

# Benefits Of Artificial Intelligence In Healthcare

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## Abstract

Big data and machine learning are impacting almost every aspect of modern life, from entertainment to commerce to healthcare. Some type of AI is already in use by payers and healthcare providers, as well as life science companies. The main application categories relate to diagnostic and treatment recommendations, patient engagement and compliance, and administrative activities. While there are many cases where AI can perform healthcare tasks as well or better than humans, implementation factors will prevent large-scale automation of healthcare professionals in a single environment. AI is ready to assist healthcare workers in a variety of tasks, from administrative processes to clinical documentation and patient education, as well as expert support such as image analysis, medical device automation, patient monitoring and more. There is great optimism that the application of AI can bring about significant improvements in every area of healthcare, from diagnosis to treatment. It is generally accepted that AI tools will facilitate and improve human work and will not replace the work of doctors and other medical personnel.

**Keywords** Artificial intelligence, healthcare applications, machine learning, electronic health record systems, ambient assisted living, clinical decision support, machine vision

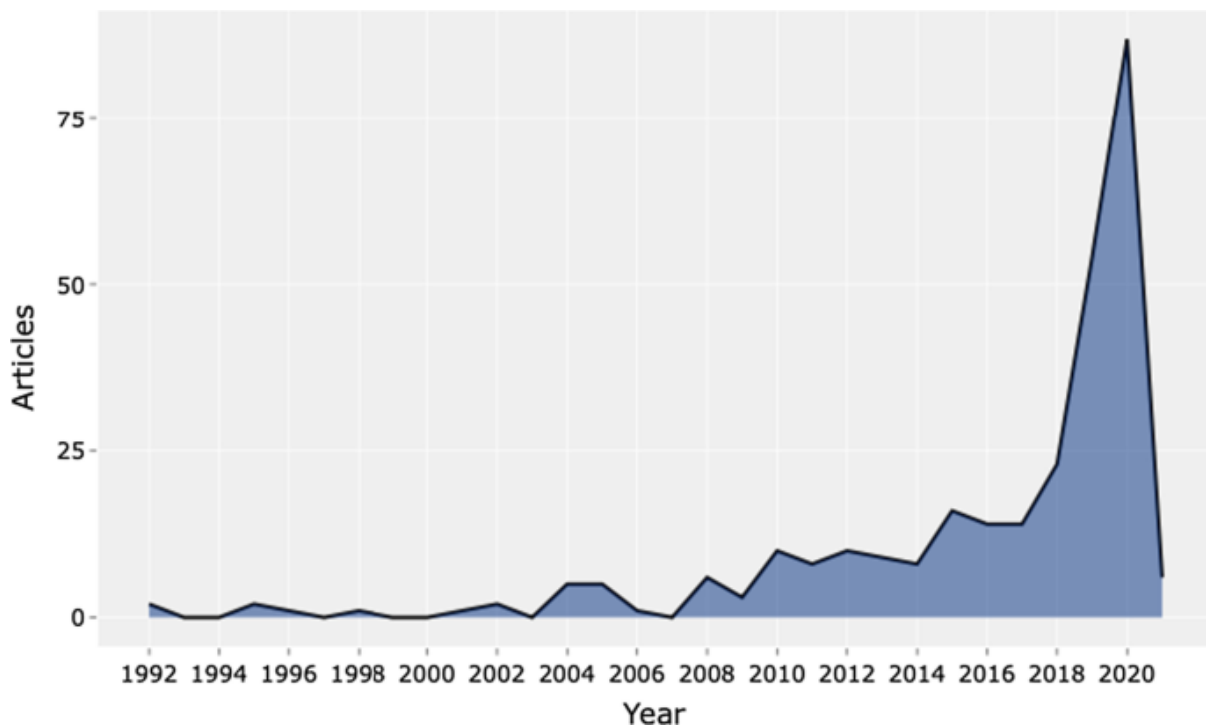
## Introduction

Artificial intelligence (AI) is rapidly evolving in healthcare with its potential to unleash the power of big data and gain insights to support evidence-based clinical decision-making. evidence and obtain value-based care. It is vital that healthcare leaders understand the state of AI technologies and how these technologies can be used to improve the efficiency, safety, and accessibility of healthcare services, supporting digital transformation healthcare. There is already some research showing that AI can perform as well or better than humans in important health tasks, such as diagnosing diseases. Today, algorithms have outperformed radiologists in detecting malignancies and guiding researchers on how to build cohorts for expensive clinical trials. For example, stand-alone diagnostic applications have proven to be less clinically acceptable unless integrated into integrated environments such as electronic medical records. However, there are also significant challenges to the usefulness of AI tools for patients. More importantly, information technology promises to empower patients or consumers of healthcare.

The demand for medical services is constantly increasing and many countries are experiencing shortages of medical professionals, especially doctors. Healthcare organizations also struggle to keep up with all the new technology developments and high patient expectations for service

levels and outcomes as they know them from consumer products, including products from Amazon and Apple. Advances in wireless technology and smartphones have created opportunities for on-demand healthcare services using health-monitoring apps and search platforms and have also enabled a new form of healthcare delivery, through remote interactions, available anywhere and anytime.

Figure<sup>i</sup> Annual scientific production.



#### Definition of artificial intelligence

AI refers to the similarity of human intelligence in machines programmed to think like humans and copy their steps. This term is used to solve the same problem as a human. AI is a method in which we program the machine to act like a human instance, drive a car, medical services and so on. Artificial intelligence (AI), the ability to perform tasks by a computer or a computer-controlled robot mainly associated with intelligent beings.

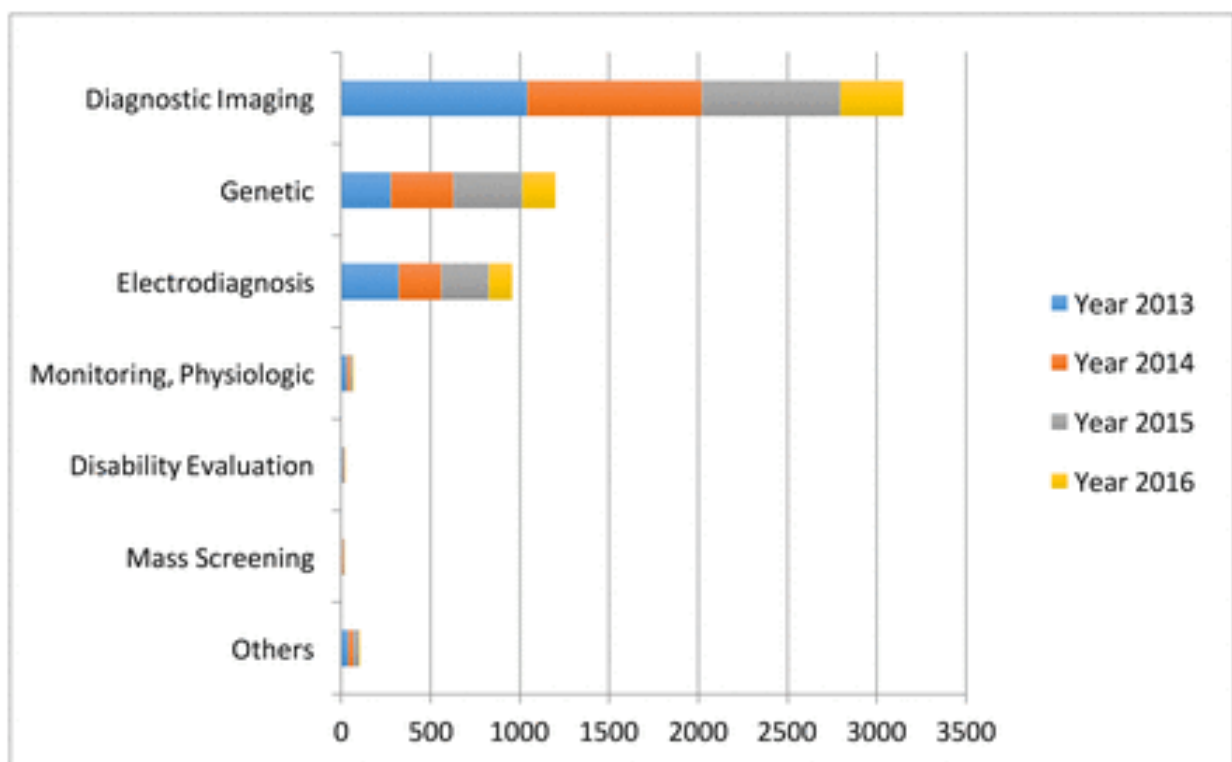
#### Artificial intelligence applications in healthcare

There are differing opinions on the most beneficial applications of AI for health purposes. Forbes said in 2018 that the most key areas will be administrative workflows, image analysis, robotic surgery, virtual assistants, and clinical decision support. A 2018 report from Accenture covered similar areas and included connected machines, quantitative error reduction, and cybersecurity. There are also many administrative applications in the medical field. The use of AI is less likely to be revolutionary in the field than patient care, but it can be remarkably effective. These are essential in healthcare because, for example, the average American nurse spends 25% of her working time on administrative and administrative activities.

## Types of AI of relevance to healthcare

Artificial intelligence is not a technology, but a collection of technologies. Most of these technologies are related to the healthcare sector, but the specific processes and tasks they support vary widely. Some specific AI technologies of immense importance to healthcare are defined and described below.

Figure<sup>ii</sup> The types of data considered in the literature on artificial intelligence (AI). Comparisons were obtained by searching for diagnostic techniques in the IA literature on the PubMed database.



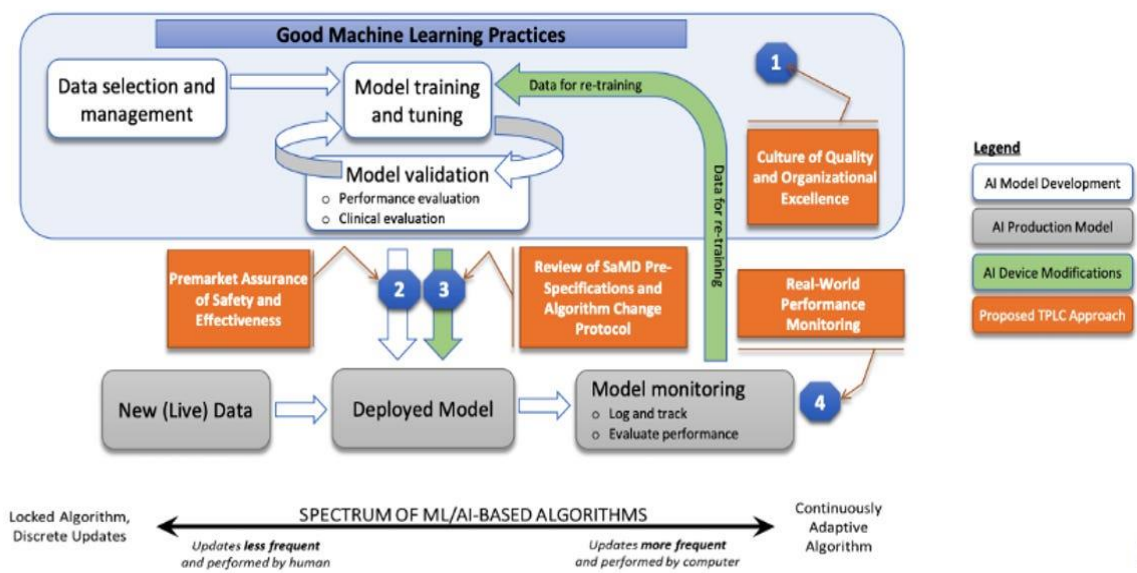
## Machine learning

Machine learning represents the mainstream approach to AI and is behind most of the recent advances in the field. In general, ML refers to a system that trains a predictive model by identifying patterns in the data from the input, and then uses that model to make useful predictions from the new, unresolved data. Machine learning algorithms can automatically learn and improve from experience without explicit programming, and such “learnability” represents a key characteristic of AI. Machine learning is widely used in other types of AI technologies, such as NLP, voice technology, and robotics. Healthcare managers should familiarize themselves with the key ML algorithms as they form the basis for understanding the potential and limitations of diverse types of AI technologies. In short, the

most popular ML algorithms are supervised learning, unsupervised learning, reinforcement learning (RL), and deep learning.

Machine learning has been applied to a wide variety of data (such as images, speech, video, and text) in complex tasks involving big data, producing comparable and sometimes superior results. compared to human experts in accuracy and efficiency. It has shown the potential to provide data-driven and evidence-based clinical information to enhance medical diagnosis, treatment decisions, biomedical research, and service delivery across the entire healthcare sector.

Figure<sup>iii</sup> The FDA has released a new proposal that captures the iterative and highly adaptive nature of AI systems in what it calls a "total product lifecycle" management approach based on best practices. about machine learning.



## Deep learning

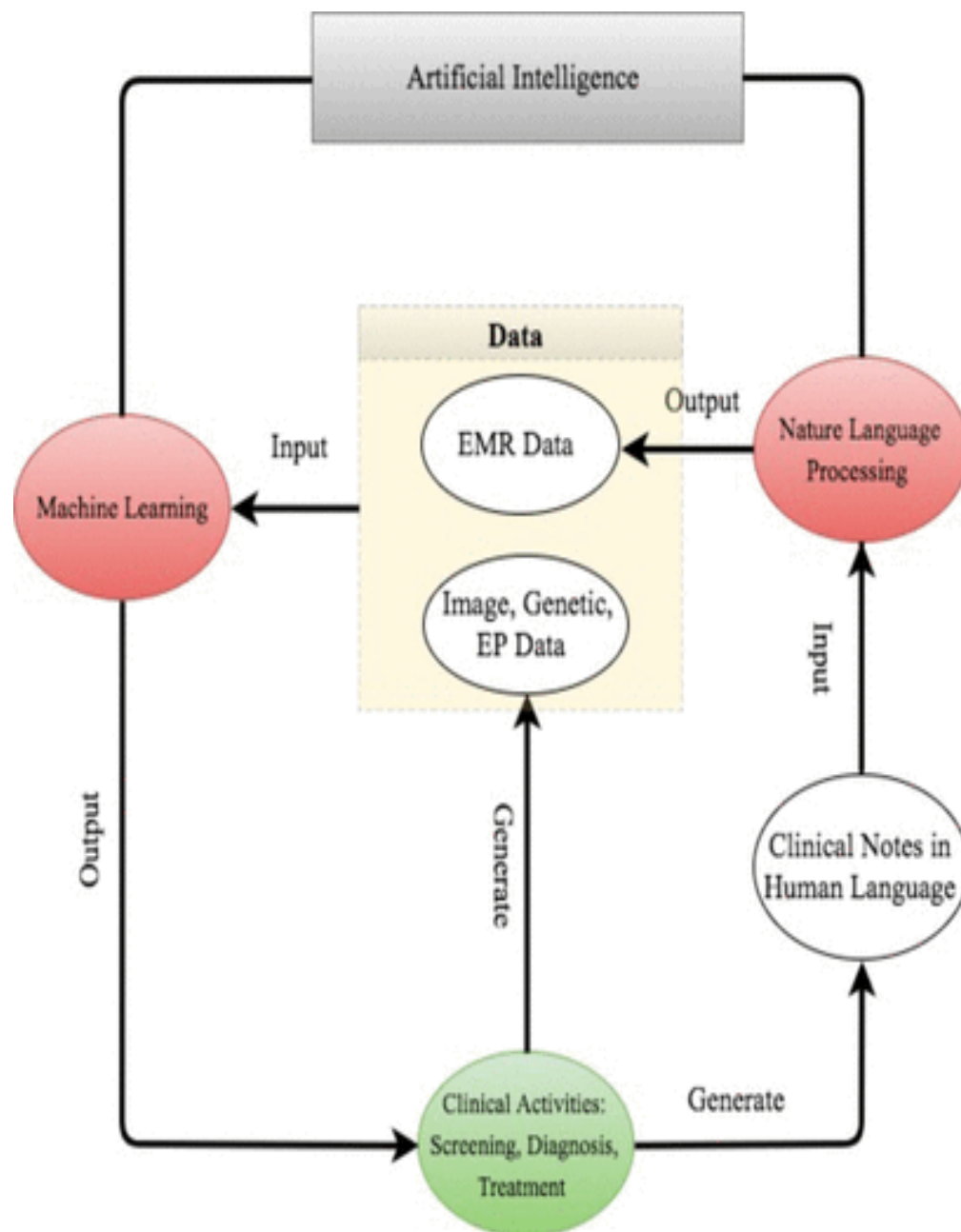
Deep learning is also increasingly used for speech recognition and thus a form of natural language processing (NLP), described below. Unlike previous forms of statistical analysis, each feature of a deep learning model usually has little meaning to a human observer. Therefore, the interpretation of model results can be very difficult or impossible. The most complex forms of machine learning involve deep learning or neural network models with multiple levels of features or variables that predict outcomes. There can be thousands of hidden features in such models, discovered thanks to the faster processing of GPUs and today's cloud architectures.

## Natural language processing

Natural language processing uses different classifications to infer meaning from unstructured text data and allows clinicians to work more freely by using language in a "natural" rather than adaptive way. text strings into input options to serve the computer. NLP talks about the interaction between computers and humans using natural language and often emphasizes the computer's ability to understand human language. NLP is important for many healthcare big data analytics applications, especially for EMRs and translations of doctor-provided stories. It is commonly used in operations such as information extraction, transformation of unstructured data into structured data, and classification of data and documents.

NLP is used to analyze EMR data and gather large-scale information about the most recent complications of a certain medical condition. In healthcare, the primary applications of NLP involve the creation, understanding, and classification of published research and clinical literature. NLP systems can analyze unstructured clinical notes about patients, prepare reports (e.g. on radiological examinations), record patient interactions, and perform conversational AI.

Figure<sup>iv</sup> The path from clinical data generation to natural language processing data enrichment, to machine learning data analysis, to clinical decision making. EMR, electronic medical record; EP, electrophysiology.



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Bohr, A., &

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