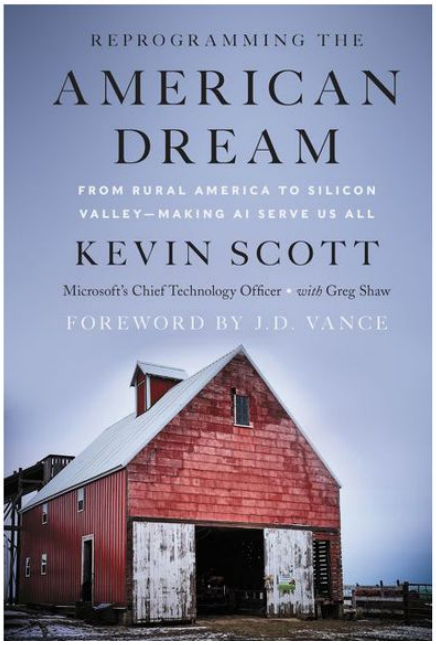
Microsoft’s CTO explains how AI can help health care in the US right now



This week for our *Vergecast* interview series, *Verge* editor-in-chief Nilay Patel chats with Microsoft chief technology officer Kevin Scott about his new book *Reprogramming the American Dream: From Rural America to Silicon Valley—Making AI Serve Us All*.

Scott’s book tackles how artificial intelligence and machine learning can help rural America in a more grounding way, from employment to education to public health. In one chapter of his book, Scott focuses on how AI can assist with health care and diagnostic issues — a prominent concern in the US today, especially during the COVID-19 pandemic.

In the interview, Scott refocuses the solutions he describes in the book around the current crisis, specifically supercomputers Microsoft has been using to train natural language processing now being used to search for vaccine targets and therapies for the novel coronavirus.

Below is a lightly edited excerpt of the conversation.

So let's talk about health care because it's something you do focus on in the book. It's a particularly poignant time to talk about health care. How do you see AI helping broadly with health care and then more specifically with the current crisis?

I think there are a couple of things going on.

One I think is a trend that I wrote about in the book and that is just getting more obvious every day is that we need to do more. So that particular thing is that if our objective as a society is to get higher-quality, lower-cost health care to every human being who needs it, I think the only way that you can accomplish all three of those goals simultaneously is if you use some form of technological disruption.

And I think AI can be exactly that thing. And you're already seeing an enormous amount of progress on the AI-powered diagnostics front. And just going into the crisis that we're in right now, one of the interesting things that a bunch of folks are doing — including, I think I read a story about the Chan Zuckerberg Initiative is doing this — is the idea is that if you have ubiquitous biometric sensing, like you've got a smartwatch or a fitness band or maybe something even more complicated that can sort of read off your heart-tick data, that can look at your body temperature, that can measure the oxygen saturation in your blood, that can basically get a biometric readout of how your body's performing. And it's sort of capturing that information over time. We can build diagnostic models that can look at those data and determine whether or not you're about to get sick and sort of predict with reasonable accuracy what's going on and what you should do about it.

Like you can't have a cardiologist following you around all day long. There aren't enough cardiologists in the world even

to give you a good cardiological exam at your annual checkup.

I think this isn't a far-fetched thing. There is a path forward here for deploying this stuff on a broader scale. And it will absolutely lower the cost of health care and help make it more widely available. So that's one bucket of things. The other bucket of things is like just some mind-blowing science that gets enabled when you intersect AI with the leading-edge stuff that people are doing in the biosciences.

Give me an example.

So, two things that we have done relatively recently at Microsoft.

One is one of the big problems in biology that we've had that that immunologists have been studying for years and years and years, is whether or not you could take a readout of your immune system by looking at the distribution of the types of T-cells that are active in your body. And from that profile, determine what illnesses that your body may be actively dealing with. What is it prepared to deal with? Like what might you have recently had?

And that has been a hard problem to figure out because, basically, you're trying to build something called a T-cell receptor antigen map. And now, with our sequencing technology, we have the ability to get the profile so you can sort of see what your immune system is doing. But we have not yet figured out how to build that mapping of the immune system profile to diseases.

Except we're partnering with this company called Adaptive that is doing really great work with us, like bolting machine learning onto this problem to try to figure out what the mapping actually looks like. We are rushing right now a serologic test – like a blood test – that we hope we'll be able to sort of tell you whether or not you have had a COVID-19 infection.

So I think it's mostly going to be useful for understanding the sort of spread of the disease. I don't think it's going to be as good a diagnostic test as like a nasal swab and one of the sequence-based tests that are getting pushed out there. But it's really interesting. And the implications are not just for COVID-19, but if you are able to better understand that immune system profile, the therapeutic benefits of that are just absolutely enormous. We've been trying to figure this out for decades.

The other thing that we're doing is when you're thinking about SARS-CoV-2 — which is the virus that causes COVID-19 that is raging through the world right now — we have never in human history had a better understanding of a virus and how it is attacking the body. And we've never had a better set of tools for precision engineering, potential therapies, and vaccines for this thing. And part of that engineering process is using a combination of simulation and machine learning and these cutting-edge techniques of biosciences in a way where you're sort of leveraging all three at the same time.

So we've got this work that we're doing with a partner right now where I have taken a set of supercomputing clusters that we have been using to train natural language processing, deep neural networks, just massive scale. And those clusters are now being used to search for vaccine targets and therapies for SARS-CoV-2.

We're one among a huge number of people who are very quickly searching for both therapies and potential vaccines. There are reasons to be hopeful, but we've got a way to go.

But it's just unbelievable to me to see how these techniques are coming together. And one of the things that I'm hopeful about as we deal with this current crisis and think about what we might be able to do on the other side of it is it could very well be that this is the thing that triggers a revolution in the biological sciences and investment in innovation that

has the same sort of a decades-long effect that the industrialization push around World War II had in the ‘40s that basically built our entire modern world.

Yeah, that’s what I keep coming back to, this idea that this is a reset on a scale that very few people living today have ever experienced.

And you said out of World War II, a lot of basic technology was invented, deployed, refined. And now we kind of get to layer in things like AI in a way that is, quite frankly, remarkable. I do think, I mean, it sounds like we’re going to have to accept that Cortana might be a little worse at natural language processing while you search for the protein surfaces. But I think it’s a trade most people make.

[*Laughs*] I think that’s the right trade-off.

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