TRAILBLAZERS TALK

Ravi Kumar S,

President, Infosys,

and Missy Cummings,

Director of the Humans and

Autonomy Laboratory,

Duke University

Link to conversation: https://youtu.be/5UpUdpRdLIQ

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Ravi Kumar S (RK): [00:00:13]
Hello everyone, my name is Ravi Kumar, President at Infosys. Welcome to this next version of Trailblazers. We're doing this in a virtual manner this time.
Today I have a very distinguished guest, Missy Cummings – the Professor of AI at Duke University. Missy has been at Duke for a couple of years and she's also the Director for Humans and Autonomy Laboratory and Duke Robotics. Her research interests include human and machine interactions, human-vehicle interactions, human autonomous systems, collaboration systems engineering, public policy implications of unmanned vehicles and ethical and social impact of technology. One of the most fascinating things about Missy I've read of and I've heard of many times is the fact that she was a naval officer and a military pilot in the 90s, one of the first few Navy female fighter pilots.
Wow, what a transition I would say! Welcome to the show, Missy and thanks for joining us today.

Missy Cummings (MC): [00:01:26]
Thanks for having me. I always love it when I get to interact with Infosys.

RK: [00:01:31]
Thank you, Missy. Thank you so much for everything you do. Missy, you know the most fascinating thing I've read about you when, in fact you know I'm a nuclear engineer myself and I thought it was a leap to go to technology, but you beat all standards - from a fighter pilot to a professor in AI. Do you know of anybody else who has done this?

MC: [00:01:58]
No, actually I don't. But I will tell you and I gave an interview to The Atlantic a couple of years ago on this topic, honestly, I don't know how people become professors without having been a fighter pilot first. I find that the 'kill or be killed' attitude has served me well in this job.

RK:
And what inspired you to do this?

MC:
Well, when I was flying, especially flying fighters and I did that for three years and about 36 people died in that three years that I knew. So, that's about one person a month that I knew. And in all cases, it wasn't war. These were avoidable accidents. And it really came down to bad machine-human interaction. People just did not understand what these planes were doing and how they were exceeding human capabilities. And so, this really motivated me, all those people dying. I thought surely there has got to be a better way to design these systems. And isn't anyone doing anything about this? And so that's what spurred me to go get my Ph.D. and then, here I am.

RK:
And if I may ask you one last question on fighters which is your favorite fighter?

MC: [00:03:16]
Well, this is tricky. Yeah. So, I mean if I could be a pilot in any time in history, I would

want to be a World War II pilot, flying A-7 Corsairs on carriers. I know this is going to sound terrible, but they are really manly aircrafts. They're big engines and I just love big engines. I also really liked the A-4 because it was a very manoeuvrable Delta wing aircraft. It could do an aileron roll one. Yeah, you could do that a couple of times in one second. So, but in the end the F/A-18 was the aircraft that taught me how to go supersonic, which is always interesting. But the importance of that man-machine interaction, that's where I see the real leaps when we start to bring computer technology into cockpits. So, they were all good. But, really I'd rather be a World War II pilot.

RK:
Thank you, Missy, for that personal anecdote of yours.
I wanted to switch gears to AI, the human autonomy laboratory which you run is probably going to redefine human and machine interactions. I want to redefine how much you could amplify the potential of humans. Where are we in the journey, because there is so much talk about driverless cars. Actually, the AI community is kind of obsessed with driverless cars. I actually believe there are easier problems to solve versus driverless cars. I wonder why we took the most complex one to deal with in comparison to other human-machine interactions which potentially could be much more mature and much easier to implement.

MC: [00:05:01]
Well, you and I are on the same page about that. Indeed, not only are there easier problems, but I think there are many more important problems that we should be looking at, really at the intersection of humans and machines, computers, technology working together. I think one of the things that we're seeing in the driverless car community is that perception systems can be incredibly brittle that are powered by AI. And so, it's also not just in self-driving cars but there are many other domains that really seek to replace humans with AI-enabled technology. And I just think we're looking at the wrong problem. I think that we really need to start thinking about human augmentation and collaboration, because indeed in most sectors, business sectors, I'm actually doing a sabbatical with Amazon Robotics this year. Amazon is never going to replace humans outright. What we really need to do is develop better teaming strategies, so that the machines can do the rote, dull, dirty, dangerous work and the humans can be left to problem solving under uncertainty.

RK: [00:06:14]
In fact, one of the things I've been researching on is in the future, if we really get this right between humans and machines, problem solving will be an endeavour of machines and problem finding will be the endeavour humans in many ways. So, so aptly put. But you know if I switch back to what you just said, which industries you believe would adapt AI much faster, like manufacturing or mining or farming? Industries of that kind which I thought relatively it's much easier to do AI implementations in comparison to the complex ones which the AI communities are dealing with.

MC: [00:07:00]
Well, I think that you just hit the nail on the head. I think manufacturing, I see that especially now that I've been working with Amazon Robotics. AI is necessary, but it's not sufficient. And so, we need both AI and also human-driven systems. Mining, I've

spent many years in Western Australia and the Pilbara mines. That is another area where we desperately need to have technology go in and replace some humans. But what that's done is it's moved the humans out of the iron ore pits for example and into these remote operations centres, which require higher levels of skill and much more nuanced and technology- enabled interaction. And so, whenever I hear people start talking about robots, AI, it's going to replace jobs, I tell people no! Everybody needs to relax about that. It's only going to create more jobs. And indeed, in America you can see that Amazon is like one big vacuum cleaner of companies that's vacuuming up every human it can from all levels and walks of society and indeed, you know, Amazon has a lot of technology. So, I think that people need to appreciate that while there is a lot of hype out there, I think that the real job creation and the real value added and we can see it in manufacturing and mining and many other industries will be the combination-collaboration of humans and technology.

RK: [00:08:35]
Thank you for that. And you know one of the things the health crisis has done ironically is, it's increased digitization, accelerated digitization in a big way. But more importantly it's moved the world into a state of dispersion, I would call it. So, you know, in some ways we've moved to accelerated digitization with dispersion, because work is getting dispersed, work is getting disconnected from enterprises. Jobs are getting disconnected from work. So, do you believe that drone technologies could be, you know, it's been in existence for a while, but is this an inflection point for drone technologies because of the dispersed world we're all going to live in even after the health crisis?

MC: [00:09:21]
Well, I would say there are drone technologies in terms of maybe, you know, will we see remote delivery? I think there's just more generally technologies. I think COVID has really brought into sharp focus the various elements of why we need to support maybe some, what I would consider distributed working arrangements. Drone technologies, they are making slow but sure progress, but the reason that we're not going to see them just burst onto the scene, maybe like we saw driverless cars, there's some physical limitations. Drones can only carry so much technology. As a person who's spent way too much time flying drones in urban areas, high winds, they ruin the battery life - you know there's just a lot of operational issues that make drones not probably as cutting-edge as people think, except they are in manufacturing we're seeing an increasing footprint and there'll be other technologies or related technologies. Mapping, I think it's another hugely important area that drones are growing in. But I actually think more broadly, COVID has taught us that we need to be more agile in terms of being able to move quickly between distributed work and locally sourced work. And so what I think, what I'm hoping is that people will take these lessons learned and start to learn what, and when I say agile, I almost roll my eyes internally because I know it's such an overused buzzword, but you know even when this vaccine starts to become distributed worldwide, I think that there will be new and emerging events that might need, that will need to make countries and companies need to go back and forth between these kind of work technologies.

RK: [00:11:20]
Thank you, Missy. In fact, in the last few weeks, Infosys launched something called applied AI to businesses, and I happened to speak to one of the professors in

Stanford University, Erik Brynjolfsson, who also works on AI and I've been talking to him for many years now. One of the things we started to believe is we have a second inflection point. The first one being on consumer AI for the last decade or so and we think this is an inflection point, where you're going to see acceleration of AI in businesses, enterprises and that's also because the level of trust, the level of preciseness of machine learning and AI algorithms has kind of started to hit that point that it's better than where humans were. It's, you know, businesses are not as complicated as driving a car on the streets, but we've got to the point where we think that inflection point does come for a better embrace of AI. Do you believe we are at an inflection point for businesses to adapt more AI?

MC: [00:12:39]
I do agree that we're at an inflection point for businesses to adapt AI and I think there's a lot of confusion out there. As a professor, I see this in spates, both in the classroom and with companies that I work with. You know, AI means different things to different people and it ranges anywhere from very straight forward, what we would call classical rules-based AI, to a more connectionist approaches with neural nets. And I think the real challenge for companies going forward is how to make sure that you understand what is the right AI to introduce at the right time and at the right scale. I think, more broadly at least in America one of the big problems that I see on the horizon, well I mean we're not even on the horizon as of today, is we simply are not training enough people to reason with AI, reason about AI, including testing and certification and safety critical systems like medical systems and driving, but also for business systems. Certainly, financial systems need to make sure that we understand securities and vulnerabilities. And so, I definitely think we're at an inflection point. But along with that inflection point, with the increasing need of AI, is the increasing need of people who understand AI from all levels, including entry level workforce but also, I have to tell you I mean, I don't need to lecture you because you're very smart about AI, but most CEOs I talked to do not really honestly, they don't have a clue. And so, I'm very worried about if the C-Suite does not understand what they're asking people to do, that this is where I can see some problems coming from.

RK:
And Missy, you know, you raised this very important point of skilling. In fact there is a notion that AI will take away jobs of the past. But, there is also equally popular notion that I would create more jobs of the future. But nobody knows how to create the bridge and reskilling. And is this also an opportunity for us to bridge the inclusivity and diversity divide which we have created in digital skills?

MC: [00:14:59]
I could not agree more that the need to start addressing, you know, we talk about reskilling, upskilling, but I think in a lot of cases it's new skilling. The digital landscape is with us forever. We will never go back to an area where we won't need people who are at least conversant, if not deeply knowledgeable about AI, digital security, cyber physical systems, you know these things all come together. At least in America, I've been a big advocate for making all computer science degrees and community colleges free. We should open the doors to everyone and this gets at the need for diversity. Recently I gave a talk about - look we appreciate that there's gender diversity and racial diversity, but I also think that there's important

background diversity that includes bringing people in from rural areas. There's a diversity of geographic location and you will find that people from different backgrounds are going to bring new ideas. And if you continue to just build a homogenous workforce of whatever that background, is it's not smart business sense. So, I think we do need to work harder in this country. I think other countries have done a better job. But even there we need to reach further into particularly rural communities to get that strength of diversity in thought.

RK: [00:16:40]
Thank you, Missy, that's so well said. In fact, I wanted to squeeze in one last question for you and this is a compelling one. I hear this from CXOs, the CXOs who know AI pretty well, are testing and building hypotheses around it. Making it responsible, you spoke about discovering more use cases, scaling AI in enterprises, but making it responsible is equally important, and data comes with a big bias, past data comes with a big bias and nobody knows how to take that bias out. It's an evolving science. Any quick thoughts or views about it?

MC: [00:17:24]
I do think that trying to understand sources of bias, and I've written extensively on this, in AI is hugely important. The bias comes from the people who create the algorithms, the people who test the algorithms and then the people who interpret the algorithms. And so, and that's in addition to the bias that maybe can creep in into the data sets that you select. And so, I think my biggest concern is that we're not training, and of course, this falls on me and other professors, we're not training people how to be critical deconstructionist thinkers about going after the subjectivity. And I think it's hard because we as professionals we want to say there's no subjectivity in my data or modelling process, but the answer is there is and there is in every model out there. And so, I think that we need to spend more time working on teams to actually identify and, you know, you'll never get away from it but you can at least mitigate it.

RK: [00:18:28]
Thank you, Missy. That was so wonderful. Such a great conversation. I can go on for hours on this and thank you so much for being a futurist, actually a realist. You're an AI realist in many ways. And thank you for inspiring all of us and thank you for your time today.

MC: [00:18:49]
Thank you for having me. I always love to interact with Infosys friends.

RK:
Thank you.