

Chapter 11

Criticalities and Advantages of the Use of Artificial Intelligence in Research

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ABSTRACT

In recent years, artificial intelligence, through the rapid development of machine learning and deep learning, has started to be used in different sectors, even in academic research. The objective of this study is a reflection on the possible errors that can occur when the analysis of human behavior and the development of academic research rely on artificial intelligence. To understand what errors artificial intelligence can make more easily, three cases have been analyzed: the use of the IMPACT system for the evaluation of school system in the District of Columbia Public Schools (DCPS) in Washington, the face detection system, and the “writing” of the first scientific text by artificial intelligence. In particular, this work takes into consideration the systematic errors due to the polarization of data with which the machine learning models are trained, the absence of feedback and the problem of minorities who cannot be represented through the use of big data.

INTRODUCTION

The objective of this study is a reflection on the possible errors that can occur when the analysis of human behavior and the development of academic research rely on Artificial Intelligence.

It is evident that over the last few years the use of Artificial Intelligence is spreading to different areas of daily life. It is therefore unthinkable that it does not have a role even in the field of academic research, a role destined to become more and more important with the development of correlated technologies.

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Consequently, the researcher, who makes use of this system, should be aware of both its advantages and criticalities.

“We are living in the era of post-truth. [...] The status of scientific research as a reliable source of truth has consequently weakened to the point that politicians, journalists or unscrupulous entrepreneurs consider it equivalent to any other opinion and therefore lacking in legitimacy. Given this situation, it may seem paradoxical that this decade is also seen as the era of data: a revolutionary moment for technological innovation and research mechanisms, and a triumph of the empirical basis of knowledge over pure speculation. Thanks to digital technologies and increasingly globalized research and communication systems, we have very large amounts of data at our disposal - a sea of facts to be studied and interpreted, whose analysis through machine learning algorithms is a fundamental factor in the development of artificial intelligence.”¹ (Leonelli, 2018:4)

With regard to this topic, in 2000 Abbott argued that sociological research was not ready to meet the challenges that lay ahead. “And the blunt fact is that sociology is woefully unprepared to deal with this problem: We have neither the analytic tools nor the conceptual imagination necessary. Our stock-in-trade analytic methods were designed for investigating relations between small numbers of variables and are useless for large-scale pattern-recognition”². Starting from this assumption, the research tries to understand if the scenario is the same or has changed after twenty years and investigate the state of the relationship between the analysis of big data of human behavior and Artificial Intelligence.

The great quantities of available data and the use of Artificial Intelligence to analyze it “may have dreadful consequences for credibility and quality of the knowledge produced”³ (Leonelli, 2018:5). In order to prevent it, it is necessary to know the limits and errors that can characterize a study carried out by using Artificial Intelligence.

As Numerico highlights in his work (2019), “the algorithms trained with human databases give sectorial representations that replicate, even more strictly, the beliefs and prejudices of humans, as a result of the correctness of hypotheses concerning the contextual value of meaning”⁴. To understand the errors which Artificial Intelligence can make more easily, three cases have been analyzed: the use of the IMPACT system for the evaluation of school system in the District of Columbia Public Schools (DCPS) in Washington, the face detection system and the “writing” of the first scientific text by Artificial Intelligence.

The three cases examined show the most common biases (lack of feedback, polarization of data and lack of representation of minorities), which can lead to faulty results, if these systems are used in social research; moreover, they stress some issues of epistemological nature.

“With the introduction of digitalization, we have a large quantity of data relating to human behavior at our disposal. It is uploaded on platforms that offer their users wide spaces for the storage of the contents generated by the users themselves. Therefore, the perspective of social studies ranging from sociology to marketing seems to be reorganized by the analysis of all these sources that already appear in the form of data. Furthermore, they are not considered as a sample of population or a section of textuality or just a simple representation, but as indicators of the entire sphere of social behavior”⁵ (Numerico, 2019: 471). Through the cases examined it is possible to reflect on the use of Artificial Intelligence in the field of research, especially in sociology, and on the birth of a new figure of researcher, who should update his/her “toolbox” in such a way as to be able to “dialogue” with Artificial Intelligence.

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