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HOST: We train machines for a particular task and they can be very good at this particular task, in fact, better than humans sometimes, but you modify the task just a little bit and they fail. Just search YouTube for robot and jump. Intelligence, it turns out, is hard to create. Welcome to The Conversation Piece. This is AI Engineer and VP at Facebook, Yann LeCun.

YANN LECUN: Good evening, everyone. There's a mystery about intelligence. What makes us human is, is really the ability to think and to plan. But intelligence is a shared ability among humans and animals. And now perhaps even machines, I'm an engineer and a scientist, and I've always been fascinated by the question of intelligence and what I, what I'm working on is trying to figure out really what is essential to intelligence so that we can reproduce it in machine, but not just to construct widgets, but also to understand human intelligence by really focusing on what is, what is the central.

So AI, these days, we hear a lot about AI. We've been hearing about it over the last 10 years or so, a lot more than in previous decades. And the reason is because we've discovered waste for machines to become intelligent by or vaguely intelligent by training themselves as opposed to being programmed.

So AI now has become synonymous with machine learning. And so the ability to reproduce running abilities and machine is really what, uh, brought about the progress. Um, because building AI systems by hand through sheer engineering is just too difficult. We don't know how to do it. Uh, so what's, uh, what's happened is that we've, uh, got inspiration from the brain and basically built computer models of, uh, you know, conceptual computer models of how the brain works and or how the brain learns. The brain is composed of billions of neurons brain cells that are interconnected with each other and learning takes place by modifying those connections. Um, as we have, uh, new experiences. So people have thought since the, the fifties, um, about ways to do this with machines, but it's become really successful on the end the last 10 years or so. We've seen a lot of success in things like speech recognition and image, understanding, uh, text understanding and open the door to applications like, uh, uh, driving assistance systems, uh, medical imaging.

That is the systems, content filtering systems, translation, automatic translation, which going to work now. So a lot of applications. Um, in fact, if today you, you took, uh, the, the modern versions of AI out of companies like Facebook and Google, both companies will crumble. They are entirely built around it these days. So it's a lot of success, but still the limitations of those systems are, are, are, are, are very, uh, dire in the sense that our machines do not learn nearly as well as humans and animals. So there is a big piece of human intelligence and learning that we have not discovered, and we're not able to reproduce with machines. And this is what stops machines from being able to learn like a baby, learn how the world works by observation and acquire some amount of common sense if you want on how the world works.

So the joke I often say is that, uh, the most intelligent machines that we have today, even though they can beat us at chess and go and, uh, and do amazing things, they have less common sense than a house cat. And we just don't know the principles upon which to base an AI system so that it will acquire this type of intelligence. So this is the, the, the challenge of the, of the next few years, uh, essentially. And then there's the big question is, uh, the kind of intelligence we observed in the machines now that, that we create in machines is, is sort of very reactive. We train machines for a particular task and they can be very good at this particular

task, in fact, better than humans sometimes, but you modify the task a little bit and, you know, they don't work very well and they, they tend to be very, very, very specialised.

So the big question is how do we build machines that have some sort of autonomous intelligence, a bit like humans and many animals. Um, so we don't specify what the mission should do. We just specify an objective and the machine figures out how to fulfil this objective. This is another topic of research. We are only beginning. And so it's going to take a long time before we discover those principles so that we can have, you know, household robots and virtual assistants that we can talk to and know they can answer any question and help us, you know, daily lives. Uh, and, uh, the, a lot of progress are being, are being done, but it's still a very primitive at the moment. So it's only the beginning.

HOST: Yann LeCunn spoke at The Walrus Talks at Home: INTELLIGENCE in October, and he's just one of the over 800 fantastic Canadians who have walked, wheeled and web-cammed into the virtual stage at The Walrus Talks.

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