

AT THE EDGE PODCAST



SEASON 1, EPISODE 11

DR. SINDHU JOSEPH – INNOVATION IS INEVITABLE

Interviewed by Michael Lee

Dr. Sindhu Joseph is the founder of Cognicor and inventor of 6 US Patents in artificial intelligence. She was a finalist for Google's Anita Borg Women in Technology Award. CogniCor is a Digital Assistant platform based on knowledge graphs for transforming customer engagement.

In this episode, Dr. Joseph talks about what to bring into the way and what to get out of the way, the uses and limits of artificial intelligence for engagement, the source of her childhood fascination with AI, what India taught her about engagement and customer service, and why Sindhu can't fly – yet.

Michael Lee

Dr. Joseph, welcome. Thank you for being here. It's a really great honor to have you.

Dr. Sindhu Joseph

Thank you so much. I'm excited to be here and talk about innovation and artificial intelligence, very excited.

Michael Lee

How can artificial intelligence be used as a tool to help engage people more?

Dr. Sindhu Joseph

Artificial intelligence, like any innovation is a tool. So we can use that in many ways. And as you are seeing in the wider world, as in consumer facing applications, in enterprise facing applications, there are many ways you can embed artificial intelligence into our daily life.

A couple of ways that I can think of is creating engagement within an organization - many times as an employee who's joining new, there are a lot of questions that an employee has in terms of, How do I work around this organization?

So if you can provide an artificial intelligence system that allows that employee to figure these things out, ask questions, get answers immediately, get engagement immediately - one of the core research in artificial intelligence that is taking place is how do we understand humans? As we are really progressing in that area, AI systems are able to pick up that communication, and are able to engage with them in different ways, understanding their sentiment. That is one way to begin an engagement within an organization, within an employee group.

But once we have that engagement, there are many other systems that you can allow for artificial intelligence to take place within that broader context. One is training. How do we train a new employee to embed within an organization? AI can allow the employee to test their skill level to understand where they stand and where they lack in terms of the capability.

Michael Lee

You've had six AI inventions of your own that are patented. Why are you so interested in AI? And what is it about AI that's important in general for people to know?

Dr. Sindhu Joseph

As a child, I was very curious about our natural surroundings, natural systems, the plants, the animals. And I was very fascinated by how we are able to display intelligence, how a child understands the things they are able to understand, how they are picking up information and able to process that. So I was very curious about that.

In my graduate years, I realized that there is a field called artificial intelligence where you can experiment with this - how do we ourselves understand intelligence? So that's my fascination towards AI, how we can design and see some of this intelligence being created artificially.

I believed there are a lot of things that we can create artificially in AI systems, and that way we can understand more about how humans display intelligence. So from that standpoint, that is my huge fascination towards AI systems, building intelligence and trying to understand more about ourselves.

I'm fascinated about two aspects of AI. One that you generally hear is the machine learning aspect. You provide a huge amount of data and then extract patterns out of it. Maybe it was not immediately visible to the human eye, but to an artificial system these patterns allow us to extract intelligence. So that is one aspect of AI that that is interesting, and I think the world has caught that fascination. And we can see the results of that.

I'm also very curious about another aspect of artificial intelligence, which is more displayed in a human kind of reasoning. If you observe a child, they don't use a huge number of data points and examples and trial and error. If you take them to the top of a building and ask them to jump, they wouldn't jump, because they know that if they jump, they will hurt their body. How do they know? Did they see a lot of people not jumping? Did they try themselves doing this hundreds and thousands of times? They didn't do that. It is based on another type of intelligence, top down reasoning. We have certain general theories, and one of these theories tells us that if we jump from a place that is above a certain height, it will hurt our body. And those general theories allow them to derive and apply that to certain specific instances.

So that is very exciting, because you don't need to have a huge amount of data there. But once we have these theories, you can apply that to many situations, and that you can scale. And you can also derive, if there are a couple of such theories, you can combine them and derive a new theory about that. So you can say that humans cannot fly. And if Sindhu is a human, then Sindhu cannot fly. That allows us to understand the concepts that we are seeing in this natural world, and able to understand that.

Michael Lee

So what you're saying, you cannot fly.

Dr. Sindhu Joseph

As we build more technologies, I should be able to. But today, with my natural capabilities without using any artificial systems, that's what I have come to derive from the general theories of physical dynamics. But we will see how we can change that.

Michael Lee

You're talking about, you know, logical systems. People aren't logical, right? How do you go beyond logic and actually get innovation or engagement or those kind of things that happen in an organization?

Dr. Sindhu Joseph

I believe in using artificial intelligence when it is appropriate, so I would not start from artificial intelligence to create innovation in an organization. I would think what motivates people, because that is one of the things that is the breeding ground for innovation - in my own case, I'm excited and motivated about how we can create intelligent systems.

One of my PhD theses was how I can build a system that is rule breaking. Then I reason to myself that that is displaying a huge amount of intelligence, because it is behaving on its own motivation. So, that kind of drive is one thing that we need to have. We need to motivate the employees towards that.

There is a higher goal that every employee strives toward beyond salaries, beyond physical comfort, and if we are able to provide that intellectual stimulation, intellectual curiosity, and intellectual motivation towards a higher objective, I think the employees are ripe for innovation. Providing that alignment within the organization I would say is the first thing.

The second is, of course, allowing that freedom for them to innovate once they have this motivation, making sure that employees are not scared or worried if they are trying to innovate and fail, if they take some time out of their regular schedule, and pressing other issues and priorities. So those things are very crucial in creating a viable innovation environment.

And then, of course promoting the innovators, showcasing examples. I would take a small example that we have done in our organization very recently. We had World Technology Day sometime in May. We launched a challenge for the entire organization. I didn't expect much from the employees to come up with something really exciting because I thought, okay, we have probably explored all the aspects of the solution. I was pretty surprised.

People have a lot of potential. You just need to provide them a platform and opportunity. To demonstrate that the learning from that was if they have the right stimulants, innovation is inevitable. And the right motivation. So that's my learning from that.

Michael Lee

You just said something really interesting. Innovation is inevitable, not a statement a lot of people in business make. In a situation where most innovations fail in a situation most companies fail to innovate, why do you think it's inevitable?

Dr. Sindhu Joseph

I think it's human nature to innovate. Imagine a world where we are not hopeful, we are not looking forward to tomorrow. Then all human motivation is lost. Then we are waiting to basically end our life, and no human can live like that.

So the opposite of that is we are looking forward to tomorrow, we are looking forward to a better tomorrow. And when we are seeing the problems of today, the human tendency is that, How do we get over that problem? How do we create solutions?

So that's why I say innovation is inevitable, because you put humans in any situation, they know how to solve that problem and come out, that is the natural tendency for humans to behave that way. So innovation is inevitable.

The social fabric of the society that we have created suppresses this innovation, from the child, we try to kind of mold humans into a factory kind of environment, where we suppress this innovation.

Michael Lee

You're saying that that innovation only doesn't happen because things are in the way of it?

Dr. Sindhu Joseph

Yes, very much. When a child asks questions, we suppress them, we discourage them, we have molded every child into certain kinds of behaviors. We have exams, we have grades, we have certain curriculum, and every child no matter how different they are, they are supposed to behave in certain ways and abide by certain criteria of success. This behavior is basically a hindrance to their innovation, their natural behavior.

Michael Lee

Is engagement natural also? Do people naturally want to engage, and then something gets in the way of that, too?

Dr. Sindhu Joseph

I believe that's true as well, it goes a little bit into what we sell, the product that Cognicor has. We are a conversational system, we believe in conversational engagement. I often think about how the world has changed.

I grew up in India, where I would walk into a store and then engage with the salesperson there about anything. We would ask their recommendation. They would show different varieties of those products. They would explain what is good, what is bad, and so on. After that natural engagement conversation, we would happily buy one of those products, and we might even negotiate on the price. That's how the old systems used to work. And then Google happened.

From our natural instinct to engage with people, most businesses, when they took it from that physical brick and mortar space, when they moved to the digital space, they lost human sales service personnel. They provided a beautiful digital friend, but they forgot to take the sales and service personnel along.

Google basically killed our ability to naturally engage with and do commerce. Engaging is the innate nature of human beings. And that's how we engage with our fellow human beings. That's how we are social beings.

Michael Lee

Is artificial intelligence naturally engaging? And is it naturally innovative? Or is it only humans?

Dr. Sindhu Joseph

As someone who's worked in the field of artificial intelligence for more than twenty years, I can say that we are nowhere near the central intelligence that we all hope for in building artificial systems. We have a long way to go. So, given how things are at this point, I would treat AI as a tool, as an enabler to humans to perform certain tasks better, certain objectives, better and faster and easier. At the end of the day, it is an enabler for humans. And that's how it is designed.

Michael Lee

Are there any specific things you think we need to get out of the way to enable innovation and engagement to be much better? And secondly, how can artificial intelligence assist with getting stuff out of the way?

Dr. Sindhu Joseph

Before I talk about some of the key things that we should get out of the way, I would say some of the things that we need to get in the way to make innovation possible. We need to have challenges. We need to have problems to innovate. So when we are crucially aware of the problems, and when all the other hindrances are taken away, that's when innovation happens. We need to have a fertile ground as well as challenges in front of us for us to innovate.

Things that we need to take away are things that take our mindshare, especially things that are hugely time-consuming and that do not allow us to have space to think. If you walk into a large corporation, one big part of the workforce is engaged in customer service support, where you would take a phone and repeatedly respond to the same questions from different customers. How do I get back my online access, for example, in a banking situation. As a customer service person, I would have answered this questions hundreds, thousands, millions of times.

Once I'm occupied with these things, even if I want to solve a problem of how do I do this differently, I don't have time, I don't have a space in my brain to think about it. So we need to remove those things that are consuming our time and our brain space and energy to be able to innovate. When we are a child, we often hear this from our parents: being bored is great, because that's when you think of different things, that's when different ideas, cross-connections happen. And that's when you think of new things to innovate.

When we are adults, when we are in a job function, we are not given that luxury. And that's where artificial intelligence comes in. They are an enabler, if we can put them in the right place, then humans can use their higher capability of innovating on top of it.

Michael Lee

So you're saying we need the luxury of being bored?

Dr. Sindhu Joseph

Very much so.

Michael Lee

What exactly does Cognicor do, and specifically the kind of AI inventions or innovations that you've created? What are they?

Dr. Sindhu Joseph

Cognicore is an AI platform designed for financial services enterprises. The easiest way to explain this is, let me go into the consumer space. If you want to order a coffee machine today, you go into Amazon. Within a couple of clicks, you're setting in motion an entire supply chain, and within two hours, you have that coffee machine on your doorstep. If you want to change your beneficiaries for your life insurance, or withdraw from your 401k, you cannot talk about the same type of experience. So that's where a Cognicor comes in.

Amazon has solved this problem beautifully - how do you create a customer experience that is engaging, that is efficient, and build automation and AI behind the scenes so that a physical asset, a physical artifact of a coffee machine is transported from maybe around the world, and you have that on your doorstep in two hours. We are talking about financial healthcare, all of those systems where there are no physical assets, but still, the systems are so inefficient that you cannot expect this kind of an experience from these kinds of service providers. So Cognicor exists to change that paradigm.

In terms of the technologies that we use, most conversational platforms, most automation platforms use machine learning, and I truly believe that to be able to understand and assist human users, we need to understand their context. And so Cognicor systems are built based on a knowledge graph that captures your business domain, your products and services. And every conversation, every automation is powered from that.

So that's where the human-based reasoning I talked about in the very beginning, a small amount of data, how do you build those kinds of logical systems? So that's what Cognicor is engaged in.

Michael Lee

So why can't we just click a button and have somebody deliver innovation?

Dr. Sindhu Joseph

That's an interesting, thought-provoking question. Innovation does not work that way. I lived in India, and now I'm based in one of the most advanced places in the world, in Silicon Valley, in Palo Alto.

So, being in India, I was surrounded by problems, I was surrounded by challenges, and innovation was a by-product of that. So, if I had the means, I was able to innovate. Because, everywhere I looked, there was a problem that was inefficient, I could make it more efficient, I could solve it in a different way. I was not in my comfort zone, because there were a lot of challenges. So it provided me the motivation to solve this problem.

I moved to the US, I have three kids, they mostly grew up in some of the most developed countries. For them, everything is available. So finding the motivation is very, very challenging for them. It has to be artificial for them. Today, within a couple of clicks of a button, we can order things and be a kind of passive consumer. Imagine, you remove that comfort.

I would say for innovation, we need to remove comforts. One example, again, we what we did in our organization very recently is I deliberately created a space where every morning, we come together as a company, around fifty-plus employees together, every morning, for half an hour, we open one of our products for our customer, and look at it, and then people start commenting on how this could be done better, that could be done better. So they actually have the discomfort of looking and engaging with our own product, to see the challenges that are faced by the users. So that when they are faced with that situation, they are able to think of innovation.

Michael Lee

What would you say is the connection between innovation and engagement?

Dr. Sindhu Joseph

I think it's a bit of a symbiotic relationship. A challenge would drive you to engage with others, that could very much happen. But I believe when we are in our own zone, and then we don't engage, we do not get exposed to problems, we do not get exposed to cross-functional solutions. That's why engagement is very, very crucial.

Michael Lee

It's interesting, it seems that as someone who is an expert in artificial intelligence, you're ultimately saying that artificial intelligence is not the most important aspect.

Dr. Sindhu Joseph

Definitely not. It's the human mind that we need to play with. Artificial intelligence helps us to understand by looking at the data, by looking at, for example, in the past ten years, we

have always hired a white male person for a certain type of job. If we don't have that data, then we don't have that problem visible to us.

How do we get that intelligence from AI solutions? Those insights are what artificial intelligence systems provide employees. How do we perform? What are the things that are past performance? What do they tell us? But also what is the field we are innovating in?

There is a huge amount of data that has been generated around any field that we work in but that is not in a human-consumable form. If you just put that data in front of us and then say that now you have all the data, now you innovate, that doesn't happen. That's when AI systems come in. You extract the crucial intelligence from that data. And now it makes sense.

Michael Lee

The idea that computers or robots are going to out-innovate us is not right around the corner.

Dr. Sindhu Joseph

I think there is a general perception from Hollywood movies, this persona that is built around artificial intelligence, that AI systems are going to outsmart us in many ways, they're going to innovate us out and the humans are in danger. I do not believe that is the case, although there are other risks around artificial systems that we need to be very aware of.

One of the crucial abilities of AI systems is their ability to scale in a huge manner. Imagine this scale can be used for faster propagation of goodness, or propagation of evil. So for example, one easy to understand example is biases. We already have in our society lots of biases - gender, racial, socioeconomic, all of these biases. AI systems can amplify these biases to a very huge scale and even make it permanent. So those are some of the immediate risks to society from AI systems, not the one that robots would come and conquer our world. I think that's a very romantic notion of artificial intelligence, not a real one.

Michael Lee

If people think of you and the message that you are bringing, what is the one thing that you would say about innovation and engagement?

Dr. Sindhu Joseph

Create space for innovation, in your life, in your mind, and in your workplace. That would be my core message. Use the tools, whether it's artificial intelligence, whether it's robotics, whether it's blockchain - use all of those tools to enable you to innovate better. That's what I would probably say.

Michael Lee

Thank you Dr. Joseph. I feel much better now, I feel safer from the robot apocalypse being deferred for a little while.

Dr. Sindhu Joseph

Once we have all this behind us, it would be great to connect in real life. Thank you so much.