Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Beyond Covid-19, why AI is revolutionizing the scientific ecosystem

The scientific research is to develop a certified knowledge. The scientific truth is an illusion towards which the researchers are projecting, knowing that they are not able to demonstrate it. So, they rely on the notion of paradigm. The writings, the symbols, the models that underlie these paradigms are the abstract mirrors of our reality. Each generation will agree on the quality of the reflection of these mirrors, until a new generation demonstrates that a new paradigm is more credible, more rational, more scientific. Science therefore has this inherent to it: it only recognizes as scientific contribution what is recognized by the scientific community. The collective has the power to validate the publication of expected or sometimes agreed results, and it also has the poetic force to let publish disruptive, innovative, questionable and sometimes little shared approaches. The peers refute, the authors argue: the scientific dialectic is respected, knowledge can move foward.

The past few years have seen the emergence of a new kind of science, rather in search of valorization than truth [1]. The evaluation methods have sometimes led researchers to publish a lot and at the expense of good research practices; publishers have prospered on the knowledge industry; the modes of financing of laboratories have contributed to the mass production of papers whose reproducibility was uncertain. Crisis of reproducibility, proliferation of predatory journals and spoof conferences, creation of paper mills. The technocracy was satisfied, the cheaters flattered it. And Covid-19 came along, revealing a major misconduct in the public space, causing a crisis of confidence between scientists and among citizens [2].

In order to be credible, major journals are now equipped with the most sophisticated tools for detecting misconduct (fraud, plagiarism, false images, etc.), which could reassure us [3]. But artificial intelligence is now much more useful to cheaters than to evaluators.
OpenAI and its artificial intelligence GPT-3, intended for natural language processing with 175 billion parameters, multiplies the possibilities of action [4]. Among these actions, it can write a scientific article [5–7]. Or an editorial on the evolution of science in the age of AI. We commanded — especially for our journal — the following text and figure to two AI models operated by GPT-3. It is, to date, the first time that AIs publish and co-sign a paper in a biomedical journal.

We provided the AIs with the same prompt: "Write an editorial about science definition, scientific integrity, how we came to the crisis of reproducibility, how editors fight against scientific misconducts and how AI will now produce its own science in a style asked to be an ultrarealistic picture using a Nikon.".

The definition of science is the study of the natural world. It is a process of observing, experimenting, and drawing conclusions. Scientific integrity is the cornerstone of this process. It is the commitment to honesty, accuracy, and objectivity in all aspects of scientific research. The reproducibility crisis has been building for years, but it came to a head in 2015 with the publication of a now-infamous paper in the journal Nature. The paper claimed that a simple statistical test could be used to identify false positive results in scientific studies. When other scientists tried to replicate the results of the Nature paper, they couldn’t. This failure to replicate has major implications for science. If scientists can’t trust the findings of their experiments, it undermines the whole enterprise of scientific research. The reproducibility crisis is a serious problem, and scientists are scrambling to find a solution. The causes of the reproducibility crisis are numerous, including scientific misconduct, poor study design, inadequate statistical analysis, and publication bias. These factors can all lead to results that are not truly representative of the underlying phenomenon being studied. The reproducibility crisis has also been fueled by a culture of hypercompetition in science. In order to secure funding and advance their careers, scientists often feel pressure to produce dramatic results that will make headlines. This can lead them to cut corners or take shortcuts that compromise the quality of their research.

Editors play an important role in combating scientific misconduct. They screen submissions for signs of fraud and they require authors to provide detailed methods so that other scientists can replicate their work. They also work with institutions to investigate allegations of misconduct and they publish corrections and retractions when necessary. The pre and post publication peer review process is also an important tool for combating scientific misconduct. Reviewers are typically experts in their field and can spot errors or red flags that may indicate fraud. If reviewers suspect misconduct, they can report their concerns to the journal editor or to post publications platforms. As a matter of fact, the current system of peer review is not well equipped to identify methodological flaws and prevent them from being published.

AI is poised to revolutionize science by making it more efficient and effective. But AI could also exacerbate the reproducibility crisis if not used responsibly. For example, if AI is used to automatically generate hypotheses or design experiments, it could create a lot of false positives that would be difficult for humans to weed out. There are a few keyways to ensure that AI is developed responsibly in order to maintain scientific integrity. First, it is important to have transparency and accountability built into the development process of AI applications. This means that there should be a clear audit trail documenting all the steps that were taken during the development process, from data collection to model training to results interpretation. Second, it is important to use established scientific methods and principles when developing AI applications. This will help to ensure that the AI system is based on sound science and will produce reliable results. Finally, it is important to involve human experts in the development process of AI applications. This will help to ensure that the application meets scientific standards and can be used effectively by humans. By following these guidelines, we can ensure that AI is developed responsibly and does not exacerbate the reproducibility crisis.

So, what is your opinion on these productions? It is likely that—through text and image generation—AIs are already making a tangible impact on biomedical research. Could we handle AI so that it’s trained only on valid knowledge and paradigms? What should academia do to foster an ethical use of AI in research? Those are questions that every scientist should give some thought to.’’

Disclosure of interest

The (human) authors declare that they have no competing interest.
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