Leeds University Business School – Research and Innovation Podcast

Episode: Towards a world of ethical computing and smarter robots

Speakers: Rashik Parmar and Mehmet Dogar

[00:00:05] **Rashik:** Hello and welcome to the Research and Innovation Podcast. My name's Rashik Parmar. I'm one of the digital leaders from IBM. I spent over 39 years at IBM before I took on various non-exec roles. And I'm also a member of the Leeds University Business School's Research Innovation Advisory Board, and I'm joined today by Mehmet Dogar. Mehmet, how are you doing?

[00:00:25] **Mehmet:** Good. Thank you. Yeah. I'm Mehmet Dogar, professor in Robotics and AI at the School of Computer Science at the University of Leeds.

[00:00:32] **Rashik:** So, listeners, Mehmet and I recently spoke at the Leeds Digital Festival. It was hosted by both Leeds University Business School and the School of Computing. We had researchers and industry leaders come to explore how artificial intelligence and responsible computing are transforming the way organisations adapt and grow.

[00:00:51] **Mehmet:** Yes, and we thought it'll be useful to share on the podcast some of the key discussions we had. Rashik - let me start by asking you about responsible computing, a topic you chaired a session on at the event. For those unfamiliar with the term, how would you define responsible computing and what was the defining moment or critical development that made this topic so urgent and essential right now?

[00:01:14] **Rashik:** So, you know, responsible computing is something that I've been involved with for over seven years now. And when I think about computing today, there are three, what I call, fundamental issues. The first one is that the failure rate of digital programs is remarkably high. We find 70% of programs fail, and that actually costs society about $2 trillion a year through failed programs, right?

The second issue is, we all think about climate change as an essential focus for society. Well, digital has a huge role to play in that, both in being much more energy efficient in itself. Also, in helping make sure that it contributes to helping create a greener world. And the third part is when you think about the ethics, you just have to think about things like Cambridge Analytica. You think about things like, you know, the Molly Russell Case digital programs, the kind of underlying ethos of digital is "move fast and break things". Sadly, that means it does break things. And is that ethical? How about we actually focus on doing things that are right and actually making sure we create the world we wanna be part of.

So see, when I think about this, when I think about what you were talking about, which is all about AI, okay - what's the most ambitious goal for the program that you have, and that the biggest kind of challenge that you wanna overcome to make this a reality going forward?

[00:02:39] **Mehmet:** So the biggest challenge that we have today would be that, the robots that we have today in factories, in manufacturing environments in that are working out there in the world outside of the research lab. They are mostly these repetitive, pre-programmed robots, or if there's any autonomy in them, they are limited to what I call pick and drop systems. So a robot

can go and pick an object and drop it at a certain location, but these robots don't really have any understanding of the physical interaction they have with the world. And that is the big challenge in robotics - getting robots to understand the physics of the world. And use that understanding to manipulate the world.

So reaching into the fridge in the morning, you push an object to the side to reach for the milk at the back - that requires you to understand the physics. And that is a big challenge for robots today. That is sometimes today called physical AI. But that is the core challenge.

[00:03:40] **Rashik:** That's cool. And so you, when you think about robotics, and you think about jumping forward, in the last, you know, it's advanced a lot, but let's translate how much progress we've actually made in robotics, you think, and what can you see in the near future?

[00:04:00] **Mehmet:** So the thing that we see in the feature, the most near goal that we're working towards is - in our lab at the University of Leeds Robotics Lab - we have a project that is funded by EPSRC, the UK's Research Council, that focuses on robotic packing. So this is packing of multiple objects.

Let's say you make an online delivery order and today, a mixed online delivery order that you might make from a company, is still packed by humans. This is not automated because this is exactly - going back to the problem that I mentioned before - it requires an understanding of the physics. So if you are packing, a bag of potatoes with a can of soda, and also a box of toothpaste, then what you're doing is, you put the bag of potatoes in and then you need to push it a little, nudge it a little, to create space for the Coca-Cola can, maybe put some other packing paper around it. When you do those things, you are crumbling, pushing, bending all these objects, and then that requires you to understand how they react to the robot's interactions on them.

And this is currently not doable by robots. And that is what we are working on, in our lab, in this project. And that is the next big goal for us.

So let me ask you, about then your single most ambitious goal for your program in responsible computing over the next year. So what is the biggest challenge you need to overcome to make that a reality?

[00:05:35] **Rashik:** I think the biggest challenge we have here is, is actually to get people to think about this in the first place, right? There's lots of bits of work going on, but nobody's actually joining these together and saying “we can do something really significant here”. And our ambition here is to make the UK a world-leader in responsible computing. And I think that's much needed in society. And I think by doing that, we could not only advance way we think about computing, we can also think about advancing the impact, making this wastage of $2 trillion apply to really useful things. At the same time, we can do it ethically, but also we can do it in a way which attracts inward investment back into the UK and we get more focus for the UK.

So it's all about trying to do this in a way which is much more ambitious and really gives UK a lead in this whole, whole program.

[00:06:29] **Mehmet:** That sounds great, and then looking a little bit more forward into the future, fast forward to five years. And let's say your initiative has been a success, then what does the world of computing look like? What is the legacy that you hope your work creates?

[00:06:43] **Rashik:** Yeah, so what I want to really have is a set of practices and benefits for the professional to do the right thing. I think when I, when I talk to professionals in the IT industry, in the digital industry, they all want to do the right thing, but actually the incentives and structure are stacked against them doing the right thing.

So they tend to focus on doing things that really support the financial goals of the organization, support the, you know, short-term needs that they have of their particular program, without really looking at the long-term. Responsible computing is thinking about it as something that we're gonna have to, you know, use and be dependent on for a long time. How do we do that in a responsible way, and really provide the right digital platforms that society can trust, can depend on, and actually makes the world a place that we want to be part of.

[00:07:37] **Mehmet:** That sounds great.

[00:07:38] **Rashik:** So, as you know, there's been lots of progress in AI recently where you can't pick up a paper with any kind of new field. You'll see something about AI. How's that progress translated into robotics, and did robotics make the same kind of big jumps forward in the last few years as the other parts of AI?

[00:07:56] **Mehmet:** The short answer is no. Robotics didn't make as big a jump forward. Of course, there has been developments, but it isn't as big. The important difference here to understand is that the big jump forward for AI has been possible because of the amount of data that is available in language and in vision, in images.

So think of the internet, the data - online has made AI possible, basically. But for robotics, for robots, we don't have that kind of data. We are nowhere near it. So currently there are lots of labs and companies that are trying to collect data, but you can think of the effort of collecting data at the internet scale isn't easy.

It is a lot of data and some people think that solving robotics will be more difficult than solving language or vision, and therefore you will need even more data than you need for language and vision. So the jury is still out on that one, whether this kind of endeavor will be successful or not.

But we haven't seen the same kind of progress yet. There has been some, obviously, but it's not the same level. And maybe one more thing to add is that I'm sure there will be listeners thinking, “oh, but I've seen a robot video online doing that”, and “I've seen a robot video online doing this”.

That is something that I would like the listeners to understand that when you see a video online, it doesn't always mean that that is working at a... in a way that is robust and reliable, right? I can show you a video of myself, scoring from the other end of a basketball court. And you probably wouldn't think that, “oh, I am able to do it every single time”. It would be the one time out of 100 that I tried, right? So you should, you should definitely think like that when you see these kind of videos online.

[00:09:50] **Rashik:** You're not saying “seeing isn't believing” anymore, is that what you're saying?

[00:09:53] **Mehmet:** Yeah. Maybe.

[00:09:56] **Rashik:** But coming back to your program then, where are you? Are you working with others? Is there any other things that we, you know, that your listeners should be aware of in your advances here?

[00:10:06] **Mehmet:** Yeah. So, I mean the other difference between the current developments in AI and robotics and the challenge of robotics is that we need robots to interact with the world using much more fine control that is in addition to the pick and drop systems that we see today. What does that practically mean?

It means practically having something like fingers on a robot and moving with those fingers and contacting the world and being able to control multiple fingers on some kind of a robotic hand. And collecting data for that becomes even more difficult because that means we need operators that are moving robots around, while controlling their fingers to manipulate objects and collecting all that data, which we can then throw at an AI system to learn from that, so that the robots can then control the fingers themselves.

But that is the biggest challenge and that is also something that we are working on trying to get multi-fingered hands robotic control objects in a way where they understand the physical consequence of the contact between their fingers and the objects. And, so those are also the big challenging projects that we're working on.

[00:11:29] **Rashik:** Wow. Well, that sounds really fantastic. Well, I wish you all the success because I think we need this, you know, as we look at the world going forward, this, the advances that you're making, robotics is really gonna help in many, many industries, many ways. So I certainly wish you all the success. I hope our listeners do as well.

So thank you for that information Mehmet.

[00:11:45] **Mehmet:** Thank you.

[00:11:46] **Rashik:** Well, thank you for listening and we hope you all found that useful. We'd always welcome any feedback, but of course you may have more questions and if you do, just follow up in the show notes and there's more details on the website.

[00:11:57] **Mehmet:** Goodbye.