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Interview series

Using machine learning to transform real-time data into life-saving predictions

KPMG LLP is a professional-services firm that continuously strives to keep abreast of industry trends, drivers, and issues through knowledge-sharing and industry-insights programs. The firm harnesses innovative technology to help clients overcome their biggest challenges.

The Google Cloud Healthcare and Life Sciences team spoke with Bharat Rao, a KPMG partner and national leader for healthcare and life sciences analytics in the firm's advisory practice, about the potential for machine learning to derive life-saving, predictive insights from healthcare data in real-time.

You've collaborated with Google Cloud to deploy machine learning in healthcare. How can machine learning help?

Bharat Rao: Because of rapidly advancing technology in healthcare today, there's an enormous amount of electronic data available. Whether it's claims, physician notes, genetic sequences, clinical trials, or recent efforts to find a vaccine for COVID-19, the amount of available data is amazing. But, in some sense, there's almost too much of it. If you went to a provider and said, "Hey, I can give you real-time feeds for the blood-sugar levels of a thousand diabetics, five times a day, every day," they would be overwhelmed. With Google Cloud's enormous capabilities in scaled data processing, however, you can securely collect the data, store it, and extract insights and highly accurate predictions, which can then be fed back to the doctor treating the patient. The data can also help providers figure out how to improve their financial return or determine which mergers will be most beneficial. There are many ways to put all this data to use.

Let's get solving.

KPMG, Google Cloud, and our clients are...

"...solving clinical, business, and operational problems that promise to transform the delivery of care."

Bharat Rao,
Partner and national leader for healthcare and life sciences analytics, KPMG

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How does KPMG work with Google Cloud to process healthcare data at this level?

Bharat Rao: By plugging their systems into Google Cloud, small healthcare groups and start-ups can get access to the same amount of computing power that larger groups access. We collaborate with Google Cloud Platform (GCP) to leverage its abilities to crunch data at scale and to use machine learning and AI to do the compression and transformation that's required. This is healthcare, unique not only in its complexity, but also in its need to be treated with privacy and care, accounting for HIPAA, the upcoming CCPA, and each client's unique security needs. We bring our domain knowledge of compliance, security, and privacy in healthcare and merge it with the great technical know-how and capabilities of Google Cloud to help solve amazing problems for our clients.

We love hearing about amazing solutions. Can you share an example?

Bharat Rao: Definitely. A large academic medical center—in fact, a large consortium of academic medical centers—had this wonderful idea: What if we streamed real-time data from the intensive care unit and built a machine-learning algorithm that could essentially predict sepsis with high reliability, up to seven to eight hours before clinical symptoms appear? Sepsis is a potentially deadly infection, and early treatment is key. If a doctor is alerted before symptoms appear, she can start treatment sooner, or at least monitor the patient aggressively well before they start exhibiting the signs of sepsis. We worked with Google Cloud to develop this idea and make it real.

Bharat Rao, partner and national leader for healthcare and life sciences analytics, KPMG

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What were some of the challenges you encountered while implementing this solution?

Bharat Rao: How do we get the data to the cloud in GCP? How do we put it into the right format? How do we make sure we are only transforming the data format, and not changing any values? This is where KPMG came in. We brought our expertise, not only in GCP, but also in privacy and security, and built something we call the Data Transformation and Migration Hub, which essentially takes real-time feeds of HL7 data from anywhere in the hospital and transmits them to Google Cloud. We also perform obfuscation to protect patient identity. Once the data is stored in GCP, we then use the Cloud Healthcare API to transform the data into the right format for the AI model. With this hub, we've helped enable this amazing, potentially lifesaving research that Google Cloud and this client are doing together.

This was clearly a very customized solution. Will it be useful for other healthcare providers?

Bharat Rao: The issue of securely transferring data to the cloud will come up again and again, and now we have a model and a tool for addressing it, not only with HL7 data, but also with notes, PDF documents, images, and genomics. We can extend the hub to cover all those, obfuscate them, encrypt them, and transport them securely in near real time to the cloud so algorithms can make predictions for the patient while they're in the patient bed. So, the hub is not a one-off, related to just sepsis or AI algorithms. It's a tool that can extend to any client who has issues with securing data and moving it to the cloud.

Bharat Rao, partner and national leader for healthcare and life sciences analytics, KPMG

"A new solution like this yields a tool that can extend to every client. The issue of securely transferring data to the cloud will come up again and again, and now we have a model and a tool for addressing it."

To learn more about Google Cloud Healthcare and Life Sciences visit:
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