this sort of control is developing in a new design of post-human/artificial sociality. People are constrained not by an iron cage of bureaucracy but rather by an invisible electronic cage. Example: today in order to speak to a customer representative/to a person (when calling to airlines, internet providers, even banks) one has to spend hours pressing buttons on the telephone responding to the rules of the answering machine.

5. Conclusion

This way or another social analytics have to answer the question – how can information systems based predominantly on AI be held socially accountable? An answer to such a question will raise few more: how is it possible to keep the balance between individual freedom, security, and potential for the lay people to communicate on a daily basis with AI? How adequately in terms of law, ethics, religion are policy mechanisms of bringing AI communications to everyday life of a society? We believe that specific sociological perspective that we call ‘sociology of human interactions’ and “sociology of social intercourse” can help to ‘cover blank spots’ in HCI studies.

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Examining the Impact of Lock-in on Customer Loyalty: a context of a Liner Shipping Carrier

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Abstract

The purpose of this study is to identify the influence of service quality, lock-in, and customer satisfaction on customer loyalty for the customers of liner shipping carriers. An empirical study was conducted using two sample sets separated according to direct shippers and indirect shippers who ship cargos by ocean forwarders to identify the relationships between constructs. Structural Equation Modeling (SEM) was applied to establish and validate the relationship between constructs. As far as direct shippers are concerned, the results show that customer satisfaction and a positive lock-in effect have a positive influence on customer loyalty. Moreover, service quality was not found to impact on customer loyalty directly but might affect customer loyalty indirectly by increasing customer satisfaction. However, in terms of indirect shippers, both service quality and the lock-in effect have a significant impact on customer loyalty.

Keyword: Service Quality, Customer Satisfaction, Positive Lock-in, Negative Lock-in, Customer Loyalty