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EDITORIAL

Will Chat-GPT disrupt healthcare?

¿Revolucionará Chat-GPT el sector sanitario?

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On November 30, 2022, an American entrepreneur named Sam Altman tweeted, «*Today we launched Chat-GPT. Try talking with it here: chat.openai.com.*» It is not an exaggeration to believe that the beginning of a new era for humanity could have happened at that moment.

With this simple announcement, Mr. Altman shared the fruit of years of work, a form of generative artificial intelligence unknown until then called large language model (LLM). Chat-GPT achieved unprecedented success by reaching its first 100 million users in two months representing a record time in the history of technology. Shortly after, globally known tech companies launched their LLMs. Then Chat-GPT, Gemini, Claude, Llama, and others started the battle for supremacy in generative AI.

Since Chat-GPT was launched in late 2022, thousands of posts, books, and scientific articles have been published to validate or criticize this prodigious tool. Apostles of generative AI emerged, as did detractors who pointed out privacy and rights infringement limitations or the generation of nonsensical information that appears plausible or coherent (known as «hallucinations»). However, new versions of these LLMs are continuously released, improving the performance of the previous versions. The pace of innovation is simply overwhelming.

The integration of AI into our daily lives has gradually followed over the past few decades (i.e., face, fingerprint, or QR recognition, virtual assistants like Alexa or Siri, etc.), and we have all accepted them with normality. From the technical point of view, generative AI represents a natural evolution in advancing AI that combines previous AI forms like deep learning and natural language processing. However, from a user's perspective, LLMs are a disruptive technology for three main reasons. Firstly, they are highly accessible and can be used by anyone in any language and from any electronic device connected to the Internet. Secondly, it is straightforward to interact with LLMs using natural language, eliminating the need to know any computer language. Finally, LLMs represent an unprecedented democratization of knowledge and technology that gives superpowers to virtually any user, helping them solve complex tasks. Thanks to LLMs, any user can delegate the most routine duties, allowing them to advance and focus on more high-value tasks.

We all know that healthcare is an unsustainable sector, having reached astonishing expenditure levels that even increase faster than the GDP in some developed countries.[1] Besides, healthcare is affected by many other problems that go beyond financial limitations. For example, burnout among physicians and nurses has terrible consequences for healthcare systems, such as increasing errors or talent shortages. In addition, healthcare organizations exhibit poor levels of efficiency. For example, a recent study showed that waste in the US healthcare system ranges from $760 billion to $935 billion, accounting for about 25% of total healthcare spending.[2] This inefficiency arises from various factors, such as the need for coordination among stakeholders, the administrative complexity, and a payment system primarily based on fee-for-service rather than value-based approaches. Although diagnosing issues in the healthcare sector is simple, finding practical solutions presents a significant challenge.

In the fall of 2022, I began working on an elective course for MBA programmes to highlight the inefficiencies, prob-

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lems, and complexities within the healthcare industry. The goal was to harness the skills of talented students to innovate within the healthcare sector and find solutions to these challenges. As the course was developed around the time Chat-GPT was released, I decided to explore how generative AI could tackle some of the most pressing issues healthcare systems worldwide face. Here are some examples.

The introduction of electronic health records (EHRs) was a significant innovation in the healthcare industry. However, while some hospitals and healthcare systems used EHRs to improve care coordination and quality, many others used them primarily for billing tasks. This technology required doctors to spend significant time filling out records during patient visits, leading to reduced eye contact with the patient. In other words, EHRs changed how millions of doctors worldwide interacted with their patients. Apart from patients' frustration when talking to a doctor who was mostly looking at a computer screen, the excess paperwork increased burnout among healthcare professionals. Generative AI can simplify this task and reduce the workload. Today, many tools can transcribe recorded doctor-patient conversations into a SOAP report, including billing codes, helping doctors to be more empathetic and improving patients' satisfaction.[3,4] From an economic perspective, considering LLMs will soon make the time spent in front of a computer virtually costless, the waste will increase significantly if doctors continue filling out the EHRs. In summary, effectively using generative AI could help decrease professional burnout, address the shortage of doctors and nurses, and enhance patient satisfaction. For instance, using LLMs would enable clinicians to allocate more time to important tasks like research, ultimately improving healthcare efficiency and quality.[5]

As I mentioned before, the healthcare sector is tremendously inefficient, and operations management (OM) is a discipline that may help any organization become more efficient using mathematical tools like linear programming. When Chat-GPT 3.5 was released, it performed poorly in this task. However, the recent updates to Chat-GPT have fixed this limitation by incorporating reliable algorithms for data analysis and complex mathematical methods. These new features allow any user to face problems like optimizing nurses' scheduling or ambulances' location by simply uploading a screenshot with the numbers, constraints, and a brief description of the problem to be solved. Besides, thanks to the GPTs (customized versions of Chat-GPT, tailored for specific tasks or topics that anyone can use), it is possible to create a resource optimization tool (like a web page) to be used anytime and anywhere.

Moreover, to conclude this brief review, let us address one of the most concerning issues in healthcare. Medical errors are the third leading cause of death in the United States.[6] This statistic highlights a troubling situation that could be improved through AI. For instance, doctors could utilize LLMs to compare their assessments and decisions in complex cases when they do not have access to specialized colleagues nearby. Physicians can rely on LLMs' answers since some models have proven better than clinicians' in answering questions published by journals such as NEJM, JAMA,[7] or, probably, JHQR! Another powerful application of Chat-GPT to minimize medical errors is to compute the precise doses – measured in the number of drops per minute – for administering a medication.[3] These tools can calculate the dose and create calculators embedded in web pages or even more advanced projects integrating suppliers' databases with the medications typically administered in a hospital. Thanks to Chat-GPT, the development of these tools is now democratized and accessible to healthcare organizations worldwide at a minimal cost.

We cannot overlook the negative aspects of any new technology. It is well-known that technology alone cannot improve, fix, or transform healthcare. Creating the appropriate conditions for the rapid, effective, and safe use of generative AI is essential to accomplish such a complex and significant task. Effective leadership is also crucial for successful technology adoption and implementation. In this sense, it might be necessary to distinguish between self-proclaimed gurus and authentic leaders who can effectively navigate this challenging change.

Generative AI also raises many ethical concerns. For example, some people argue that it needs to be clarified how these tools have been trained; therefore, they can be flawed or make mistakes. However, it is worth noting that human clinicians are also affected by biases and make mistakes.[8] These biases may result from outdated knowledge or cognitive biases, such as confirmation bias, contributing to numerous serious medical errors. A second ethical implication of generative AI is the concern that AI may replace clinicians. However, this scenario is not likely to happen soon. Given the current shortage and the upcoming wave of retirements in many countries, LLMs could help reduce the strain on the job market for clinicians.

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