Qeios

Peer Review

Review of: "Kepler: The Pioneer of Data Science and AI"

Moisés Marinho Cavalcante[1]

1. Instituto de Ciências Farmacêuticas, Universidade Federal do Rio de Janeiro, Brazil

The article highlights the potential of Artificial Intelligence (AI) to transform disparate information into meaningful data, correlating it with specific topics of interest. To illustrate the challenge, consider that a single year's issues of a biochemistry journal like *The Journal of Biological Chemistry* can stack higher than a five-foot person. How can such a vast amount of information be correlated? This is where AI excels: its powerful correlational capabilities enable us to uncover new insights from the immense body of existing knowledge. In this sense, Johannes Kepler is seen as a pioneer of data science, whose methods of rigorous empirical data analysis to derive fundamental mathematical laws are mirrored and amplified by modern Artificial Intelligence techniques. AI, with tools such as Symbolic Regression, which extracts interpretable mathematical expressions from large datasets, and Explainable AI (XAI), which aids in model interpretation and understanding, reflects and enhances Kepler's discovery process. Furthermore, innovations like Kolmogorov-Arnold Networks (KANs) offer the ability to find clear and precise models, following Kepler's analytical rigor. In managing large volumes of data, AI transcends Kepler's work in scale, as demonstrated by its capacity to rediscover Kepler's Laws from historical data. This capability is even more evident in modern examples such as the rediscovery of the Law of Conservation of Energy (with Eureqa), the reconstruction of relativity equations (with AI Feynman), and the detection of new particles in high-energy collisions at CERN, underscoring how AI exponentially amplifies the human ability to unravel mysteries from vast datasets.

Declarations

Potential competing interests: No potential competing interests to declare.

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