

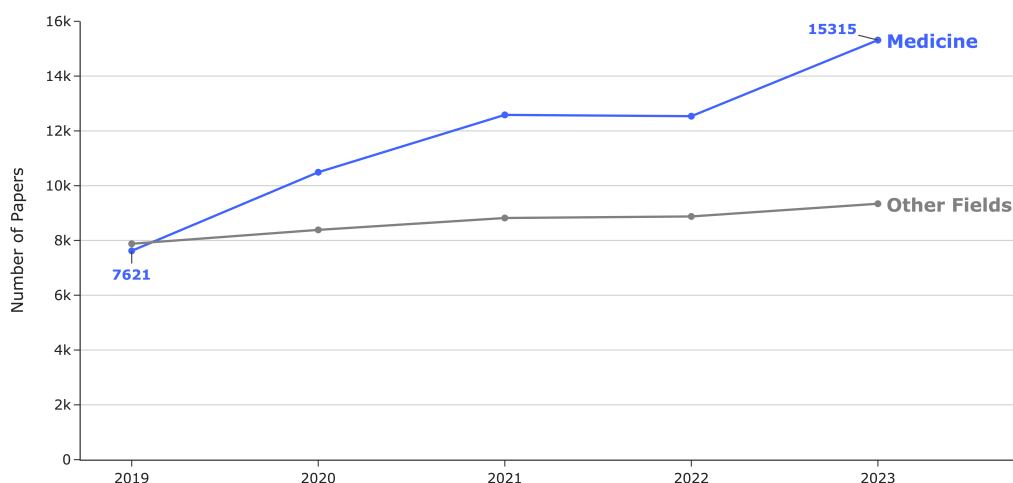
Artificial Intelligence - Next Revolution in Medicine?

1 Introduction

In recent history, there have been several major leaps in medical research that have changed the way we view and understand disease. Computed tomography, MRI scanners, DNA sequencers, and 3D printing are just a few of these revolutionizing technologies without which medical science would not be where it is today. The question that arises here is whether we are witnessing another technology revolutionizing medical research - artificial intelligence. To answer this question, let's take a look at where academic research in artificial intelligence in medicine is headed. What are the most relevant topics in artificial intelligence for medical research? What are the possible future trends? And which subfields of medicine benefit most from this new field?

2 Trending Topic - Artificial Intelligence

The Number of Papers Published With **AI in Medicine** Is Increasing **Stronger** Than in Other Fields



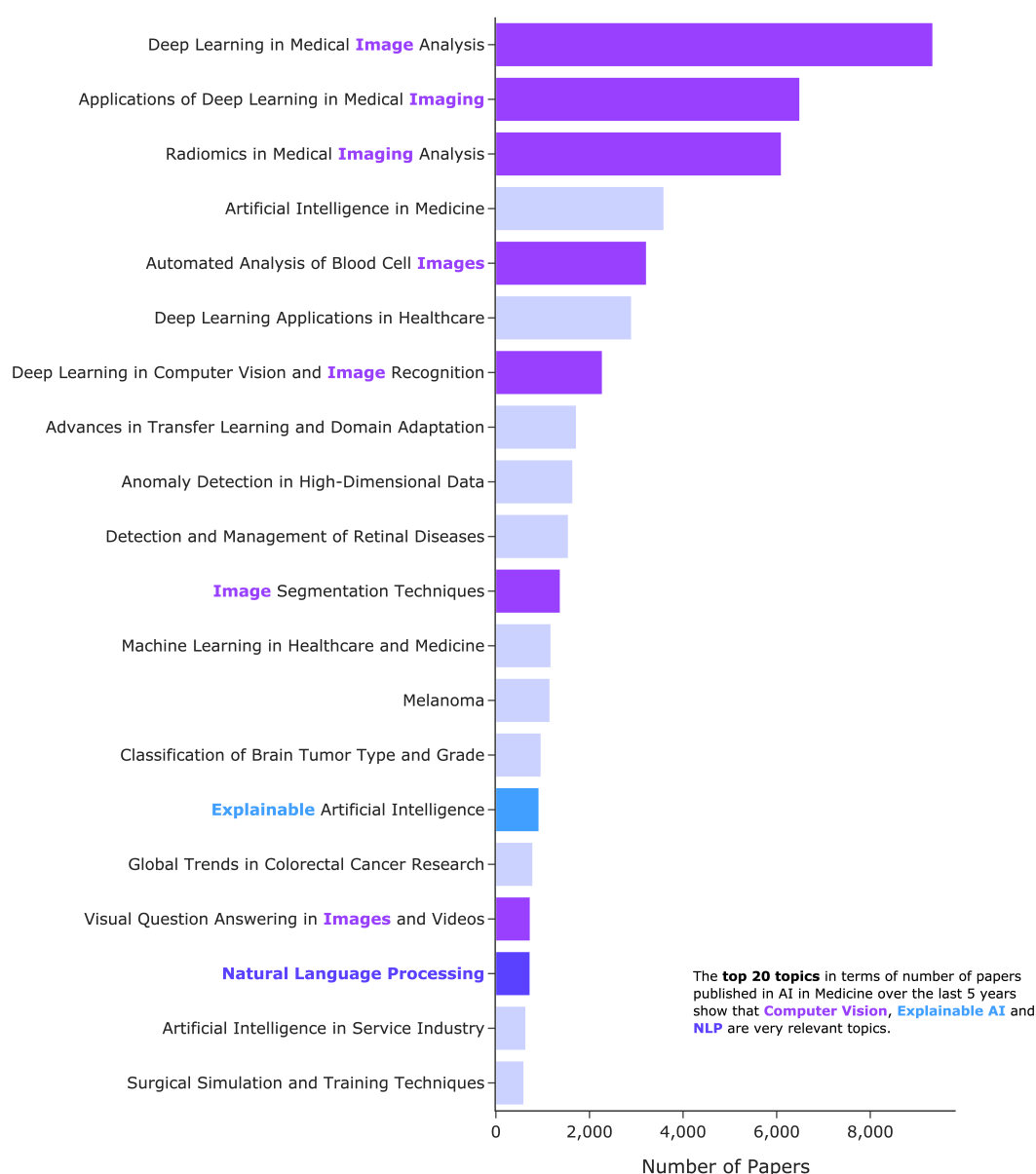
The number of papers published in association with AI shows a **larger increase** compared to the average of the other fields. In medicine, the number of papers has **almost doubled** since 2019.

In recent years, there has been a large increase in publications at the intersection of artificial intelligence and medicine. This increase in medical research publications

related to artificial intelligence is much stronger than the average for all other fields. In 2023, there were almost twice as many publications as in 2019. This suggests that interest in artificial intelligence is growing rapidly.

3 What are the most relevant topics?

Computer Vision, **Explainable AI** and **NLP** - The Most Relevant Topics



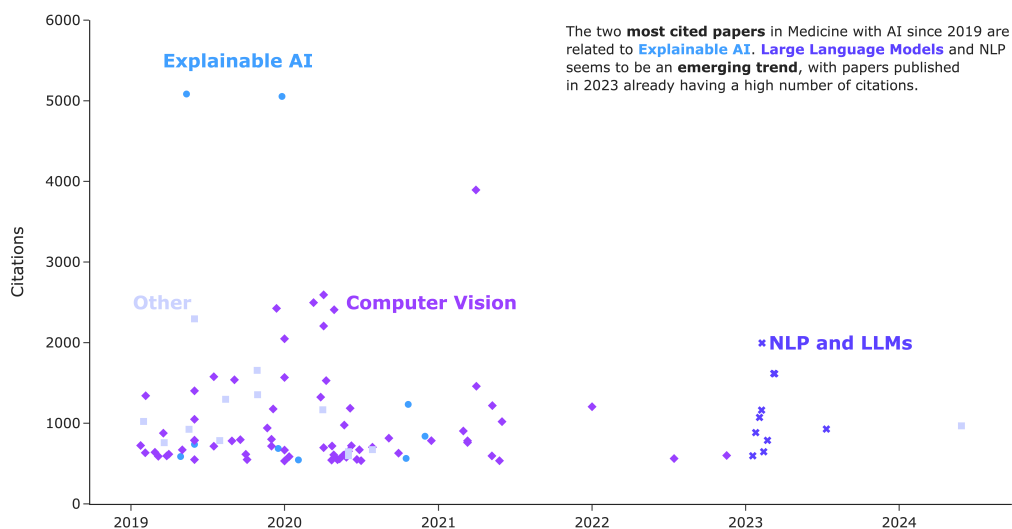
Artificial intelligence is a very broad field with many topics. Of course, some of them are more relevant to the field of medicine than others. Many of the most prominent topics at the intersection of medicine and artificial intelligence in the last 5 years

have been related to the field of computer vision. Today, medicine relies heavily on these imaging technologies to detect tumors, broken bones, and inflammation. Here, artificial intelligence can be used to automate the detection process, or perhaps even to detect relevant conditions that a human doctor would have missed. In particular, the large amount of data generated by fMRI scans of the brain may no longer be possible to analyze manually, and some disorders have complex fMRI patterns that can be more accurately classified by artificial intelligence algorithms [1].

However, the topic of explainable AI also seems to be particularly relevant in the field of medicine. The two most cited papers in the last five years are both related to explainable AI [2], [3]. In medicine, there is little to no room for error. Therefore, understanding the model rather than blindly trusting a black-box model seems to be a high priority.

Looking at the most cited papers also shows that large language models and natural language processing are becoming increasingly relevant, as all of the most cited papers in 2023 are related to large language models. Some of these papers are more in the style of a discussion to understand the potential risks and benefits of using large language models in the field [4], [5]. While other papers investigate how clinical knowledge can be encoded in large language models to exploit their potential either to train medical professionals or to use large language models as a utility tool [6], [7]. Whether these are sustainable trends or just an artifact of the hype around large language models like ChatGPT is unclear at this stage.

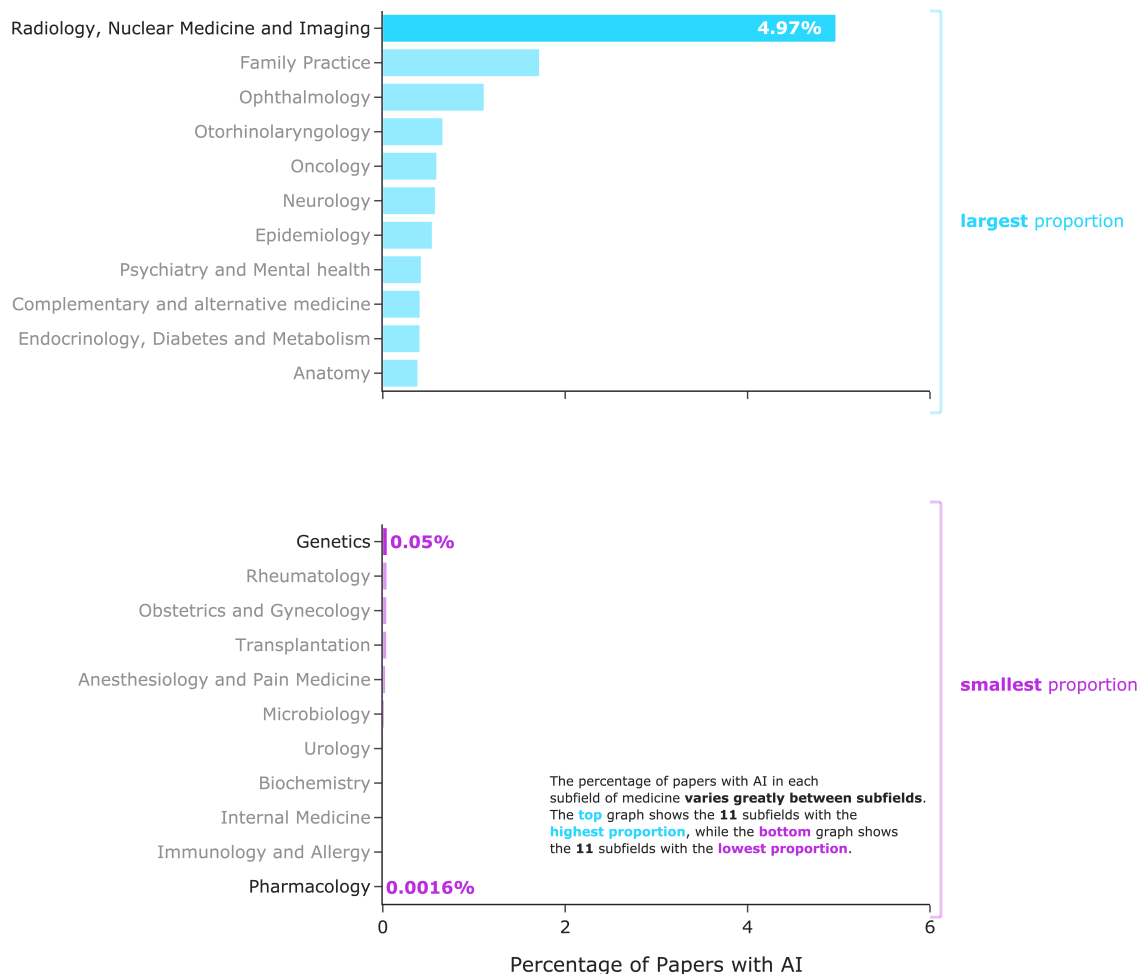
Most Cited Papers in Medicine with AI



4 Differences Between Subfields of Medicine

The percentage of artificial intelligence papers published in each subfield of medicine varies widely among the medical subfields. Not surprisingly, the subfield with the highest proportion of artificial intelligence papers in the last 5 years is Radiology, Nuclear Medicine and Imaging. This subfield can best exploit the potential of computer vision technologies.

Percentage of Medicine Papers With AI **Greatly Varies** Between Subfields



The large differences may indicate that some subfields of medicine have not yet discovered the potential that artificial intelligence could bring to their subfield. However, this percentage may also soon increase in these underrepresented fields, such as genetics, as they seem to be recently discovering the potential of artificial intelligence [8]. Pharmacology, which has the lowest percentage of artificial intelligence papers, seems to have a lot of potential due to the large amount of data needed to create new drugs. For example, artificial intelligence can help predict the structure of proteins

and RNA, which is an essential precursor to drug discovery and design [9].

However, it is important to note that this graph only shows publications in these subfields if they are related to medicine. It may well be that there is more artificial intelligence research in these areas, for example, related to biology.

5 Conclusion

Although there is already a growing interest in the intersection of artificial intelligence and medicine, there seems to be much more that can be done. The big picture here shows that interest in artificial intelligence in medicine is growing rapidly, that computer vision, explainable AI, and more recently natural language processing and large language models are particularly relevant topics, and that the degree to which artificial intelligence already plays a role in different subfields varies widely.

It is too early to say how big the changes and insights in medical practice will be and how much artificial intelligence will revolutionize the field of medicine. I think there is a lot of untapped potential in this intersection and I am excited to see what advances will be made in this area in the future.

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