

# Artificial intelligence – will we be replaced by robots?

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## Abstract

Advances in artificial intelligence (AI) increasingly dominate the news with billions of dollars in funding invested to combine AI with machine learning and data science across many disciplines, including medicine and healthcare. Within the context of scholarly scientific and academic publishing, AI is seen also as a potential means of bringing more

speed, efficiency, and effectiveness to current and increasingly challenged processes and systems as well as supporting open science principles.

We cannot fail to be impressed with the increasingly prevalent and dominant news on artificial intelligence (AI) advances. Whether it is the recent announcement by MIT,<sup>1</sup> one of the birthplaces of AI, that it has secured US\$1 billion in funding to create a new college that combines AI, machine learning, and data science with other academic disciplines. Or with Eric Topol, the renowned American cardiologist, geneticist, and healthcare visionary, whose latest book *Deep Medicine*<sup>2</sup> looks systematically at the role that AI is playing right now in US healthcare.

But there are health warnings. Although AI is already helping us diagnose cancer and under-

stand climate change, regulation and oversight are needed to stop the new technology being abused.<sup>3</sup> Importantly, guidelines are being developed for the responsible design and implementation of AI systems.<sup>4</sup>

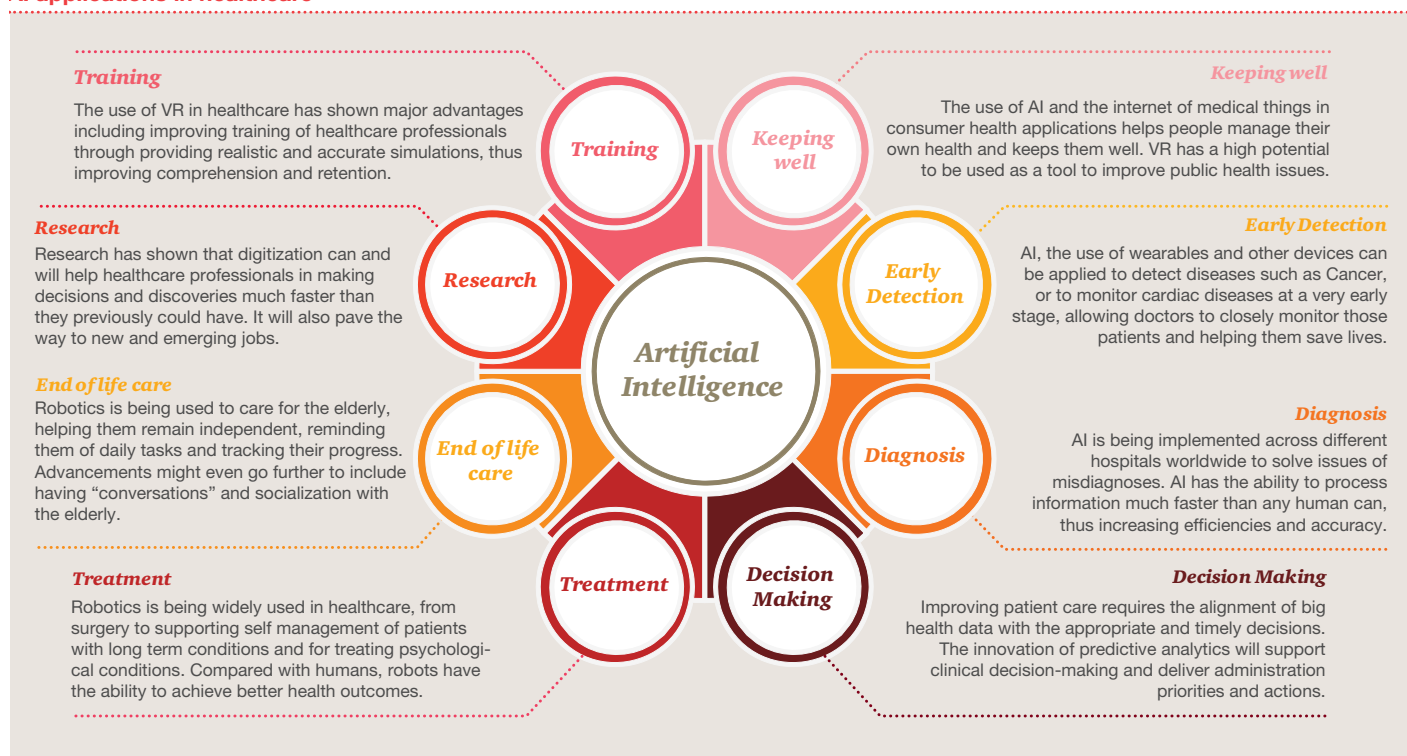
A recent *Science* article<sup>5</sup> reflects on the practical hurdles and concerns when implementing AI in medicine and states that more collaboration is needed before involving patients.

## The AI ecosystem

To begin, a common problem is that AI tends to be used interchangeably when actually describing one or a number of elements within the vast AI ecosystem, for example, machine learning or natural language processing. Figure 1 is therefore helpful in breaking down, mapping out, and communicating to a diverse audience, the many constituent parts.

Figure 1. AI applications in healthcare. Reprinted with permission from Mike Quindazzi, PWC.

## AI applications in healthcare



## AI and publishing

Within the context of scholarly scientific and academic publishing, AI is seen as a potential means of bringing more speed and efficiency to current processes and systems, as well as supporting open science principles.

In 2018, I gave a broad-ranging talk on various AI technologies at the European meeting of the International Society for Medical Publication Professionals – provocatively titled “Will we be replaced by robots?”.

But more recently, the experience of working with a number of clients and their journal editors brought me back to thinking again about AI’s potential real-world applications. Therefore, in my opinion, the most immediate and pressing problem that we could try to solve with AI is that of peer review.

Web of Science (Clarivate Analytics) reports that, since 2013, there has been a 2.6% annual growth in published articles and 6.1% in article submissions. Also, a recently published survey<sup>6</sup> reports that, on average, an editor in 2017 needed to send out 2.4 peer review invitations to get one peer review report done, an increase from 1.9 invitations in 2013.

Consequently, the task of finding reviewers for an academic peer-reviewed scientific journal is projected to get much harder across all scientific disciplines. Peer review is a core critical function, therefore, to be sustainable and successful, journals must be capable of scaling with increased submissions and increased demands on the quality and nature of peer review.

This will demand significant advancements in automated technologies, including algorithms for assigning reviewers and improving reviewer experience and retention.

What we want of AI, therefore, is more operational speed and efficiency. AI is already beginning to hit the ground in these five areas:

- Identifying new peer reviewers with broader searches
- Fighting plagiarism with software that can identify components of whole sentences or paragraphs rather than verbatim text
- Discovering where authors fail to report key information that would affect accept or reject decisions
- Spotting statistical errors that generate false conclusions
- Detecting data fabrication

## Real-world applications

When looking beyond the AI hyperbole to real-world applications, I was pleased to find one impressive example reported in the magazine *Communications of the ACM* (Association for Computing Machinery) that demonstrated how state-of-the-art tools from machine learning and AI are making inroads to automate and improve parts of the peer review process<sup>7</sup>. Allocating papers (or grant proposals) to reviewers is also an area in which much progress has been made.

These computational methods have been used to support other academic processes outside of peer review, including a personalised conference planner app for delegates, an organisational profiler, and a personalised course recommender for students based on their academic profile.

**We hope that [the future directions for computational support], along with this article, stimulate our readers to think about ways in which the academic peer review process – this strange dance in which we all participate in one way or another – can be future-proofed in a sustainable and scalable way.<sup>7</sup>**

– Simon Price and Peter Flach

This leaves me excited to see more applications of AI technologies to support the peer review process. With these applications, we may be able to move on from a process that has remained relatively unchanged since the first peer-reviewed publication *Medical Essays and Observations*<sup>8</sup> published by the Royal Society of Edinburgh in 1731.

## Further reading

Look out also for the forthcoming December 2019 issue of *Medical Writing* on the theme *Artificial intelligence and digital health*. This issue will show how technological innovation is overtaking all industries, and

medicine is no exception. AI and digital health are growing trends and, as medical writers, we must understand and communicate these advances.

## Conflicts of interest

The author declares no conflicts of interest.

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