Enabling AI in healthcare: Cloud, collaboration, and continuous improvement

xtelligent HEALTHCARE MEDIA

Introduction

In just a few short years, artificial intelligence (AI) has moved off the wish list and onto the to-do list for healthcare organizations.

Since 2016, AI has dramatically accelerated into the clinical space thanks to breakthroughs in processing power and data storage capabilities, as well as a growing interest in leveraging digital data to support more cost-efficient, high-quality patient care. In a 2018 landmark report, the Office of the National Coordinator (ONC) and government advisory group JASON said that artificial intelligence is a game changer for healthcare.

Unlike previous periods of hype and excitement, the healthcare industry is now primed and ready to embrace machine learning to overcome lingering frustrations with legacy processes and enable a new era of value-based care, the report explained. Hospitals, health systems, and physician groups are in widespread agreement that AI and machine learning are ready for use in clinical and administrative environments.

In a survey conducted by Xtelligent Healthcare Media on behalf of Amazon Web Services, 94% of healthcare organizations stated AI can already support the industry's existing business needs, including reducing unnecessary spending, improving quality, and creating better patient experiences.

The survey of more than 175 healthcare executives found that most organizations are expecting AI to reach peak maturity within the next five years, particularly in the realms of clinical decision support, security and intrusion detection, population health management, and EHR optimization.

"The healthcare industry has definitely turned a corner when it comes to the adoption of AI and machine learning," observed Ujjwal Ratan, Principal AI/Machine Learning Solutions Architect, Healthcare & Life Sciences at AWS.

"More organizations are being exposed to a higher level of technical innovation, and they are very interested in learning to apply those tools to their clinical and financial challenges. It will be particularly important for organizations to take a close look at their infrastructure and data assets to ensure they are creating a strong foundation for AI in the near future."

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Healthcare organizations are supportive of the idea that using cloud-based strategies to underpin flexible, future-proof approaches to AI innovation has the highest likelihood of producing success across the care continuum.

As organizations start to wade deeper into machine learning, they are actively looking for the technology partners, collaborators, and data science experts to extract as much value as possible from their existing data sets.

How are healthcare providers approaching AI and machine learning in this challenging environment, and what strategies are they deploying to meet the ultimate goal of becoming an AI-driven organization?

Addressing the challenges of artificial intelligence in healthcare

Interest and confidence in AI may be high, but many organizations are facing hurdles turning ideas into actions. Only 30% of survey respondents are currently using AI tools within their organizations, and many admitted feeling at risk of falling behind their competitors as adoption accelerates.

The majority of participants believe it should take no longer than five years for an organization of their size and scope to mature into an AI-driven enterprise.

But when asked how long it will take their specific organization to reach maturity, estimates dragged out into the five- to ten-year time-frame. More than 20% of respondents think it will take at least a decade to infuse artificial intelligence into routine operations at their places of employment. Participants feel hampered by a number of familiar challenges, including financial restrictions (63%), a lack of available IT talent (56%), and insufficient access to the data they need for training models and validating results (49%).

“One of the major issues across the industry is the availability of data,” agreed Ratan. “There are regulatory concerns; there are data quality concerns. There are business concerns — some entities view their data as a proprietary business asset and are not willing to share freely.”

“There is an urgent need to deploy strategies that can overcome these issues while maintaining the highest levels of privacy and security. Once organizations make their data more available, they will be able to achieve their goals.”

Most of the industry’s objectives are centered on generating measurable improvements in clinical and administrative areas by addressing known pain points in care delivery. Of the 30% of organizations that are currently using AI, more than 40 percent have implemented clinical decision support tools and 32% have applied AI to clinical documentation improvement.

Imaging analytics is another popular area of focus, with 36% of organizations using machine learning to better understand the data produced during imaging studies.

Providers currently without AI tools are planning to target similar areas for the future, and would also like to bring machine learning into their population health management (70%), fraud detection (65%), and infrastructure optimization (60%) processes.

The keys to success with artificial intelligence

Whether they are currently undertaking a machine learning project, organizations are very clear on what should constitute success for an AI initiative.

Eighty percent of organizations believe a financial return on investment is an important criterion for gauging the impact of an AI initiative, while a similar number need to see measurable clinical improvements or better performance on quality measures to consider a project successful.

Participants also cited increased patient satisfaction (69%), increased end-user satisfaction (63%), and the ability to reallocate resources due to greater efficiencies (55%) as important metrics.

In order to achieve these goals, organizations are increasingly turning to cloud-based solutions, the survey found. Eighty-four percent of healthcare organizations agree that cloud computing is a key component of making data available to the right individuals at the right time without compromising on cost, security, or flexibility.

"Cloud is the optimal tool for democratizing data access and creating an environment in which AI can thrive," asserted Ratan. "Cloud technology is designed to enable seamless access to authorized individuals when and where they need it. It's also very agile, so that companies can experiment with AI and start building models without the typical costs and time investments of using an on premise solution."

"If your goals are to achieve ROI quickly and bring actionable improvements into your care settings, which most participants identified as top priorities, you should be exploring how cloud can get you there," he said.

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Embracing cloud computing as the enabler of collaboration

Respondents strongly believe that the cloud offers the scalability and reliability to support artificial intelligence projects as well as the tools to help integrate multiple data sources to train machine learning models.

"The ability to synthesize data sets from different settings or partner organizations is fundamental to creating models that are accurate and comprehensive," Ratan explained. "We see the most promise for artificial intelligence when organizations collaborate with one another to share data appropriately."

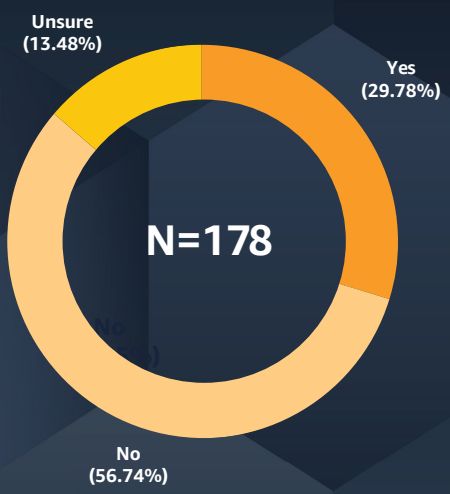
"That could mean a partnership between an EHR vendor and a genomics company, or a payer and a provider," he continued. "Any way that you can start to generate a horizontal record of an individual is a positive step because that allows you to correlate actions to clinical outcomes. AI is most successful when it has that longitudinal data to work on."

Ratan acknowledged that privacy and security concerns often play a role in skepticism around cloud computing, especially when moving data across disparate systems. And the survey confirmed that discomfort with cloud security is still a worry for healthcare providers.

Of the 16% of respondents who do not believe cloud is suitable for AI development, 80% cited security as a moderate or significant reason why the cloud gives them pause.

"Everything we do at AWS begins with the discussion of how to keep a customer's data safe and secure, and we have incredible resources devoted to security—much more than most healthcare organizations could provide by themselves," stated Ratan. "We have the most cloud-based certifications for compliance and security of any cloud provider among our competitors, which makes us a very reliable choice."

Are you currently using artificial intelligence in your organization?



"When it comes to AI and the sheer volume of data involved, it absolutely must be secure, whether it's deidentified or not. There are no exceptions. We understand very clearly that if we want to work in this space, we have to keep security top of mind no matter what."

Organizations that do embrace the cloud are getting more than secure storage for their efforts. By partnering with AWS, providers are receiving access to numerous tools and products that can cut down on the need to invest in in-house talent or purchase expensive services from third parties.

"It is important to experiment with different ideas—that's why we consider ourselves a platform that you can hop onto, start building immediately, try things out, and fail fast if you need to," Ratan said. "If it turns out you are not on the right track, you can easily move in a different direction."

"The fact that AWS doesn't lock customers into a long-term contract or require them to make a huge upfront payment really gives people the confidence to experiment. This is especially true since customers have access to a fully functional stack of tools they can work with immediately, even if they are one of the 56% of organizations that said they do not have a full data science staff."

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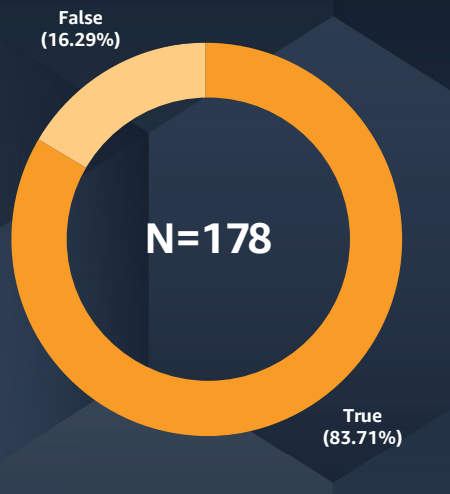
Cloud computing is a key component of artificial intelligence and machine learning.



Investing in continuous improvement to create an AI-driven ecosystem

Cloud computing and AI are optimally suited for one another due to the uniquely challenging nature of developing and nurturing machine learning algorithms. Cloud computing removes access to cutting-edge equipment as a barrier to entry in analytics among many others.

"AI projects work differently than legacy analytics initiatives," Ratan explained.

"In a traditional environment, you define the requirements, hire a few developers to build to the specifications, then test and deploy. After that, the project is basically over. The only thing left is ongoing maintenance."

"AI and machine learning are different. It's an ongoing investment that needs to be continually refined and trained. There is no model that will answer all your future questions and meet all your future needs. Research evolves; technology evolves. The beauty of AI is that it can evolve, too."

Organizations may have to reassess their development processing in order to meet the new requirements of the AI environment. Beginning that journey with the right infrastructure and data management strategy is vital for organizations that are aiming to develop a data-driven culture.

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"I would encourage organizations to treat artificial intelligence as an investment in continuous improvement rather than a cost center," Ratan advised. "Executives should certainly set benchmarks and milestones for AI initiatives, but there really is no such thing as an end-date."

"It's important to have markers for what constitutes return on investment, as the participants in the survey already understand. But becoming an AI-driven organization is more of a cultural philosophy than something with a beginning or an end, and that requires a different outlook on the roadmap."

Choosing technology and analytics partners that share the organization's vision for long-term success with artificial intelligence is a critical first step toward developing a sustainable, data-first approach to care delivery.

The majority of survey participants stated that cloud providers make excellent partners for ongoing AI initiatives because of the cloud's ease of use (53%), ready-to-use features (50%), short implementation time (58%), and low customer maintenance needs (56%).

Less than 10% of participants said that these factors were not important when considering cloud computing providers as partners for their AI projects.

Organizations that are new to artificial intelligence and those that are seeking to expand into additional areas of innovation will need to carefully assess their infrastructure options and work collaboratively on data management strategies that can produce measurable results in a rapidly changing healthcare environment.

As AI matures further in the healthcare industry, organizations that hope to meet their clinical and financial goals are likely to find that cloud-based tools offer the right blend of security, reliability, flexibility, and support that will enable providers to extract actionable insights from their valuable data assets.

Methodology

This survey of 178 healthcare executives was conducted via email using an online survey tool between December 2018 and January 2019. The 20-question poll was fielded to C-suite executives, senior IT executives, IT consultants, and IT managers for hospitals and physician groups.

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