Transcript:

Debo Dutta: If you look at what's happening today, it's not just because of AI, but in general because of high throughput data that can be generated out of a biological system. And the amount of data that you can generate was unimaginable even a few years ago.

Jason Lopez: In our series on MedPerf we wanted to introduce you to a computer scientist at the forefront of AI and machine learning development. Debojyoti Dutta, who goes by the nickname Debo. His work is bringing AI to IT leaders across many industries, including healthcare. This is the Tech Barometer podcast, I'm Jason Lopez.

[Related: Exploring Uses for AI in Healthcare]

Jason Lopez: When you hear about AI and how great it will be for healthcare, you might wonder, well who are the people making it happen? Debo is one of those technologists who's working to connect the dots of computer science and medicine.

Debo Dutta: When coupled with AI, it's going to completely change the way we design drugs, how we design antibodies, new therapeutics, I can't even imagine all the things that we will be able to do using this iteration of AI coupled with the amount of data that we can generate out of living beings.

Jason Lopez: One area Debo thinks AI will have a profound effect is in examining medical images. For example, people with diabetes are at risk for loss of eyesight. With AI assistance, images of the inside of the eye could give doctors far earlier detection of diabetic retinopathy. Other imaging examples include detection of tumors and cancers. But another area where AI could bring a transformation…immunotherapy.

Debo Dutta: Immunotherapy in a nutshell is to program your immune system to fight bad actors in your body. The bad actors could be viruses, it could be cancer cells.

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Jason Lopez: Our immune system can detect viruses, but sometimes cancer cells are invisible. Cancer cells can appear normal and the immune system allows them to go about wreaking havoc. In immunotherapy, the DNA of the immune system's T-cells are changed to recognize the genetic strands of the tumor cell and destroy them.

Debo Dutta: Let's see how AI gets into this space. So the programming, the existing T-cell can be done with gene therapy, but how do you know what to program? That's where AI comes in. Using AI, you can rapidly design sequences. People are today looking at a lot of sequence data as well as literature, feeding them into large language models. And they are actually trying to generate candidate sequences for lab experiments.

Jason Lopez: Advances in large language models as well as computer infrastructure are cutting development times dramatically. Debo says what would have taken years might take a 10th or even a hundredth of the time.

Debo Dutta: I'm not an oncologist. I'm not a gene therapy researcher or an immunotherapy researcher, but I do believe that as a systems person, if I can help the lifecycle of the machine

learning go faster, I can help them to make immunotherapy get better and better. We can cure more types of cancers and more diseases.

Jason Lopez: Debo was born in India. His mother is a retired doctor and his father a retired engineer. Those two professions are some of the most sought-after in the country and getting into a good university to pursue those professions is very competitive, and he was able to enroll in one of the top colleges in engineering where he opted to study computer science.

Debo Dutta: But I kept thinking about biology, but I didn't do much about it.

Jason Lopez: After graduating, he came to the US to study for a PhD at the University of Southern California, and that's when he saw another dimension to computer science.

Debo Dutta: It looks like pure science in many ways because it's a lot of math, applied math and discrete math, and a lot of engineering too. But it can be applied to biology.

Jason Lopez: At USC he encountered a large team doing computational biology. And after his PhD, he had this thought:

Debo Dutta: No matter what I do in life, I need to spend some time in computational biology at USC before I actually get into my career and just be a researcher and learn how computer science can be applied. And that's when I first picked up what is now known as machine learning.

Jason Lopez: What do you think about the AI boom?

Debo Dutta: Yeah, that's a very interesting and loaded question. I could spend the entire session just talking about that.

Jason Lopez: Models are at the heart of machine learning. Data is used to train models. Which are deployed to infer from new data. And in the ChatGPT and the generative AI space, models are getting bigger.

Debo Dutta: These models can be as large as 1 trillion parameters. And typically when you see new data, you have to run this data through the model. Big models take longer time, more compute resources. And so measuring the performance will lead to more innovations in the infrastructure space.

Jason Lopez: That will make models cheaper to develop and cheaper to deploy. But, Debo points out the quality of the model still matters.

Debo Dutta: When you're generating text, how good is the text? Is it hallucinating? Is this text believable? How was this model developed? Was it developed on open data? Was it developed on somebody's private data? And if that is the case, what's the liability of the model if I use that model?

Jason Lopez: When Debo did his postdoc in computational biology at USC, it was called statistical algorithms. He says he was on the right track as he explored signals in biological experiments, especially proteomics: the study of proteins.

Debo Dutta: I got to learn about machine learning as a part of understanding how the human body works.

Jason Lopez: Statistical algorithms were one of his tools at his job, later, at Cisco. He did cloud computing for a while. But then decided to investigate a new area.

Debo Dutta: And what struck me is cancer therapeutics in the US was still not advanced enough by a computer scientist standards.

Jason Lopez: One day, he found himself at a meeting at Stanford with some leading machine learning experts. That group became ML Commons. Subsequently, they began discussing what ML Commons ought to do. It wasn't long before a medical-focused working group was formed.

Debo Dutta: And that's when the idea of this med perf paper was born.

[Related: Alex Karargyris's Path to Becoming a Pioneer of Medical AI]

Jason Lopez: The MedPerf paper, entitled Federated Benchmarking of Medical Artificial Intelligence with MedPerf, established the vision for the organization.

Debo Dutta: MedPerf was not even a thing. I mean, we just started Med Perf. We got together a bunch of experts from different walks of life, because problems in medicine are hard. They need expertise from all corners. So we consulted with oncologists, computer scientists, data folks, and a lot of people who knew the ins and outs of the pharmaceutical industry.

Jason Lopez: In our conversation with Debo, we did ask him specifically about Chat GPT. And he relayed what Nutanix customers are saying.

Debo Dutta: I love Chat GPT, it can do amazing things and maybe transform my business, but I have to give away my data to Chat GPT.

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Jason Lopez: What they want is a Chat GPT equivalent – kind of a GPT-in-a-box running on their own private infrastructure.

Debo Dutta: Nutanix is very customer-focused. So our reaction to our customer's request is a turnkey solution, which will help our customers run generative AI models, including large language models that fuel applications like Chat GPT, on their private infrastructure.

I joined Nutanix in 2020 during the pandemic. And when I joined Nutanix, I realized that Nutanix had this amazing platform, which could host a lot of these amazing next-gen AI workloads that would change the world in ways that we don't even know about. For example, new drugs, new antibodies. So I'm really excited by medicine and AI and infrastructure and what it could do to humankind.

Jason Lopez: Debo Dutta is vice president of engineering at Nutanix and a founding member of ML Commons. This is the Tech Barometer podcast, I'm Jason Lopez. If you like this report and

want to know more about MedPerf, we've got a couple of other stories on the group, one focusing on the paper and another on MedPerf co-founder and the paper's author, Alex Karargyris. You can find more at the Forecast, which produces this podcast. It's at www.theforecastbynutanix.com.