Perspective | Healthcare

The impact of AI in healthcare

Artificial intelligence is revolutionizing the healthcare industry as we know it. AI is changing how medical professionals diagnose, treat and prevent diseases for their patients. With advancements in machine learning, natural language processing and data analytics, AI tools are becoming further integrated into healthcare systems. This offers the potential for healthcare providers to enhance patient outcomes and streamline their operations.

Content

Current state of AI in healthcare

Artificial intelligence (AI) uses computers and machine processes to simulate human intelligence and perform complex automated tasks in healthcare. While AI is designed to reflect human abilities, it does so in a way that far exceeds our limitations. Most notably, it sorts through copious amounts of data quickly and efficiently while pulling out patterns, anomalies and key insights. If the models are well-trained, AI can reduce bias and human errors. An additional benefit could pertain to regulatory and legal issues that arise.

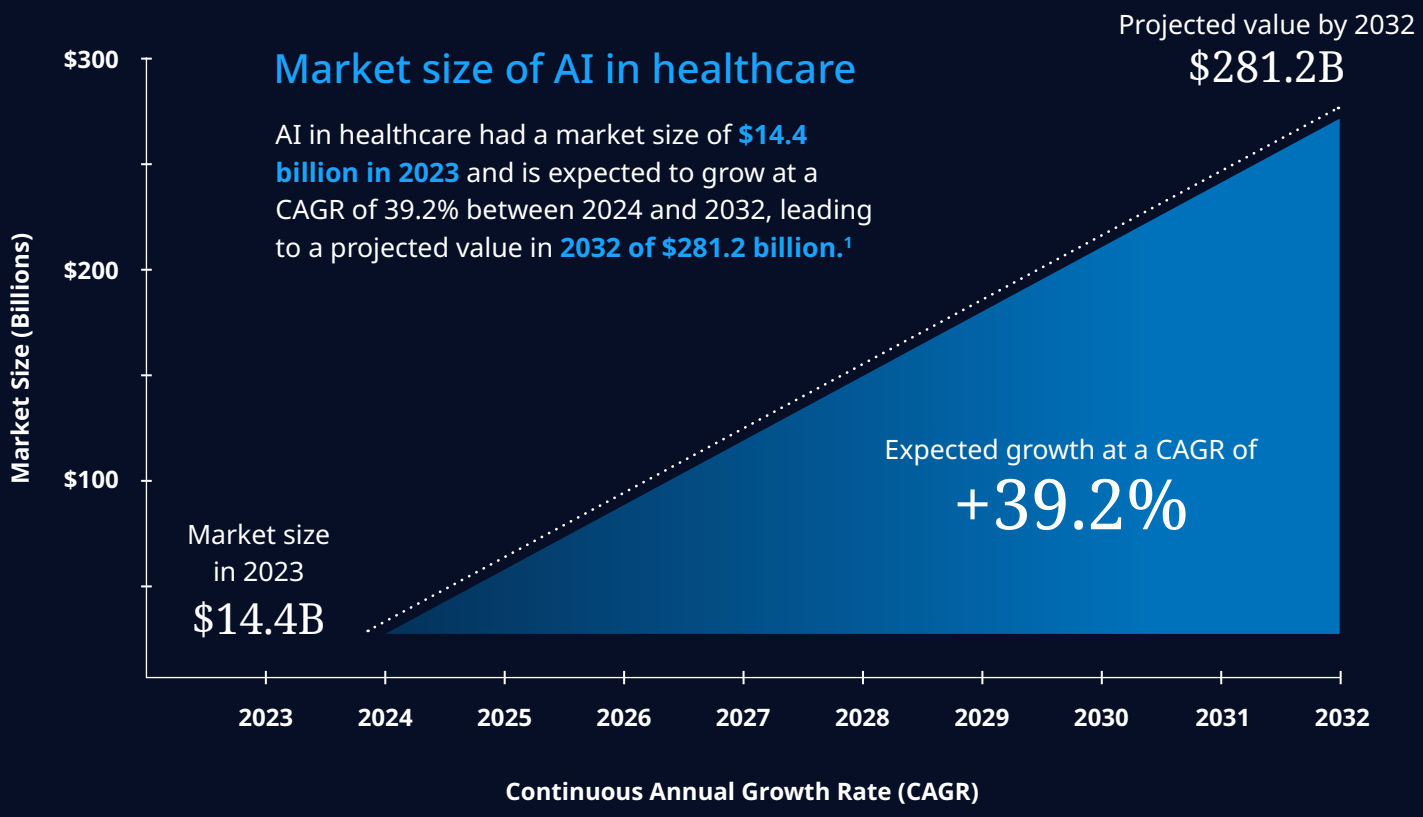
As an umbrella of sorts, AI covers a wide range of interrelated processes. Some of the most well-known forms of AI seen within healthcare are[2]:

- **Machine learning (ML).** Training algorithms that use datasets, such as health records, to create smart models capable of performing tasks like information categorization and outcome predictions
- **Deep learning.** A subset of machine learning that involves greater volumes of data, training times and layers of ML algorithms to produce neural networks capable of more complex tasks
- **Natural language processing (NLP).** Using ML to understand human language, be it verbal or written
- **Robotic process automation (RPA).** Using AI in computer programs to automate administrative and clinical workflows

As AI continues to make significant strides, healthcare professionals can use the technology. Researchers do not expect AI to replace these professionals. Instead, they see AI as a supporting tool that can improve the work of health providers now and in the future. IT can help humans make decisions. Specifically, those that require more than simple human interaction. Implementing models could assist in decision-making by sorting and organizing information into meaningful forms. Outside experts can provide different perspectives, thought processes and accurate evaluations to help human decision-makers. Both models and experts should be complementary because each will have strengths and biases.

Market size of AI in healthcare

AI in healthcare had a market size of **$14.4 billion in 2023** and is expected to grow at a CAGR of 39.2% between 2024 and 2032, leading to a projected value in **2032 of $281.2 billion.**[1]



Proven benefits

As with anything, there are areas for improvement and growth for AI in the healthcare industry. New developments are on the horizon, but AI has already delivered numerous clear and tangible benefits. It has improved health systems through diagnostics and imaging, predictive analytics, drug discovery and development, virtual assistants and chatbots, fraud prevention and streamlining administrative tasks.[3]

Revenue cycle automation

AI is changing revenue cycle automation in healthcare by streamlining key processes, such as insurance verification, claims submission, denials management and documentation improvement. By using AI, healthcare organizations are reducing errors and improving efficiency, revenue recovery and the revenue cycle.

Digital scribe and ambient listening

Digital scribes and ambient listening technologies are revolutionizing healthcare by improving physician efficiency. These tools filter out background noise and accurately transcribe clinical notes in the physician's own voice and format. By automating the documentation process, digital scribes allow doctors to focus on patient care rather than administrative tasks.

Diagnostics and imaging

AI algorithms are now capable of analyzing medical images with tremendous accuracy, often more so than experts in the field. For example, research shows that AI is nearly twice as good (82% accuracy compared to 44%) versus lab analysis when grading the aggressiveness of a rare form of cancer.[4] AI-powered tools are also detecting anomalies in X-rays, MRIs and CT scans, aiding medical experts in the early detection of serious medical conditions.

Augmented care at home

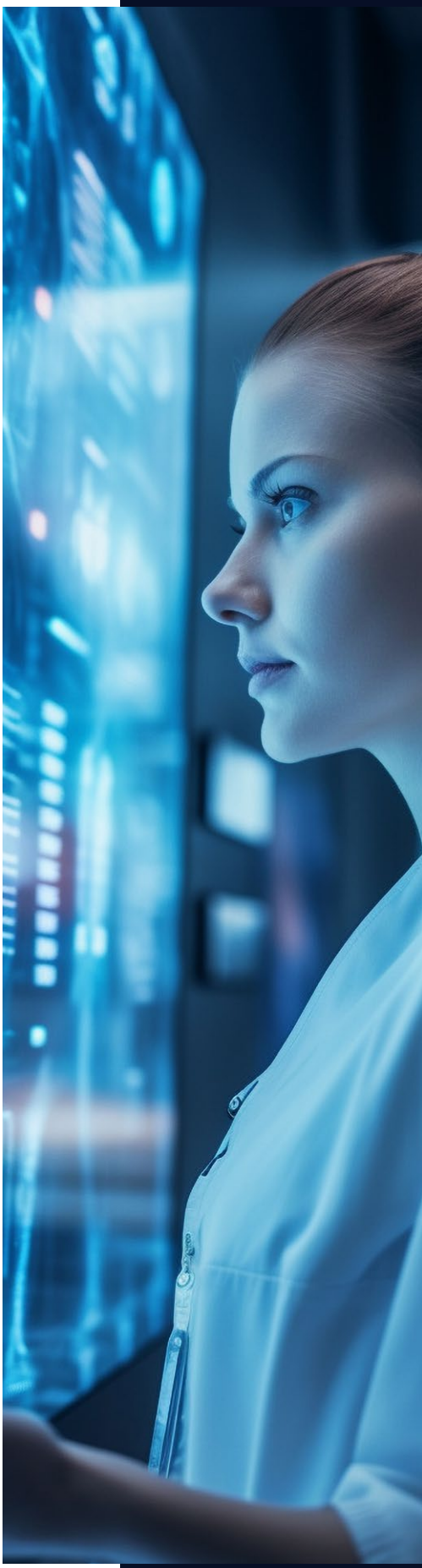
Monitoring, automation and data analytics are essential in-home capabilities that require integration and orchestration. The current complexity of implementing these technologies is moderate. However, incorporating AI is crucial as technologies such as wearables and implanted devices can significantly enhance patient care and provide valuable clinical data. These developments can also lead to a net-neutral or decreased workload for clinicians.

Predictive analytics

By analyzing substantial amounts of patient data, including genetic information, lifestyle factors and medical histories, AI can help create tailored treatment plans. This leads to better health outcomes for patients. It also allows medical experts to spend less time looking through data and more time with the patient focused on their treatment plan.

Drug discovery and development

AI can examine data on drug interactions and side effects, as well as make predictions for what compounds will be most effective for specific conditions. This information gives doctors clear insight into what is best



AI can automate routine administrative tasks like appointment scheduling, insurance claims processing and scribing during visits.

to prescribe for their patients. Additionally, AI can speed up the drug discovery process by analyzing substantial amounts of data. This can not only save significant time and money but also lead to new and improved treatment plans.

Generative AI (GenAI) and contact center

GenAI is having a major impact on contact centers by helping patients easily access healthcare information and services. It can answer patients' questions about their symptoms or help them schedule an appointment, all by having a fluid conversation. Outdated chatbots may discourage patients and families with their preset responses. But GenAI can process what they say and produce a unique response, as opposed to delivering mandated lines. For example, if a patient is unable to think of the name of a prescription that needs to be filled but says a name that is close, the GenAI tool will know all of their current prescriptions and guide them to the right one the same way a human would.

Fraud prevention

It is well-documented that fraud is a problem within the healthcare industry. Issues range from billing for unnecessary services to misrepresenting dates and locations of service. AI is going to help crack down on this epidemic. It can analyze large volumes of healthcare data and identify both intentional and unintentional patterns of fraudulent activities.[5] Additionally, AI can develop predictive models that will identify potential fraudsters or at-risk claims. Potential inaccuracies in coding and billing will be more visable.

Streamlining administrative tasks

One of the most obvious areas of improvement AI will bring to healthcare is with administrative work. AI can automate routine administrative tasks like appointment scheduling, insurance claims processing and scribing during visits. This will have a significant impact on cost savings and improve efficiency from the top down.

Known challenges

While everyone is excited about AI and the benefits are clear, significant challenges remain. Organizations must think through and carefully consider these issues. More challenges are sure to surface, but the ones currently top of mind tend to be data privacy and security, bias in the data, a lack of transparency, regulations and governance, and a general lack of understanding.[3]

Data privacy and security

For AI to be used to its full potential, it requires large quantities of sensitive data. Those responsible for feeding data into AI tools must ensure that patient data is protected from unauthorized access and that patients have control and insight into how their data is being used.

Bias in the data

A topic of interest in the AI space is how to avoid data biases. AI systems can be biased if the data they are fed is not representative of the population they will be serving. This can often lead to inaccurate or unfair outcomes and results. It is important to be certain that the data AI tools use is protected and accurate, so no biases occur. A key part of avoiding bias in data is having a strong code of ethics. Organizations should adopt the UNESCO global standard on the ethics of AI.[6]

It includes 10 core principles:

- Proportionality and do no harm
- Safety and security
- Right to privacy and data protection
- Multi-stakeholder and adaptive governance and collaboration
- Responsibility and accountability
- Transparency and explainability
- Human oversight and determination
- Sustainability
- Awareness and literacy
- Fairness and non-discrimination

39% **2022**

52% **2023**

In 2023, 52% of Americans expressed nervousness toward AI products and felt more concerned than excited, up roughly 13% from 2022.[7]

Lack of transparency

AI systems have been popping up in healthcare institutions all over the world. Unfortunately, it is often a surprise to those who will be using them. Without transparency, those who need to use AI tools may find it difficult to do so. Additionally, when users do not have a strong foundational understanding of how AI operates, they may find it hard to trust the outcomes it shares. It is critical for AI users to fully understand how it operates and what it is capable of.

Regulation oversight

The healthcare industry currently lacks regulations and guidelines for the use of AI. This tends to make it challenging for healthcare professionals to understand how to use the technology properly. It can also be intimidating for patients to know what to expect from AI systems. Fortunately, in 2023 alone, the total number of AI-related regulations grew by 56.3%.[7]

Cultural acceptance

The biggest problem right now is that neither healthcare professionals nor patients fully understands how AI works and what it can and cannot do. This leads to unrealistic expectations, limited use and mistrust of the technology. In 2023, 52% of Americans expressed nervousness toward AI products and felt more concerned than excited, up roughly 13% from 2022.[7] Educating healthcare professionals and patients on AI can help reduce nervousness and increase acceptance and buy-in.

Change management and reassigning work

AI will make healthcare processes more efficient, making effective change management and reassigning staff based on their new availability more important. Employees can be retasked to focus on higher-value responsibilities, such as patient interactions, quality improvement initiatives and care coordination. Change management involves transparent communication with staff, comprehensive training programs and continuous support to ensure a smooth transition.

Overcoming resistance

"Healthcare systems are not questioning whether they will implement significant AI initiatives," says Will Conaway, Vice President Consulting and Provider Leader at NTT DATA. "It's a matter of when they will do so. Many healthcare providers, life sciences companies and technology vendors have already adopted AI with positive results. However, the shortage of experienced specialists has slowed progress in the provider sector. Additionally, past experiences with large technology initiatives — often characterized by delays, budget overruns and unmet expectations — have made many institutions hesitant to embrace new solutions. Those healthcare systems that delay the implementation of AI will likely fall behind their competitors, resulting in substantial financial losses."

As with anything new and unknown, there has been resistance to AI adoption within healthcare from both the professional and patient perspectives. Among employees, 52% welcome AI, while 22% think their organizations will implement AI in a trustworthy and responsible way. [8] For healthcare organizations to get buy-in from their employees and patients, they need to close this trust gap.

The black-box theory describes how AI works, especially the functions based on complex algorithms like deep learning. It also states how humans can neither easily understand nor interpret these processes. The systems involve numerous layers and parameters that make it hard to trace how data becomes decisions and responses. This tends to undermine trust and accountability. Stakeholders may be

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hesitant to rely on AI if they cannot comprehend or verify its decisions. "External a posteriori explanation may be necessary if the model has already been trained or offered only as a black-box system after the fact."[9]

Healthcare will deal with many black-box items. It will involve generalizing and breaking down things beyond any similarities to more interpretable conceptualizations. Everything needs to be analyzed so users can understand if the models are simple, complex or have built-in physiological knowledge that can be communicated in a way all stakeholders will understand.

Tools (such as Explainable AI) can increase users' understanding of AI by showing the reasoning behind decisions and outputs. That information helps the user grasp the model's logic, fostering more trust and acceptance. Implementing human-in-the-loop (HITL) systems is another way to overcome AI resistance.

Combining the advantages of AI with human intuition typically decreases the stress that may come with handing over complete control to machines.

This approach places humans at important stages of the AI workflow. It allows them to inspect, revise and, if needed, override AI-generated results. Combining the advantages of AI with human intuition typically decreases the stress that may come with handing over complete control to machines. When humans maintain accountability for the final say, it may help them overcome their fear of AI. On the other hand, the change in task implementation may lead to more resistance if employees don't understand how AI functions and what impacts the technology will have on their day-to-day operations.

Another key factor in establishing trust in AI is identifying bias mitigation techniques. AI bias can result in unfair outcomes like discrimination in hiring, financing and legal decisions. Before feeding data into the system, it should be cleaned to ensure that it represents the intended population. Additionally, during model training, organizations can use fairness constraints that penalize the model for making biased predictions. By implementing these techniques, organizations may create AI systems that can earn the confidence and trust of healthcare professionals and patients.

AI maturation journey

With healthcare leaders trying to stay ahead of the competition by using AI, there is a critical conversation that needs to take place. Due to the lack of readiness and reluctance to define a maturation roadmap, AI investments have failed to deliver value as quickly as hoped. Organizations generally realize less than one-third of the returns they expect on their AI investments. In healthcare, successful large digital transformation efforts happen only about 30% of the time.[10] To ensure healthcare companies maximize their AI investments going forward, they should have in place a maturation journey that includes strategic planning, governance, pilot projects and the infrastructure to scale.

Strategic planning is the foundational step in the journey. It sets the stage for the next three phases. In this step, organizations define clear objectives, assess their current capabilities and align their AI initiatives with their overall business goals. The business also identifies high-impact areas, secures leadership and stakeholder buy-in, and works to allocate resources properly. A key part of gaining buy-in is making sure that everyone is fully AI-aware and has access to the necessary training.

Governance follows. Establish a fortified framework that can manage AI deployment and ensure compliance with regulatory standards. Additionally, governance focuses on safeguarding data privacy and fostering ethical AI practices. For AI to work well, the data must be cleaned, reviewed and maybe reviewed again to avoid any biases that could undermine the entire investment.

Next, healthcare companies must invest time in pilot projects. Evaluating the AI application in a controlled environment helps validate the assumptions and outputs. Being able to refine AI outputs before a broader rollout is a critical step. It's easy for organizations to rush through this step, but they shouldn't.

Finally, expand successful pilot projects across the organization, integrating AI solutions into everyday operations. "This is a critical step for short-term and long-term success," says John Frownfelter, MD, FACP, Director for Data Driven Health at NTT DATA. "In fact, each organization will have to make a choice of whether they are going to develop these capabilities themselves or 'stay in the boat' and follow the path that their core vendors provide for them. The organization that owns generative AI as an asset will have the ability to move faster and adapt in this rapidly evolving field. When AI agents become allies, and tedious tasks are automated, it allows clinicians to focus on what matters most. Then we will truly see the beginning of healthcare transformation."

This maturation journey is critical to a successful AI investment. However, organizations should not forget to monitor performance continuously while making ongoing improvements.

Strategic planning

Set high-level strategic objectives and align the organization's budget and goals

Governance

Establish governance frameworks, implement risk management protocols, ensure data readiness and assess the technology landscape

Pilot projects

Identify and prioritize use cases for pilot projects before developing prototypes to test feasibility and show value

Scale

Develop infrastructure and pipelines to manage growth and prepare the organization for new role types and process changes

Use cases

This paper discusses a multitude of use cases that highlight several key areas where the healthcare industry can deploy AI. NTT DATA develops new use cases daily. Here's a more detailed look at one of our recent implementations:

A Fortune 10 pharmaceuticals distributor asked NTT DATA to review its approach to data integration. The client was overloaded with datasets from its hundreds of suppliers and pharmacy partners. It spent hundreds of thousands of person-hours each year mapping source datasets from its partners into its own target datasets. On average, it took six months for a team of four to five people to map a sole source to a target. The client needed a solution for quickly and accurately mapping these datasets to maximize business value.

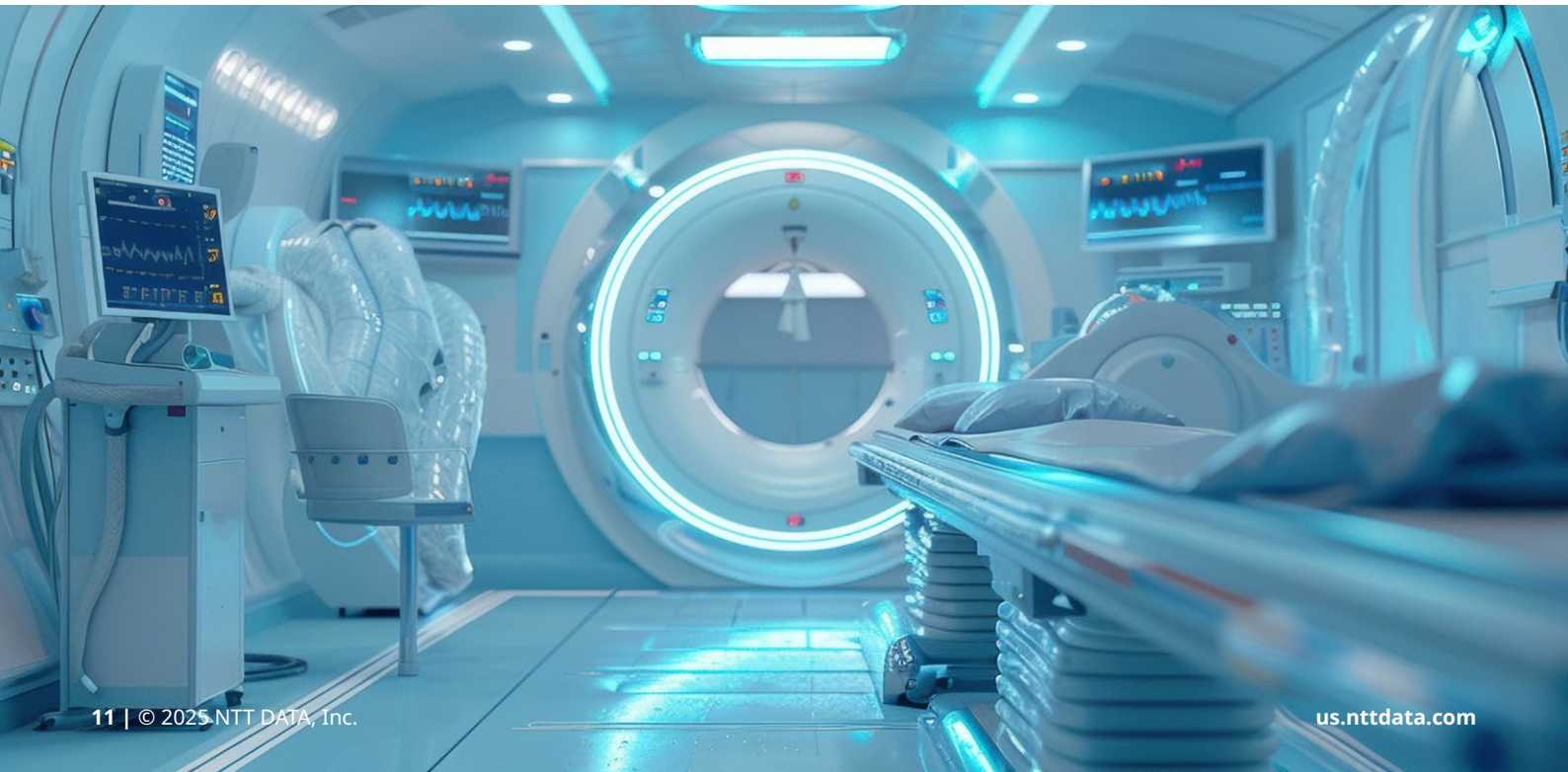
NTT DATA took an innovative approach to this distributor's challenge, implementing GenAI to replace a manually intensive process with more efficient data integration. Our solution layered two different methods that together enabled the client to rapidly map source data files to target data files with a 60–70% rate of accuracy. It also reduced mapping times from six months to three minutes for a single source of data. Automation and accuracy in the mapping process greatly reduced the need for manual intervention, leading to labor cost savings.

How AI success in other industries can help healthcare

The manufacturing industry has seen an increase in the use of AI for predictive maintenance. Algorithms analyze data from sensors on machinery, allowing companies to predict potential breakdowns before they occur. The healthcare industry can do the same. Hospitals can stay ahead by replacing their machines and surgical robots before they experience failure.

Fraud has always been a serious problem within the world of finance. However, AI-based fraud detection systems can be and have been used to enhance the security of customer transactions. These systems identify unusual deviations from traditional transaction patterns and flag them for review. Healthcare can use the same tool to save costs and improve both compliance and patient trust.

In the automotive industry, GenAI is improving how customers choose and buy a car. It uses customer data to create personalized marketing content. GenAI sales assistants handle inquiries and organize scheduling so sales teams can focus on customer engagement. Healthcare can use GenAI in similar ways. Providers can use customer data to better understand health conditions, identify suitable prescriptions and handle administrative tasks. All of which allows healthcare practitioners to provide a better overall customer experience.



The time is now

The landscape of healthcare is rapidly evolving, and the integration of AI is no longer a distant possibility but a present-day reality. Healthcare practitioners have an unprecedented opportunity to harness AI to improve patient care, streamline operations and fast-track innovation. AI analyzes vast amounts of data with unparalleled speed and accuracy. This can lead to earlier diagnoses, more personalized treatment plans and better patient outcomes. Organizations gain efficiency while also easing the administrative burden on healthcare professionals. This frees them to focus more on patient interaction and care delivery.

Now is the opportune time to adopt AI in healthcare. The global healthcare landscape, strained by challenges such as aging populations and rising costs, stands to benefit immensely from AI-driven solutions. The technology has matured significantly, with more robust and reliable AI models available than ever before. Ongoing developments in AI ethics and regulatory frameworks will help ensure that organizations use AI applications responsibly and in a patient-centric manner.

With AI, healthcare practitioners can improve the quality and efficiency of care. It also positions healthcare organizations at the forefront of a transformative wave that will define the industry's future.

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List of abbreviations

Abbreviation	Meaning
AI	artificial intelligence
ML	machine learning
NLP	natural language processing
CAGR	compound annual growth rate
RPA	robotic process automation
GenAI	generative artificial intelligence
HITL	human in the loop

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