Detection of Artificial Intelligence in Scientific Writing: Turnitin vs. ChatGPT

Detección de inteligencia artificial en la escritura científica: Turnitin *vs.* ChatGPT

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Dear Editor,

Artificial intelligence (AI) can be defined, with some skepticism or controversy, as a set of algorithms in a computer program to develop conceptual models, computational model rewrites, programming language adjustments and designs, and physical machinery, among other processes that allow humanity to perform more efficiently and thoroughly, activities that eventually require a certain cognitive rigor and scientific techniques.[1] However, AI development, application, and manipulation are limited to a small group of individuals with resources or knowledge.[2]

Given the advancement of AI, the need to introduce ethical or bioethical aspects of this and other new technologies into the curricula arises in parallel in schools and academic computer science programs. For López Baroni,[3] the discussion must

not revolve around bioethics, which implies that the entities or systems that intervened must be alive, such as humans, animals, or genetically modified organisms, excluding robots.

A dominant element that feeds AI is Big Data, which comprises vast amounts of data ranging from human preferences to weather, sports, and history, among others, to predict future events as reliably as possible.[4] AI assumes that the more data can have and processed, the more opportunity authors have to anticipate the prediction of a particular event or behavior.[4]

The fear of AI is not necessarily related to the fact that these types of systems resemble human abilities such as thinking, reasoning, or replicating in some way characteristics and cognitive abilities of this species, but rather to the inappropriate use that they can give it. Some people, or failing that, to the fact that the AI itself becomes a risk to the extent that it does not develop a conscience or ethics like the human.[5]

According to Abou_Foul *et al*[5] recent advances in AI have a strong impact on academia and research; occasionally, they contribute to automating repetitive tasks, such as data collection and tabulation. This help allows scientists to spend more time in the process of interpreting and analyzing them. However, the massive diffusion of the free access tool ChatGPT has facilitated the creation of essays, text fragments, or even journal articles based on areas such as medicine, biology, physics, astronomy, and other relevant disciplines for science humanity.[6] This creates an obvious problem because it takes work to draw a dividing line between the contribution or participation of AI and, even more controversial, whether to acknowledge authorship.[7] For example, in some scientific journals, the contribution of text editors and proofreaders has already been recognized.[6,7] For this reason, numerous journals have seen the need to discuss and establish a position on the acceptance or not of this tool and the ownership of the submitted texts. This situation is a debate that is just beginning, and the scope of the future is still unknown.[8]

Now, what is ChatGPT? Van Dis *et al*[9] define and recognize it as the latest in a series of AI models developed by OpenAI, a company located in California, United States, which, as previously mentioned, has generated both enthusiasm and

controversy, given the ease of convincingly conversing in real-time in different languages, on most topics. Although, with limitations in the political sphere, as has been repeatedly highlighted on different digital platforms.[10] Regarding the reliability of the information, the Harvard Medical School tested the performance of this application with the United States medical license exam. The results were located near the quartile of approval of the three tests it made. What stands out the most in the performance in this test is the level of insight and agreement in the explanations.[11]

The progress of this tool is increasing as the construction of the standards or entities that may regulate it progresses. In this sense, anti-plagiarism platforms such as Turnitin, recognized in universities and schools worldwide for its robustness in the verification of coincidences between what has been published and what is supposedly unpublished, recently launched an extension (called AI) for the detection and confirmation of texts from ChatGPT.[12] However, they warned that it would only be able to recognize sentences of a specific size written in English.

To exemplify, the authors produced two documents, one in English and the other in Spanish. In both, the first paragraph was self-authored; the rest was generated by ChatGPT (https://chatgpt.org.ua/es.php), upon request, in English: "Write an essay about the Scimago Journal Ranking" and in Spanish: "Escribir un ensayo sobre el Scimago Journal Ranking." Subsequently, when Turnitin reviewed it, it reported a similarity of 4% for the first and 33% for the second (fig. 1).
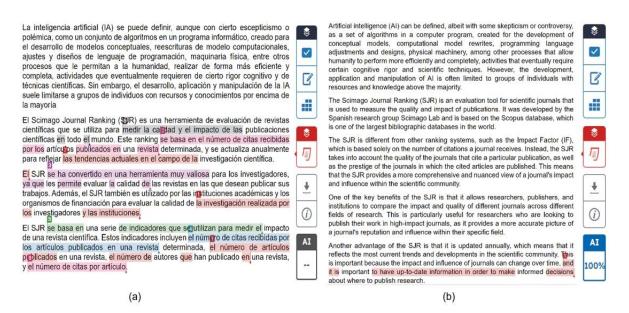
Source: Own elaboration from Turnitin.

Fig. 1 – Percentage of similarity of the document evaluated, written in English and Spanish.

Regarding the summary of matches, all were found in the text portion produced by the AI (fig. 2). The lower similarity of the English document indicates a better performance of ChatGPT in assimilating human writing in this language.

Source: Own elaboration from FeedBack Studio of Turnitin.

Fig. 2 – Summary of matches in Spanish (a) and English (b) of the document evaluated.

On the other hand, the AI extension, as expected, did not work for the Spanish document (fig. 2a). Meanwhile, for the one written in English, it suggested that 100% of the content was edited by an AI (fig. 2b). This result overestimates what was written by ChatGPT since the authors wrote 25% of the document. Likewise, it

warned that this percentage might not indicate bad academic behavior and therefore require revision. Literally: "Percentage may not indicate academic misconduct. Review required".

It is concluded that: i) it is necessary to establish a limit for the use of information and writing tools based on artificial intelligence in the academic field; ii) it is essential to acquire and compare anti-plagiarism software that has extensions that identify texts from artificial intelligence; iii) Turnitin is shown to be a simple and promising tool to identify texts produced by AI, which can be of great help to professors, researchers, and journal editors.

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Conflicts of Interest

There are no conflicts of interest.