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AI in Healthcare: Truth vs. Hype

With the rise of artificial intelligence, the healthcare industry finally has the tools to address challenges that have proven unsolvable by human means. Artificial intelligence can reshape healthcare—but to do so, it must be appropriately applied to realistic use cases and supported by a strong ethical framework. In this white paper, we examine the ways AI can be practically and meaningfully applied to healthcare, why many existing solutions fall short of capitalizing on AI's transformative potential, and how healthcare leaders can learn to separate truth from hype.

Introduction

The healthcare market has been inundated with new AI solutions, and to be sure, some of these solutions apply AI meaningfully and effectively. However, there are just as many solutions promising to revolutionize care delivery and administration—and so far, those promises have yet to bear fruit. There is an outsized number of healthcare AI applications that can best be categorized as "low-risk/low-reward"; these solutions often amount to little more than using AI-powered chatbots to marginally reduce manual workflows and overhead, while charging customers exorbitant sums for the service.

The recent trend of AI companies moving into healthcare and healthcare companies moving into AI—fueled in no small part by large tech companies' willingness to invest heavily in AI—is a clear indicator of AI's massive potential. Yet even the most well-established AI companies are struggling to adapt their solutions to a healthcare setting. ChatGPT is widely regarded as the most advanced generative AI available, and its potential is a key reason for Microsoft's reported $13 billion investment in ChatGPT's parent company, OpenAI.[1] Yet when researchers for JAMA Pediatrics recently put ChatGPT to the test, the program incorrectly diagnosed an astonishing 83% of pediatric cases.[2]

Some of these AI newcomers have managed to gain a foothold in the market, but that is not necessarily proof of the value of their offerings. A more plausible explanation for their success is that many healthcare business leaders lack a clear understanding of the full range of possibilities for meaningfully applying AI in a healthcare setting. The surfeit of low-ROI applications makes it harder for legitimately game-changing AI solutions from established and experienced healthcare AI organizations to gain a foothold in the market. More importantly, this trend of overpromising and underdelivering will inevitably engender skepticism about AI among healthcare leaders, which could have a chilling effect on adoption of AI-enabled solutions across the industry.

The first step towards effectively utilizing AI is understanding its full range of possibilities. Learning to separate truth from hype will help healthcare leaders identify the solutions that can truly impact the healthcare landscape for the better—and that understanding is crucial to successfully apply the right AI solutions for their organizations' needs.

GETTING STARTED

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WHITE PAPER CONTENTS

[1] CNBC, Microsoft's $13 billion bet on OpenAI carries huge potential along with plenty of uncertainty. (Link)
[2] The Hill, ChatGPT incorrectly diagnosed more than 8 in 10 pediatric case studies, research finds. (Link)

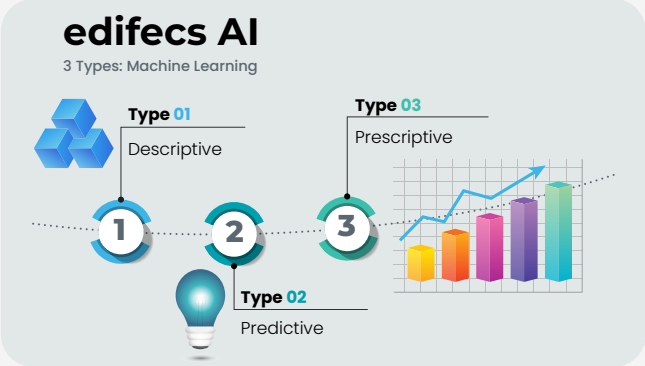
What Do We Mean by "AI"?

The term "artificial intelligence" is a catch-all term that refers to the simulation of human intelligence using machines. That intelligence is simulated by a series of technologies and applications, each responsible for their own particular functions.

Machine Learning (ML)

The list of potential use cases for AI applications is constantly expanding thanks to machine learning, which was defined in the 1950s by Arthur Samuel as "the field of study that gives computers the ability to learn without explicitly being programmed."[3] Machine learning (ML) systems are trained using historical data to function in any of three ways: to explain what happened and identify clusters or anomalies (descriptive), to infer future results (predictive), or to learn how to operate in a particular use case without being programmed to do so (prescriptive).[4]

Machine learning can involve a number of different kinds of algorithms, depending on the intended use of AI technology. There are two main types of ML models, each with a variety of potential healthcare applications: discriminative models and generative models.[5]



DISCRIMINATIVE AI

Discriminative AI is particularly useful in coding reviews and ensuring diagnostic accuracy.

Discriminative Models

Discriminative models separate data using regression or classification algorithms. The user defines the boundary, and the model learns to sort the data using, in essence, "yes/no" criteria. Discriminative models that use classification algorithms do not make any assumptions, which makes them ideal for descriptive functions.

Using a classification algorithm, discriminative models can place patients within a specific disease category that has a specific ICD-10 code; this is especially useful in risk adjustment, where coding accuracy is crucial. Classification algorithms can also be used to automate claim adjudication, with claims being accepted or denied according to whether the codes associated with the patient align with the treatment submitted for payment.

Discriminative models that use regression algorithms can make predictions based on existing data, making them ideal for predictive use cases; for example, analyzing the historical cost of medical procedures to predict future costs of those procedures in a given geographical area. Natural Language Processing (NLP) can also be used in discriminative models, as it allows systems to understand and classify text-based information. NLP is particularly effective in a risk adjustment context, as we outlined in a recent ebook.

Regardless of the algorithm used, however, discriminative models cannot generate new data (i.e., perform prescriptive functions). From a healthcare standpoint, discriminative AI is particularly useful in coding reviews and ensuring diagnostic accuracy.

[3] MIT Sloan, Machine learning, explained. (Link)
[4] Omega Venture Partners, Artificial Intelligence and the Future of Work. (Link)
[5] Omega Venture Partners, Artificial Intelligence and the Future of Work. (Link)

Generative Models

As the name suggests, generative models can generate new data points that are similar to the data the model was trained on. Discriminative models typically require supervised learning; that is, training with data sets that have been pre-labeled by humans. Generative models, on the other hand, are capable of unsupervised learning: identifying patterns or trends in unlabeled data. This makes them ideal for prescriptive machine learning.

Generative AI also includes Large Language Models (LLMs). Like NLP, LLMs can understand and classify text-based information; however, LLMs can go beyond textual analysis, sorting, and prediction to complete text-based problem-solving functions or generate entirelygen new text.[6]

These models can be enhanced via **deep learning**, a subset of ML that mimics the way the human brain learns to gather, analyze, and interpret information.

GENERATE NEW DATA

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Generative vs. Discriminative: Which Is Better?

The models each have their own strengths and weaknesses. Discriminative models are more effective at correctly interpreting and accounting for outliers in training data, which makes them more accurate when performing descriptive or predictive functions. Still, discriminative models are not immune to incorrectly classifying data points, and reinforcement training may be needed to correct any misclassifications.

Overall, discriminative models are highly effective for specific use cases, but their range of potential uses is fairly limited compared to generative models. Generative models, on the other hand, have a wider array of potential uses, but they typically take much longer to train than discriminative models. In addition, generative AI is much more likely to be swayed by outlier data, and inaccurate modeling can lead to biases in generative AI behavior.

Much of the buzz surrounding healthcare AI is centered on the potential of generative models, but there are still a few major hurdles to clear before that potential can be reached. Reports have surfaced of generative AI being used to read and analyze MRIs and diagnose conditions, create personalized treatment plans for patients, improve healthcare data interoperability, and even support population health initiatives.[7] That potential certainly exists; however, many of these proposed applications are in their nascent stages—and as the JAMA study noted previously demonstrates, non-healthcare-specific LLMs lack the necessary depth of understanding required to navigate the intricacies of patient care.

[6] Elastic, What is a large language model (LLM)? (Link)
[7] Boston Consulting Group, Generative AI Will Transform Health Care Sooner Than You Think. (Link)

Serious concerns have been justifiably raised about how the healthcare industry can meaningfully apply generative AI the way it is meant to be used; that is, with little to no human input. Generative AI is expected to make mistakes as it learns, and mistakes are certainly inevitable in a field as complex as healthcare.

In other industries, this trial-and-error approach might result in dissatisfied or frustrated customers, but that short-term frustration is necessary to achieve the long-term benefits of refining the AI model. But healthcare organizations cannot afford to be quite so cavalier—the stakes are much higher, and failure can be fatal. Healthcare organizations have a legal and moral duty to protect the lives of their patients, and there is simply no room for error.

Using the examples outlined above, if the barometer for success in applying generative AI is the ability to deploy it with no human intervention and at minimal risk to patients or members, we're not quite there yet. Effectively applying generative AI in a patient-facing capacity demands a more precise and ethically rigorous approach than might be required in other industries, so the exciting future of patient care seamlessly assisted by generative AI may take longer to arrive than expected. Nevertheless, there are countless opportunities in the interim to meaningfully use generative AI and deliver a better and more efficient healthcare experience.

Why AI Is So Important Now

Whether due to the shift to value-based care, regulatory requirements for data interchange and interoperability, or ongoing provider and clinical staff shortages, the healthcare industry has to do more with less—and reducing manual processes and simplifying workflows is key.

The proliferation of AI-enabled technology in other sectors has been a key driver of the push for greater adoption of AI in healthcare. The increased demand represents an opportunity for non-healthcare tech companies to break into the healthcare market using their existing products; however, the language and requirements of healthcare differ dramatically from those used in other sectors.

DO MORE WITH LESS

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As a number of non-healthcare tech companies have learned, meaningfully applying AI in healthcare requires much more than just porting over existing solutions; in response, many healthcare AI neophytes have set their sights considerably lower. In a bid to capture the greatest value for the lowest financial and opportunity cost, many tech companies are only focused on leveraging their most transferable non-healthcare applications. Unfortunately, those applications really only capture the low-hanging fruit: handling patient communications & scheduling, automating patient update notifications to care teams, and so on. Not only do these solutions offer marginal value to healthcare organizations, their impact is negligible: patient communications and updates are typically performed by lower-salaried clinical staff and can also easily be outsourced to third-party companies if necessary.

Healthcare AI: A Unique Industry Requires Unique Expertise

As noted above, because of the healthcare industry's singular terms and taxonomies, solutions originally designed for other industries cannot easily be converted for use in healthcare. This may make it more difficult for non-healthcare AI companies to move into the healthcare space, but it does not preclude the healthcare industry from meaningfully applying AI; quite the opposite, in fact.

In other industries, there is some overlap in the language used to categorize AI training data; the word "stock" has one meaning for retailers, but financial firms have an entirely different definition. This overlap is far less prevalent in healthcare, allowing AI models designed for use in healthcare to be trained to a greater degree of specificity and accuracy—provided, that is, that the tech company training the AI speaks the language of healthcare. Non-healthcare AI companies are learning the language, but their focus on low-impact solutions suggests that they are not fluent yet.

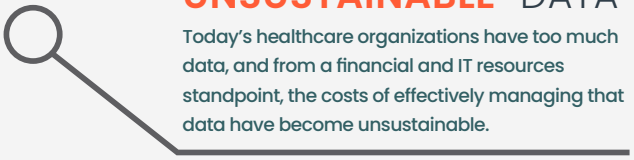
Although the "style-over-substance" approach is favored by many AI newcomers and non-healthcare tech companies, there are a variety of meaningful potential applications for AI in healthcare. Used effectively, AI-enabled solutions can help healthcare organizations address real challenges like effective data management and exchange, automating manual processes, and reducing friction between payers and health plans.

Healthcare's Data Problem

In 1980, the amount of medical knowledge doubled every 7 years. By 2010, that rate increased to every 3.5 years; in 2020, the amount of medical knowledge doubled every 73 days.[8] Today's healthcare organizations have too much data, and from a financial and IT resources standpoint, the costs of effectively managing that data have become unsustainable.

A recent report from the Council for Affordable Quality Healthcare (CAQH) found that the healthcare industry spent $60 billion on administrative tasks in 2022—an $18 billion increase from 2021.[9] This is at least partly attributable to the industry's move towards value-based care, which requires massive amounts of patient/member and population data to be effective. The more data healthcare organizations collect, the more administrative work is needed to manage it, and the more the industry spends on administrative tasks.

Increased administrative spending would perhaps be acceptable if it led to more efficient data management and exchange. However, an estimated 80% of patient data is unstructured (images, chart notes, non-OCR PDFs and faxes, etc.) and is not easily organized or pulled into healthcare systems for further analysis. As a result, valuable insights about patients/members and populations remain inaccessible to healthcare organizations.



[8] NIH, Challenges and Opportunities Facing Medical Education. (Link)
[9] CAQH, 2022 CAQH Index: A Decade of Progress. (Link)

Effectively managing vast amounts of data is one major hurdle for the healthcare industry. Another is the need to ensure the fidelity and accuracy of that data—and as healthcare AI solutions continue to proliferate, addressing this challenge is more urgent than ever before. Healthcare AI models are trained and re-trained on clinical and administrative data; if the information used to train these models is inaccurate or incomplete, the accuracy of AI solutions will suffer. To meaningfully apply generative AI solutions for healthcare use cases, AI models must be trained, re-trained, and trained again on data that is of the absolute highest possible quality and accuracy.

Finally, because healthcare organizations operate on a variety of disparate systems, the data that can be accessed is often difficult to share. As a result, the insights providers and health plans do exchange with one another are often fragmented and incomplete, which in turn creates friction between partner organizations.

These combined challenges create a significant barrier to success in value-based care. However, other industries (such as the entertainment industry) with even larger data-related hurdles have still successfully and meaningfully incorporated AI technology. In other words, while healthcare's data volume is undoubtedly a challenge, it is a challenge that has been overcome before.

How Healthcare Organizations Can Meaningfully Apply AI

In 1996, the internet was a promising technology with strong roots, but it wasn't until 2000 that we finally figured out the best way to put that technology to meaningful use. We expect AI to follow a similar timeline. 2023 was AI's "1996," in that we collectively grasped its vast potential and all the ways in which it can potentially be used. Over the next three years, AI will continue to grow and evolve into a technological staple; during this period, new use cases will be discovered, and existing use cases will be honed and refined.

For now, though, we are still trying to figure out the best ways to put AI to good use. And with any new technology it can be easy to fall into the trap of "tech for tech's sake": trying to make the organization's needs fit the technology's capabilities instead of asking whether it's the right technology for the organization's needs. As AI gains more wide-spread adoption, this phenomenon has taken hold in healthcare organizations nationwide—often with disastrous results.

To successfully leverage AI-enabled solutions, it is crucial for healthcare leaders to take a strategic approach and let practicality guide their decision-making. Healthcare leaders must focus on specific use cases where there is a clear need for AI, fully define the intended role of the AI solution—and above all, partner with an AI organization with a documented track record of achieving ROI for the specific AI application under consideration.

Know Your Needs

A clear understanding of the organization's needs helps business leaders quickly and easily eliminate any AI solutions that don't meet those needs. Where are the gaps or inefficiencies in the organization's workflows? Can automation help address them—and is automation the most practical way to do it?

Define Your Goals

It is also essential for healthcare leaders to establish clearly-defined goals for their use of AI. The goals themselves will vary depending on the business function; for example, for risk adjustment, the AI solution should be evaluated on coder productivity, provider accuracy, throughput, and error reduction rates. For prior authorization, cost per transaction and response times for prior authorization requests should be the key measurables.

Choose the Right Solution

As outlined above, generative and discriminative AI models each have their own unique strengths and weaknesses, so it's critical to ensure the AI solution is trained on the right model for its intended function.

To determine whether a potential solution is right for their organization's needs, healthcare leaders also need to learn as much as possible about the solution's underlying AI. How extensively were the models trained, and what data was used to train them? Is that data relevant to the organization's patient or member population? Was that data correct or, in the case of generative AI, is intrinsic bias a potential concern? How quickly and effectively can the AI be trained to adapt to external changes like new CMS guidelines? Can that re-training take place simultaneously in a parallel training environment so updates can be seamlessly pushed to the production environment, rather than having to take the AI offline to re-train it? What are the AI creator's security and governance policies?

Asking these questions is the fastest and most effective way to determine if the solution will perform as advertised—or if it's more hype than substance.

A Game of Singles

As a technology, AI's potential is boundless, but it is not a panacea. AI is most effective when it is targeted and designed for specific use cases; for proof, we need only look at Olive AI or IBM Watson Health, whose "jack-of-all-trades" approach to AI quickly fell out of favor and ultimately led to their demise.

We believe that the future of AI lies in more precise niche models that can address specific functions and workflows, and our AI-powered solutions are a reflection of this belief. Over the course of our 10-plus years of experience in healthcare-specific AI utilization, we have built a database of over 8 million patient charts for AI training and retraining.

To deliver maximum ROI for our customers, we have taken a holistic approach across multiple use cases, including risk adjustment, value-based payments and contracting, and prior authorization. We also leverage AI for batch/mass error correction in all our solutions to enhance existing functionality and enable our customers to achieve more efficient operations. This cross-usage—which we will augment using chatbots as knowledge resources across our products—helps drive more advanced learning in our models, which allows for broader prediction sets and greater accuracy. Our long-term objective is to build a generative AI model that is trained on our healthcare data and infused with Edifecs-specific product knowledge for more effective knowledge sharing and automation across all our products.

Our AI-enabled solutions help healthcare organizations uncover valuable insights into their patient or member populations, and make it easier to share those insights with their partners for greater transparency and collaboration. With our comprehensive approach to AI, our goal is to eliminate more than $10 billion in administrative waste for our customers—the equivalent of 47.5 years' worth of operating expenses for the average U.S. hospital.10 We believe that with our experience, flexibility, diversity of AI training models, and vast training data repository, we are uniquely positioned to most effectively use AI to meet the changing needs of the industry.

The future of AI in healthcare is extraordinarily bright. To reach that future, the healthcare industry needs to focus on meaningful applications for AI technology and not let itself be distracted by hype. By effectively leveraging AI, healthcare organizations can put themselves in a better position to deliver on the promise of value-based care.

[10] Becker's Hospital Review, Hospital expenses, state by state. (Link)

BOUNDLESS POTENTIAL

AI is most effective when it is targeted and designed for specific use cases.

LEARN MORE EDIFECS AI

To learn more about how Edifecs' AI-enabled solutions can help your organization thrive, visit our website.