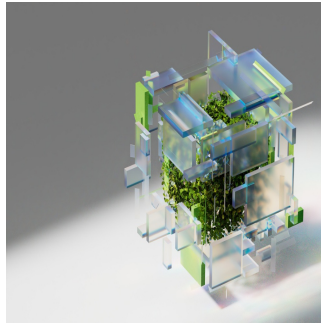


Balancing AI and Sustainability in Healthcare



The integration of artificial intelligence (AI) in healthcare has immense potential to transform patient care. However, a recent study has revealed the significant environmental impact of deploying large language models (LLMs) in medical settings. The study, conducted by researchers from the University of Adelaide and the University of Reading, highlights the need for responsible AI implementation in healthcare to reduce resource consumption and carbon emissions. As hospitals increasingly adopt AI to enhance operational efficiency and patient outcomes, sustainability considerations must be a priority in these advancements.

The Environmental Cost of AI in Healthcare

The computational power required by LLMs like ChatGPT is immense, and this comes with a substantial environmental cost. These systems consume significant amounts of energy and water, with a single query requiring the equivalent energy to charge a smartphone 11 times. The situation becomes even more concerning in healthcare settings, where hospitals generate vast amounts of patient data daily. Doctors, nurses and other healthcare professionals document tens of thousands of words for each patient during their hospital stay. Processing such large datasets with LLMs would dramatically increase energy demands and carbon emissions.

Healthcare AI systems are particularly resource-intensive because they need to process complex medical information. Unlike generic applications, these systems often require more powerful models that run locally to ensure patient privacy. This adds further strain on energy resources. Beyond energy consumption, the physical hardware required for AI systems poses additional challenges. Manufacturing these systems depends on the mining of rare earth metals, a process that contributes to habitat destruction and resource depletion. The carbon footprint is exacerbated by emissions from the production and transport of these components.

LLMs already generate significant emissions globally. ChatGPT, for example, produces daily carbon emissions equivalent to those of 400–800 US households. Healthcare applications, requiring even greater computational power, would likely have a larger footprint unless proactive steps are taken. This highlights the urgent need for sustainable practices in the deployment of AI in healthcare.

Strategies for Responsible AI Integration

The study outlines a set of practical guidelines to help healthcare providers minimise the environmental impact of LLMs while benefiting from their transformative capabilities. A central recommendation is to use the smallest effective model. Smaller, fine-tuned systems often outperform larger ones in specific healthcare tasks, such as summarising patient data, while consuming significantly fewer resources. This approach ensures that healthcare institutions achieve their goals without overburdening energy systems.

Another key strategy involves optimising AI prompts. Concise and well-targeted prompts can substantially reduce the computational load, thereby lowering energy consumption. For example, rather than processing an entire patient record, healthcare professionals could design prompts to extract only the most relevant details, ensuring efficient use of resources without compromising on quality or accuracy.

Choosing sustainable hardware is another essential consideration. AI systems run on servers that can be powered by renewable energy sources, reducing their carbon footprint. Hospitals can also adopt data-sharing protocols that maximise efficiency. By securely sharing data and avoiding redundancy, healthcare providers can optimise the performance of AI systems while minimising their environmental impact.

Finally, healthcare organisations should critically assess whether they genuinely need an LLM for every application. In some cases, existing technologies or simpler AI tools might be sufficient to meet their needs. Thoughtful evaluation can prevent the unnecessary deployment of

resource-intensive solutions, ensuring that AI is implemented only where it adds clear value.

AI as a Tool for Sustainable Healthcare

Despite its environmental challenges, AI has the potential to contribute to sustainability in healthcare when used judiciously. For example, it can optimise patient flow by predicting bed availability and reducing waiting times, leading to better resource management. Additionally, AI can reduce reliance on paper-based systems by digitising records, which not only improves efficiency but also cuts down on paper waste.

Moreover, by enhancing diagnostic accuracy and treatment planning, AI can help prevent unnecessary tests and procedures, reducing resource use across the healthcare system. Hospitals that adopt AI responsibly can thus improve both patient outcomes and environmental performance, proving that technology and sustainability need not be at odds.

The adoption of AI in healthcare offers transformative possibilities, but its environmental implications cannot be ignored. Hospitals must balance the benefits of AI with its ecological costs by adopting sustainable practices. Using smaller models, optimising prompts, leveraging renewable energy and evaluating the necessity of AI systems can help mitigate the carbon footprint of these technologies. By doing so, healthcare providers can ensure that AI serves not only to improve patient care but also to support global efforts to combat climate change. Responsible innovation is the key to aligning technological progress with environmental stewardship.

Source: [Healthcare in Europe](#)

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Published on : Tue, 26 Nov 2024