

From Classical Construction to AI in Science: editorial reflections

Da Construção Clássica à IA na Ciência: reflexões editoriais

De la Construcción Clásica a la IA en la Ciencia: reflexiones editoriales

How to cite:

Lara, José Edson (2025). From classical construction to AI in science: editorial reflections *Revista Gestão & Tecnologia*, vol. 25, nº 3, p: 5-8

José Edson Lara, Editor

<https://orcid.org/0000-0001-6120-075X>

Dear reader,

From philosophers to historians of science, the commonality of their findings and perceptions has been concerning the “modus cogitandi” and the “modus operandi”, from individual scientists or specialized research groups. The depth of the theoretical spectrum, as well as the methodological possibilities, have always been determined by human aptitude in scientific research activities. Obviously, aptitudes are determined by academic backgrounds, by the economic conditions available to laboratories, by observation and experiment niches, by the capacity to aggregate research inputs and by economic interests, which are more precisely in the case of technological research.

Of all the epistemologists, it is possible to highlight Thomas Kuhn, who with his “The Structure of Scientific Revolutions”, contributed significantly to the understanding of the investigative phenomenon, exerting a decisive influence on the most recent directions of the philosophy of science. The essence of Kuhn's contribution consists in the evolutionary structure, in which each knowledge starts from a pre-paradigmatic situation, which evolves to a stage of “normal science”; This led to a theoretical-methodological crisis, which manifested itself through a revolution of purposes and processes. This revolution gave rise to a “new normal science”, which would then be subjected to a new crisis, generating a new revolution. This is how the history of each science progresses...

In this context, the centrality of “modus cogitandi” and “modus operandi” is consistent with individuals and research groups, notably in “closed science”, as is still the case in most scientific research programs.

However, in our days a new phenomenon has been demonstrating a unique potential, resulting in the emergence of a new era, or a new configuration in the classic process of constructing scientific and technological knowledge: the arrival of Artificial Intelligence. It is worth noting that some applications of more advanced technological resources have already been exercised for some decades, however with more restrictive resolution possibilities.

Preliminary philosophical criticism may focus on questioning the capacity for change in the classic purpose-process relationship established by Kuhn. Given the density of Kuhn's conception, I consider it more likely that this general conception will not be tarnished. However, the reconfiguration of scientific production processes is already beginning to be manifested, at least as an executive potential. Specifically, the historicity of each science begins to signal some changes, not in the essence of the Kuhnian paradigm, but in terms of its evolutionary system. For example, in the optimization of processes in observational and experimental research, with the reduction of time spent on repetitive activities, the reduction of costs for searching for and evaluating data and information, the reduction in the number of research assistants, the optimization of various laboratory inputs, the integration with advanced databases of similar research and the demonstration of progress to investors in research systems.

Initially, the evidence has been clearer in open systems for constructing scientific knowledge. More clearly, what is experienced and projected, according to the relevant media, is the emergence, in many cases, of a “research machine”, and not the centrality of the execution of research processes in an individual or team. Machine learning and deep learning have been able to identify, by themselves, through consultations of vast literature, gaps in theoretical knowledge and inconsistencies in the application of models or explanatory variables of a phenomenon. Thus, they contribute significantly to the explanation of a socio-technical phenomenon, enabling compliance with the canons and rigors of in-depth scientific research, with the minimum of resources.

In this context, AI, by identifying, analyzing, discriminating and classifying gaps, can now create research hypotheses and establish the most competent methodological procedures

for their respective in-depth validations, as well as project the intricate natural residues of any research. In short, both gaps, hypotheses and testing methods can now be autonomous, in the concept and context of machine and deep learning. This is the frontier environment of scientific research that is emerging for us today and that projects so many perspectives and expectations for the near future.

This is the essential questioning of the thinking, role, possibilities and skills of scientists in the next frontiers of scientific production. It concerns the origin and evolution of thought and the evolution of knowledge in its philosophy and development. In fact, machine learning has already contributed significantly to the development of meta-analyses in many fields of knowledge. However, the definition of subjects and objects of investigation, as well as morphologies, methodologies, technologies and metrics, must continue to be guided by human and social ethical interests and purposes. Machines can already be assigned a multitude of operational situations in cutting-edge laboratories. After all, machines do not exercise leadership. This competence is essentially individual and organizational.

Although the machine can identify scientific serendipity, the attribution of its values is essentially human. But through serendipity, the machine will be able to guide decision-making on the foundations of knowledge regarding “what, how, when, how much, who and where” knowledge will be established. Thus, it is clear that science and knowledge find every reason for being if and only if they assume human life as their origin and destiny. The human condition is, therefore, the essential foundation of evolutionary actions. This concerns the philosophy and ethical reason for efforts in the development of knowledge, especially scientific knowledge. Furthermore, human beings have cognitive and cultural conditions that impact perceptions and the objective utilitarianism of the evolution of knowledge, in the sense of creating the conditions for a better life.

In this historical context, doubts loom over the possibilities of AI generating extra-human and even anti-human processes and solutions. The challenge is to direct AI towards a social and human AI! This has been the warning and the establishment of precautions regarding the autonomy of machines through AI: leaving it to machines to merely perform iterative processes, with the monitoring of the logical processes of scientific research, encouraging the observance of ethics, integrity and sustainability of living conditions on this fragile planet...

Therefore, it is essential to allow AI to interfere in the Kuhnian paradigm, only in the rationalization of resources and in the acceleration of the time required for the research most necessary for human life and the sustainability of the planet, according to the emerging dictates of the historicity of each science.

Therefore, it is in this scenario that the invitation to researchers to develop their studies arises, aiming at robust publications to be presented to the academic media, especially to this Revista Gestão e Tecnologia.

Reaffirming its purposes, the Revista Gestão & Tecnologia through this Editorial, expresses its satisfaction and honor in presenting these contributions to the scientific communities. In line with the state of the art in this field, it offers substantial, robust, consistent, important and timely content, provided by researchers, aiming at contributing to the evolution of knowledge in critical foundations of management science. These are articles that effectively challenge the status quo of each frontier addressed, in the dimensions of theories and methodologies. We would like to thank the authors who believed in the purposes of this journal by submitting their articles in accordance with the publication criteria and processes. We look forward to receiving contributions in the form of article submissions, serious evaluations consistent with the purposes of this journal, recommendations to students and friends, as well as contributory criticism. I renew my wishes for good reading and great reflections.

Keywords: Science, AI, Artificial Intelligence, Scientific Evolution

References:

- Condé, Mauro L. L. (2017). *Um papel para a história: o problema da historicidade da ciência*. Curitiba: Editora UFPR, 171 p. <https://www.editora.ufpr.br/produto/320/papel-para-a-historia,-um--o-problema-da-historicidade-da-ciencia>
- Cozman, Fábio G.; Plonski, Guilherme A. & Neri, Hugo (2021). *Inteligência Artificial: Avanços e Tendências*. São Paulo: Instituto de Estudos Avançados. <https://doi.org/10.11606/9786587773131>
- Kuhn, Thomas S. (2005). *A estrutura das revoluções científicas*. 9a ed. São Paulo: Perspectivas.