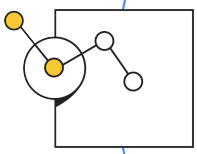
Google Cloud

Using AI/ML to help healthcare scale

The COVID-19 pandemic has driven home that augmenting human expertise and action with AI/ML is a **reliable way healthcare can scale** to meet the growing demand of communities everywhere.



MAYO CLINIC

About Mayo Clinic:

Mayo Clinic is a nonprofit organization committed to innovation in clinical practice, education and research, and providing compassion, expertise and answers to everyone who needs healing. Every year, more than a million people come to Mayo Clinic for care, whose highly specialized experts are deeply experienced in treating rare and complex conditions.

> All of this starts with keeping people healthy."

Christopher Ross
CIO of Mayo Clinic

Although the COVID-19 pandemic laid bare many clinical, administrative, and logistical gaps that the industry scrambled to address, the most acute was the difficulty in scaling the medical response with the speed, accuracy, and magnitude required to stem the initial onslaught.

No quick insights were available to predict the trajectory of this new disease, explain how it worked, or identify which treatments would be effective.

Meanwhile, data sets that could potentially provide answers were either locked behind regulatory controls, or they were too huge, complex, and dissimilar in ontology to be easily combined. Systems that could transform data into actionable insights were still in the planning stages.

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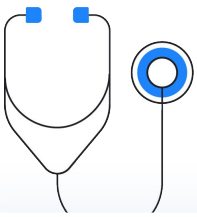
Leading healthcare organizations such as Mayo Clinic were already working with Google Cloud and other technology partners to build the infrastructure necessary to use data in more broad and meaningful ways."COVID-19 created a new set of urgencies," says Aashima Gupta, Director of Healthcare Solutions at Google Cloud. As the pandemic worsened, partnerships had to accelerate their efforts and prioritize based on health need.

"Mayo, Google, and many companies have worked together on the many threads of COVID, each requiring different levels of data and analytics," says Dr. John Halamka, president of Mayo Clinic Platforms. The more than 1,000 companies around the globe joining forces to reduce the suffering caused by the pandemic, Dr. Halamka says, are now "figuring out how to govern data acquisition, how to acquire and curate data, and then how to deliver visualizations of that data."



Such efforts to modernize technology infrastructure, aggregate data, and build tools that facilitate collective action are necessary groundwork for helping professionals in healthcare do what they cannot do alone: deliver improved care to more people earlier, faster, and more affordably. As the pandemic demonstrated, the efficient way for the healthcare industry to scale to meet the enormous demands of the populations it serves is by augmenting human expertise and action with artificial intelligence and machine learning (AI/ML).

> With help from AI/ML, clinicians and researchers can develop **better risk models**, as well as **better screening and prevention strategies.**"

Dr. Tufia Haddad
Breast Cancer Medical Oncologist, who also serves as Chair of Information Technology for the Department of Oncology at Mayo Clinic

Pushing medicine from disease intervention to wellness preservation

"All of this starts with keeping people healthy," says Christopher Ross, CIO of Mayo Clinic. By detecting illness early, accelerating access to care, and tailoring treatment plans for individuals with scientific, data-driven precision, AI/ML can transform the patient journey from a sequence of intermittent interventions to a continuous, lifelong engagement that preserves and enhances wellness.

"With help from AI/ML, clinicians and researchers can develop better risk models, as well as better screening and prevention strategies," explains Dr. Tufia Haddad, a breast cancer medical oncologist who also serves as Chair of Information Technology for the Department of Oncology at Mayo Clinic. "The ultimate cure for cancer is to prevent it," she says. "If we collect the tube of blood and look at the patient's genome, are there signals within there that can help us to understand their cancer risk in the future?"

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The earlier doctors can detect a disease or illness like cancer, the earlier treatment can start. But labor intensive treatment protocols that require hours of highly detailed manual work, such as mapping tumors before radiation, create delays that only cascade as more patients enter the treatment queue, according to Dr. Nadia Laack, a radiation oncologist at Mayo Clinic. "There's not enough of us, or enough time, to do that work at scale without the assistance of AI," she says. Applying AI/ML to simplify and automate clinical processes will free clinicians so they can spend less time in front of computers and more time with patients.

Moreover, with AI/ML assistance, doctors will be able to more readily provide personalized treatment and precision solutions for individual patients. "The development of advanced clinical decision support systems can synthesize patient data with evidence-based best practice and guidelines to provide the best care recommendations possible for each individual patient," Haddad explains.

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>
> **Dr. Nadia Laack**
> Radiation Oncologist at Mayo Clinic

Priming healthcare organizations for AI/ML

Incorporating AI/ML requires IT departments to take a few technical and organizational steps. First, they must build the infrastructure necessary to quality-check, integrate, harmonize, and store vast amounts of complex data types, including visual structured data such as radiographs and unstructured documents such as physicians' notes. Then they must work with care teams and administrators to integrate AI/ML into existing workflows at the right junctures. Finally, they must design clear protocols for change management to facilitate not only continuous system improvements, but also fast responses to catastrophic events like natural disasters or pandemics.

But even with all technical elements and workflows in place, AI/ML can only be effective if clinicians understand the strengths and weaknesses of the specific algorithms designed to help them make decisions about patient care.

The quality of such algorithms heavily depends on the accuracy and completeness of the data that trains them, which is why algorithms cannot replace human experience, intuition, or compassion. "We're not going to be checking our brains at the door and having something else think for us," says Laack.

The more inclusive the data used to train algorithms, the more useful AI/ML will be to clinicians for diagnosing and treating their patients—whoever they are, wherever they live, and whenever they need help. "We have the opportunity to ensure that every patient and every clinician around the globe has access to the very best care possible in terms of knowing what screening prevention, what diagnostics, what treatment options are available," says Haddad. "We're impatient with the advances, because we see the potential there and evolving, and we simply can't move fast enough."

Learn more on Healthcare AI