Why You Are Non-Computable

https://mindmatters.ai/podcast/ep254

Announcer:

Greetings and welcome to Mind Matters news. Your non-computable host, Robert J. Marks has done a number of interviews about his latest book, Non-Computable You. In this episode, we've collected some of the greatest hits from that press tour in one place. First up is Bill Meyer from KMED, KCMD in Medford, Oregon. Enjoy.

Bill Meyer:

I started reading a book over the weekend that I am going to continue to eagerly devour because it cut against some of my preconceived notions. Let me tell you a little bit about this. Because the other day I was watching these stories and I was reading this story about how a worker at Google was talking about this artificial life, essentially this software, I guess they're calling it a being, and a software developer thinking like, "Yeah. This software is actually self-aware," and they're making a big deal about this. I think he ended up getting bounced out of Google because of this. Maybe it's because of talking out of school rather than actually just saying that the software was alive. But is there a possibility that software replaces us?

And I wanted to talk with Dr. Robert J. Marks the second, PhD. Let me tell you a little bit about him. Distinguished professor of electrical and computer engineering, School of Engineering and Computer Science, Department of Electrical and Computer Engineering, Baylor University. So he is a pretty big brain on such things. And serves as the director of the Discovery Institute's Walter Bradley Center for Natural and Artificial Intelligence, and he hosts the center's Mind Matters podcast. He's also a fellow of both the Institute of Electrical and Electronic Engineers and the Optical Society of America. He's written a book about these various subjects like the Google being, I guess, that they're calling, and it's called Non-Computable You: What You Do That Artificial Intelligence Never Will. Bob, it's great to have you on. I guess you're okay with being called Bob, right?

Robert J Marks:

Yes. Yes. That's my name, Bob. Yeah.

Bill Meyer:

Okay. So did you have pretty much the same response that I did when there was this talk about the Google software, sentient being of sorts? What was your general impression when you saw that?

Robert J Marks:

Oh my goodness. There are so many ways to push back on that claim, and it's hard to choose which one to go down. We can explore one of them if you'd like to, why that software is not sentient, why it doesn't understand what it's doing, for example. Computers can add numbers, they can add numbers like 12 and 13, but they don't understand what the number 12 and number 13 is. So the question is, in this Google chatbot is whether or not that chatbot understood what it was talking about. I think in order to be sentient, you need to understand what you're talking about.

The argument against this is beautiful, goes back to a philosopher named John Searle who didn't know Chinese, and what he decided in his little parable, very short parable, is that he would place himself in a room called the Chinese Room, and in this room there would be little slips of paper pushed through the

door that were written in Chinese. They were questions and Searle inside the room didn't understand Chinese, but fortunately he had a bunch of file cabinets, and he was able to look at the question and he was able to go to the file cabinets until he found a match to the question. Then in the file cabinets was the answer to the question. So he wrote down the answer to the question on the card, he refiled the card. He went back over and slipped it outside the room. Now the interesting thing is that Searle inside the Chinese Room didn't understand Chinese, he couldn't read it, he couldn't write it, he couldn't speak it, yet from the outside it really looked like John Searle knew, what was ever in that Chinese Room, knew Chinese. I mean, my goodness, they could respond to the questions, and it sure looked from the outside...

And that's exactly the same thing that's happening with the Google robot. This software has looked at millions and millions of files, including, I would suppose, all of Wikipedia plus some. They have done correlations, word relationships and things of that sort. And so, in the background, there's a bunch of number crunching, and that number crunching is going to spit out an answer, and that answer is going to look like it means something. And it can mean something but it's like the people external to the Chinese Room. That computer has absolutely no idea why it responded, it has no understanding of what it did or what it's saying.

Bill Meyer:

But it is associating and coming up with... Well, I guess what you talk about is how computers are essentially that everything is an algorithm, right? Everything is algorithmically because everything is computational within the computer. Is that kind of the short way of putting it?

Robert J Marks:

Yes. Yes. And in fact, we have known that there's things which have been non-computable way back since the 1930s. Alan Turing, the founder of computer science, he was in the movie The Imitation Game. Alan Turing was played by Benedict Cumberbatch. They're the ones that cracked the enigma code, that helped win World War II. But Alan Turing was also a genius. He was a mathematical genius. And he was able to show, back in the 1930s, that there were things which are definitely not computable. Now, this was not something which was conjecture, this was mathematical fact. One of his first papers was on numbers, which were non-computable.

Then he went on to show some other things, the Turing halting problem. And there's also, since then, a number of different things which have been shown to be non-computable. Now, if a computer can't compute something, you have to ask the question, "Are there things that humans do that are also not computable?" And the answer, which is talked about more deeply in the book, is yes. Now there's the obvious one, such as love, empathy, and compassion, anger. I don't think that those will ever be duplicated in a computer. But even more important are the idea that we just talked about, if computers will never understand, they will never experienced sentience and they will never be creative. And these are things which are brick walls that artificial intelligence will never go through. Now artificial intelligence is doing incredible things. We certainly don't want to diminish the accomplishments.

Bill Meyer:

Yeah. Certainly. I was hoping if maybe you could touch on here, briefly if you could, Dr. Marks, what is the difference between artificial intelligence and artificial general intelligence? Because you do talk about this AI and AGI, if you could?

Robert J Marks:

Yes. Yes. Artificial intelligence is what we see loud in the news. For example, the sentient chatbot the Google has is an example of artificial intelligence. You got to define things before you talk about them. If you come into my world, people tease against the difference between machine intelligence and artificial intelligence, and computational intelligence. But I think in terms of the media, artificial intelligence is anything that a computer can do, which you look at and you say, "Oh. Gee whiz. That that's amazing." I think that that's the way the media treats it. And that's a good way to talk about it since the common denominator there is that everything is being done by a computer.

Artificial general intelligence is the belief, and it's actually a faith. There's actually an AI church around this, believe it or not. It is the belief that artificial intelligence will some way and someday duplicate everything that humans can do. Now if the premise that there are non-computable things that humans do, then this will never be achieved. I like to say that artificial intelligence is written in computer code like Python and C++ and all these other esoteric languages. And AGI or artificial general intelligence is mostly written in PowerPoint slides and news releases. We don't see any indication that artificial general intelligence will ever happen. It'll never understand, it'll never be sentient, it will never be creative.

Bill Meyer:

The book is Non-Computable You: What You Do That Artificial Intelligence Never Will. Where do you think what humans do that artificial intelligence never will, what do you believe here, Dr. Marks, is the source of that non-computable side of humanity?

Robert J Marks:

Well, we're getting above and beyond computer science and more into the area of philosophy, even though this area of philosophy is being illuminated now, and that's the mind-brain problem. And in terms of humans, the question is, is the mind the same as the brain? This has been a debate which has been going on for years. Now, if one is a materialist and believes that everything can be described by natural laws and equations and things of this sort, you have no other place to go than artificial general intelligence. In other words, we're all a bunch of meat computers, everything could be done algorithmically. But I think computer-

Bill Meyer:

Are these the same people that think that you can literally take the human brain and upload everything about it into a computer?

Robert J Marks:

Yes. And that is really curious because since part of you is non-computable, the non-computable part of you will never be uploaded to a computer. So only the computable part of you, which is able to be uploaded to a computer, and I tell you that just the computable you is pretty boring.

Bill Meyer:

Just the computable you. I really like that. This is a fascinating book and it really got me thinking, and also learning some words that I had never heard of before. And I was hoping you could define one of them that I was bringing up to you before we came on, called qualia. And you say this is something that artificial intelligence just is not capable of. What is qualia?

Robert J Marks:

Yes. Well, qualia is a type of sentience and it deals with the perceptions that you have from your senses. When you bite into a lemon, you have a certain taste. When you see the color red, you see a certain color. When you feel pain, there's a certain experience that you had. And this goes back, actually, to the Google bot, this idea that it's sentient. If it's sentient, it better have qualia. Let's go through a thought experiment. If you look around your room, you can probably see something that's red. And if you look at that redness for a second, you experience something, you are experiencing red. Now, Bill, you and I can talk about red because we've also experienced red, but imagine explaining red, your experience, to a person that's been blind since birth. You could tell them all sorts...

Bill Meyer:

That would be next to impossible. That'd be next to impossible to explain.

Robert J Marks:

Yeah. You could explain the wavelength, you could say blood is red, you could give all sorts of examples, but duplicating that experience in the blind man through you just talking to them is never going to happen. So indeed, if that's the case, how are you going to write an algorithm, a computer program to have a computer experience the qualia of red? You're never going to be able to duplicate that in a computer.

Bill Meyer:

Or the taste of a lemon to a human biting in.

Robert J Marks:

Or taste of the lemon. Exactly.

Bill Meyer:

Yeah. Okay. So it's not the weakness in the thought of a sentient artificial intelligent being, let's say, is that every aspect of that individual's programming or that computer programming was written and encoded by a human. Is that not the case?

Robert J Marks:

Yes. Yes. And a computer will only do what it's programmed to do.

Bill Meyer:

What do you think-

Robert J Marks:

Go ahead.

Bill Meyer:

Okay. Yeah. What do you think happens then as artificial intelligence increases in complexity to the point where it begins to program itself, which is already happening? And I'm wondering if that is not a form of consciousness, ultimately.

Robert J Marks:

Well, there's an assumption and that is that artificial intelligence will be creative because it has to be creative to write something that wasn't intended by its original programmer. There are no cases of artificial general intelligence. And here you have to go back to the definition. What does creative mean? Creative is defined by a guy named Selmer Bringsjord at Rensselaer, follows something called the Lovelace Test, and that asks the question, "Does the computer program do something which is beyond the expectations or beyond the intent of the programmer?" Now this doesn't mean you can't be surprised. I think computer programs surprise us all the time. I think that you might get unexpected results, but it can all go back to the input and the creativity of the computer programmer. And if indeed the computer program is limited to the creativity of the programmer, it itself is never going to create artificial intelligence which is better than it is. And to date, there has been no computer software that has passed the so-called Lovelace Test of creativity. So AI writing better AI is never going to happen in accordance to the Lovelace Test definition of creativity.

Bill Meyer:

Is there a possibility, though, that as computing power increases, though, in spite of the fact that it may not know what it's doing as far as we're concerned, we don't know the difference, we can't detect it, that you-

Robert J Marks:

Well, I think the computers can simulate a lot. I don't know if you've seen the movie A.I., where with this little boy... I think it was by, who, Stanley Kramer and Steven Spielberg put it out. But this little boy robot was just incredible, a humanoid form. And he was standing there and there was this love button that you pushed, and the mother pushed the love button because she wanted a little boy, of course. And the little boy played by, oh, what was his name? Osment, I think...

Bill Meyer:

Yeah. Haley Joel. Yeah.

Robert J Marks:

Yeah. Yeah. Just an incredible child actor. All of a sudden he came from totally emotionless into an idea of love, of snuggle hugging. It was just amazing to watch that transition. But the fact that he did that, does that mean that he was experiencing love or was it all computing which was being done under the hood?

Bill Meyer:

Yes. When humans fall in love, is it a mathematical computation that we're engaging in? When a human falls in love.

Robert J Marks:

Yeah. Yeah. And I maintain that's non-computable. You can program a computer to say, "I love you," or you can write a computer program to show empathy, for example, but it doesn't mean that it's showing love, it doesn't mean that it's experiencing empathy.

Bill Meyer:

Elon Musk, I think others like Henry Kissinger, Stephen Hawking, not big fans of artificial intelligence, or are they? I know Elon Musk isn't, but why do you think they're wrong about this?

Robert J Marks:

Well, the interesting thing is that the colleague of Stephen Hawking, who was Roger Penrose, just won the Nobel Prize last year in physics, just a brilliant, brilliant man, agrees with me. He agrees that there's things within the human that are non-computable. And in fact, he wrote this wonderful book, which influenced me a lot. It was called The Emperor's New Clothes, or The Emperor's New Mind, I believe it was. Just a wonderful book which outlines some of the thoughts that I'm talking about here.

But a lot of these people, including Elon Musk and Stephen Hawking, come to this problem from a total materialistic point of view, which is that everything that exists can be explained by science. I think a subparagraph of that is that if that's the case, then we are computers made out of meat, and everything we do in our mind is computable. And I challenge that. I believe that Roger Penrose challenges that. The CEO of Microsoft, Satya Nadella, in his biography, challenges that. There's a number of people that do challenge that idea that we are 100% computable. So it comes from one's ideology. If you are a firm materialist and you believe everything has to be described by mathematics and physics, then you're inescapably in this idea of artificial general intelligence occurring eventually.

Bill Meyer:

All right. Dr. Marks, aren't we just dancing around the subject of the human soul or the spirit? Isn't that really what we're dancing around when we talk about this right now, what's non-computable?

Robert J Marks:

You can and here we're getting into theological-

Bill Meyer:

I know.

Robert J Marks:

... topics, which I guess is fine. I am a Christian, and I do believe that there is something which is external to the brain, and I think that we have evidence of this. I think that we're starting to get evidence from neuroscience, we're starting to get evidence from different places, out-of-body experiences and such, which are now being documented more than ever, that there is something there beyond the brain. And indeed, this is something which goes back to Descartes. This is not a new thing. But it's something which has been around for a long time. And we're starting to get evidence that indeed the mind is greater than the brain.

One of the great experiments is something called Libet's experiment where he showed, and this is really remarkable, that before you want to do something, there is a signal in your brain that occurs before your brain tells you you want to do it. Now that sounds kind of materialistic, but Libet also discovered something interesting, that you can take that inclination, that idea that you want to do something and you can say, "No." He called it free wont. So it's not the idea that we have free will, but we have free won't, and we can turn off those signals from our brain. And that looks to be something which is external to the brain.

Bill Meyer:

That is an absolutely fascinating take on that. And I really enjoyed this book. I'm only about a fourth way through. I'm going to get the rest of it through. And I hope to have you back and talk about it further at some point. And Dr. Robert J. Marks, his new book is Non-Computable You: What You Do That Artificial Intelligence Never Will. And he expands way beyond what we've talked about in just this 15, 20-minute conversation. Doctor, available at all the usual suspects, this book here, Non-Computable You?

Robert J Marks:

Yes. Yes.

Bill Meyer:

And do you have a website, any social media feeds people can find out more about you?

Robert J Marks:

Yeah. As I mentioned, I'm the director of the Walter Bradley Center of Natural and Artificial Intelligence for Discovery, and we maintain a bunch of posts and a bunch of podcasts at mindmatters.ai. So that's a good place to go to read more about these things. We have have people who are neurosurgeons, psychologists, economists that are all writing and are supportive of the place that I am.

Bill Meyer:

It's a very thought-provoking book in your work. Thank you so much for having joined us today. Be well.

Announcer:

Up next, let's start with a chat about the movie Top Gun with Michael Medved on his nationally syndicated talk show.

Michael Medved:

A great day when there are, on the table, all kinds of questions about AI, that's artificial intelligence. Why shouldn't we be able to replace all those hotshot pilots like the ones being trained in the movie Top Gun: Maverick? One of the most successful movies ever made, by the way, in terms of its box office receipts. But that's showing pilots doing death-defying, astonishing jobs in guiding their airplanes. Well, can't you do it better using artificial intelligence and drones?

We will get to that with a terrific guest, who I'm very privilege to welcome to the show, Robert J. Marks, who is a director of a center at the Discovery Institute on human intelligence and artificial intelligence, and the differences thereof. He is the author of a very important and fascinating, and timely new book called Non-Computable You: What You Do That Artificial Intelligence Never Will. Dr. Marks, it is great to speak to you. He's also a professor of electrical and computer engineering at Baylor University, and a fellow of both the Institute of Electrical and Electronic Engineers, and the Optical Society of America. So with that introduction, welcome to the show.

Robert J Marks:

Well, thank you, Michael. It's good to talk to you again.

Michael Medved:

It's great to speak to you. So first of all, I thought that your little piece on Top Gun: Maverick was particularly pertinent because you have to think about it, when you think about people, not just in

movies, but in real life, people in Ukraine right now who are risking their lives, wouldn't it be just a tremendous blessing for us to replace all the human service people, who sacrifice their lives, with machines that could probably do every bit as of effective a job?

Robert J Marks:

Well, yeah, absolutely. I think that with reference to the movie Top Gun, the piece I wrote said that involving humans in this was kind of very 20th-century, which I guess the original Top Gun came out in the 20th-century, but they were just trying to repeat that same old scenario. But it turns out, we have the technology now with drones, we have drones that can be controlled by pilots remotely. And so, they can see where they're going. And this was, for example, the technology that we used to take out the General Soleimani a while back. We used a drone, we fired a hellfire missile and just took them out without any danger of human life. That's the same thing that could have happened on the mission of Maverick, the Top Gun sequel. A bunch of advantages. One is the G-force. One of the big things in the movie was the G-forces would black you out. Well, that's not a problem with autonomous vehicles, drones that don't have any people on them. You can really accelerate and as long as you don't destroy the computer, your AI is still there.

Another aspect was that they thought that they needed to fly below where they could do GPS and things like that. Well, even with modern military, you don't need GPS. Some of the military radar drones have maps on the inside. They take pictures of the terrain on the outside. They compare the pictures of the terrain with the maps, and they can go ahead and they can navigate without any GPS. So there's a number of different aspects which lead one to believe that the technology that was used in Maverick Top Gun was very ill-advised. It should have been done with the 21st-century technology, with artificial intelligence, drones, and even autonomous killing weapons. It would've been more realistic, but I don't think it would've been as fun of a plot. By the way I...

Michael Medved:

Well, you certainly couldn't have featured Tom Cruise playing a drone.

Robert J Marks:

No.

Michael Medved:

... and that's a big part of... And just think of the movie posters. If you do it with all machines, basically... All the machine movies usually end up showing some of the limitations of machines. But one of the things that I was thinking about is in warfare, we used to be so worried, you talk about the 20th-century, about a mistake that leads to nuclear apocalypse, and wouldn't further use of AI and machines to actually not only fight on the battlefield, but also to guide strategy and to help direct the command structure, wouldn't using AI in that reduce the risk of mistake?

Robert J Marks:

Well, one of the things you have to be careful about, I think, is that AI is very brittle. And one of the things that has to be applied in the command field is to be able to react to situations which you've never seen before. And if you don't have those in your training data and you are exposed to a total different scenario that you've never seen before, you won't know how to react if you're AI. It's going to take human intelligence to do that.

And as far as the danger, absolutely. I think that one of the things that needs to be done in the design of artificial intelligence is to apply AI ethics. In other words, make sure that the AI that you design does exactly what it is intended to do, but does no more. And that can be done through extensive testing, domain expertise. You're never going to get a 100%, but I think it's probably going to be like the legal system. You have to make sure that the operation is above and beyond any reasonable doubt, kind of in the same sort of level of certainty that you have in convicting a murderer or something. So I think we can borrow from there and apply these standards to some of this artificial intelligence.

Announcer:

Up next Dr. Marks discusses the impact of artificial intelligence on the job market with Mark Hahn. Mark can be heard on KSCJ in Sioux City, Iowa.

Mark Hahn:

As we talked about before we came on the air, Dr. Marks, artificial intelligence is something that many people fantasize, whether on a science fiction level, many shows have been about that. Of course, space Odyssey 2001, HAL took over, and that's what scared people about artificial intelligence. Are we going to be making computers that are smarter than us?

Robert J Marks:

No. Absolutely not. And I don't know if HAL 2000... HAL 2000?

Mark Hahn:

Yeah. I think that's HAL 2000.

Robert J Marks:

Yeah. I don't know if that was smarter than the people. I think it was just programmed incorrectly. It was programmed to put the mission before human life. And I think that that's where the failing was, and I don't know if it actually took over in any sense.

Mark Hahn:

Well, there've been other books too along the same line where man makes a computer, he keeps improving the computer, finally he wants to have it have a little bit of intelligence on its own based on, of course, the information that you put into it. And that's what computers are, garbage in, garbage out. If you put good things in there and you build the formats properly for what you want to do, it stays within those parameters, right? It doesn't go outside, just as you just discussed.

Robert J Marks:

Oh, exactly. In fact, that's a very good illustration. The idea is that computers and artificial intelligence can take their training data and they can interpolate, they can look inside the box, but they don't have the creative ability to think outside the box. You're exactly right.

Mark Hahn:

The question, I think we got out of the way right at the beginning, are future humans doomed to be replaced by artificial intelligence? And of course, you said emphatically, "No." But what will it replace?

Will it replace travel agents? I mean, right now you certainly have online travel sites that are set up and you can book in your own travel, you don't need an agent.

Robert J Marks:

Well, here's the deal. And you hit the right word, algorithms. You have to ask yourself, "Can a certain job be described by an algorithm, meaning a step-by-step procedure for doing something?" That's certainly true for travel agents, right? They go through step-by-step procedures. You hear other things. Toll booth operators, for example, they're totally gone because they just did a simple algorithm. So if your task could be defined by an algorithm, if that task is your job, is in danger of being replaced by artificial intelligence. But if your position requires sentience, if it requires creativity, if it requires understanding, you're probably in less danger of artificial intelligence taking over. But what is going to happen eventually is, artificial intelligence is going to be a tool. And that's all artificial intelligence is. It's a tool. But it's a tool which can be used by these different professions to enhance the profession to do a better job, but it isn't going to replace them.

Mark Hahn:

Well, we see how computers and robotics have replaced human workers, because of in factory jobs, it's a repetitive thing, you're online, whether you're on an automotive line or whatever, but you're putting the nuts on these bolts and it's car after car, after car, truck, it doesn't matter. Your job is boring because it's the same thing. So we see that a computer running robotics actually does that job. So that worries people that, "Am I going to be replaced by a computer?" In my business, yeah, they do. Except when it comes to adding personality to a program where we called it here, voice tracking, which is basically adding our voices in between songs or commercial breaks or whatever, and we can make it sound like we're live right there in the studio, not a problem. Computers can't do the same thing, they can't put the same emotion, they can't put the same thought into reading up on a segue or talking about a certain subject.

Robert J Marks:

Yeah. Absolutely. Absolutely. I would also say that artificial intelligence is going to introduce new jobs. Today we have all of these people that make their living on TikTok, which I don't watch-

Mark Hahn:

Yeah. Me neither.

Robert J Marks:

... or some of these other social media. And we have people that work for Google that do all the censoring of the content. Not a good job. But nevertheless, these are jobs which are being created by artificial intelligence and technology. So I guess I'm a big believer in free enterprise, and I think it might be painful, but I think that we're going to adapt.

Mark Hahn:

I've heard people say this expression more than once, "Computers, you can't live without them and you can't live with them sometimes." It's the same-

Robert J Marks:

That's true. I was separated from my cell phone for a couple of days, and man, I went through withdrawal symptoms. I am so dependent on this stupid thing for GPS. I tell people that I have all of the knowledge of the world available at my fingertips. So if I have a question, I could just type it in. Boom, there it is. Yeah. Boy, we are dependent upon it, aren't we?

Mark Hahn:

Until it crashes or you're without it because it crashed or you lost it, then you know how much you really depended on this. And I'm one who is kicking and screaming into the 21st-century, because I had just an old little flip phone and nothing in internet search, and it was an old LG phone. It was nice, it did what I wanted to do. I could send quick texts or make a call. I couldn't search the internet, but that's okay. I mean, it just did basic things that I wanted. But one of my brothers wound up giving me their smartphone, a Motorola smartphone, and boy, I know what you're talking about now because I do use this and there's so many more things that I can do with this phone than I couldn't do with the other.

Robert J Marks:

Oh, yeah. You think of technology. When I was a boy and you made a long distance call, if you went to a payphone, you had to put nickels and quarters in it. Today I can do FaceTime, and I've done this simultaneously with somebody in Sweden and another person in the country of Columbia. And it's just like we're in the same room, we're doing FaceTime. So it is remarkable. AI does incredible things, but as I mentioned at the beginning, there's certain walls that it's never going to go through. And I think some of those walls are things which are exaggerated by science fiction like The Terminator and The Matrix. Those things are never going to happen.

Mark Hahn:

No. That's true. Are we ever going to have campaign managers in political campaigns? Here we are coming up to the midterms. Are they ever going to be replaced by artificial intelligence?

Robert J Marks:

I think AI is going to be a tool in this sort of thing, but one of the things that AI doesn't have is creativity. And you can talk about, not only campaign managers, but, say, a commander in the field.

Mark Hahn:

Right. Military. Yeah.

Robert J Marks:

Now campaign managers and a commander in a military field are going to face scenarios that they've never seen before. CEOs and companies do the same thing too. Now, the AI has to be trained in that scenario, and if it sees a scenario that it hasn't seen before, and it's outside the box, if you will, it doesn't know what to do. But people, campaign managers and commanders in the field in the military field are going to have to react and assess situations that they've never seen before and adapt to them. And no, I don't think artificial intelligence will ever do that. Now, AI might be used as a tool by these people that can give them forecast and suggestions of things to do, but the final decision will always lay with the human.

Mark Hahn:

Indeed, it will. So the cool thing about that is, is that you see these people in Japan. Japan technically seems to be more into AI than what we are here. I mean, virtual girlfriends in 3D. Have you seen that? That's just crazy stuff.

Robert J Marks:

No. But I can imagine.

Mark Hahn:

It is. One guy even married one. I don't understand how you think about that, but it's your mental state of mind, I guess.

Robert J Marks:

Yeah. I guess so.

Announcer:

Up next we have John Catsimatidis hosting The Cats Roundtable on WABC in New York City, talking with Dr. Marks about sentient AI and whether AI could predict school shootings.

John Catsimatidis:

Dr. Marks, tell the American people how you feel.

Robert J Marks:

Well, let me just start out by saying that I don't want to distract from artificial intelligence, it's doing great and exciting things, it'll continue doing great and exciting things, but there's a lot of hype associated with it. People think, "Well, is The Terminator going to come alive? Are we ever going to face a scenario like we see in The Matrix?" And the answer is no. There are certain brick walls which artificial intelligence will never go through. And we know this because we're non-computable. It does turn out, as far back as the 1930s, computer scientists knew that there were things which are non-computable. The biggest one was Alan Turing. He was the father of computer science. And he showed a bunch of problems, which you couldn't compute, you couldn't take to the computer and solve these problems. So this begs the question, are there things that humans do that are not computable? Well, if they're not computable, they're not going to be captured by artificial intelligence.

I would maintain that the simple ones to grasp are emotions like love and empathy, and anger, but more significant is the idea that artificial intelligence will never understand what it's doing, it'll never have sentience, and it will never be creative. Now, I've mentioned these things, and one has to be beware seductive semantics. All of them need to be defined before they're deconstructed. But fundamentally, artificial intelligence is never going to go through that, and you're never going to have artificial intelligence which duplicates the human.

John Catsimatidis:

Well, not today. I mean, I watched Star Trek and data's doing pretty good.

Robert J Marks:

Yeah.

John Catsimatidis:

Dr. Marks, the question is, our creator who created us, the human brain is comparison to what today's computers are. Give me the comparison.

Robert J Marks:

Well, I don't believe so. I think that if one is a die hard materialist and believes everything can be explained by science and are materialist, if you will, you can go to no other conclusion than the brain is nothing more than a computer made out of meat, but there are also some people... Most notably, Roger Penrose won the Nobel Prize last year, maybe it was the year before, who says just the opposite. In fact, I learned a lot from Roger Penrose in reading his book. One was called The Emperor's New Mind. And he pointed out that there were things that computers will never be able to do. And one says, "Well, what about computers of tomorrow?" Well, computable means computable. And if you go back to the 1930s computers, today's computers and computers of the future, it all addresses the question, "Is what you do computable?" And in computer science, there's something fancy called the Church-Turing thesis, which basically says that even computers of the future will be limited to do computable things. And they will be able to do them faster, they'll have more memory, they'll be more amazing, but basically we could do them on computers here, even though it would take longer.

John Catsimatidis:

Can artificial intelligence... Can we develop them to have emotions the way we have?

Robert J Marks:

You can always make artificial intelligence simulate emotions. I don't know if you ever saw the movie A.I. where there's robot boy...

John Catsimatidis:

No. I did. But there was rumors around that Google last week had a computer that was a sentient being in artificial intelligence, and the computer was afraid it's going to be turned off and the computer was going to hire a lawyer.

Robert J Marks:

Yes. There are so many ways to take down that story, John. One of the things about these hype stories is, usually they come out and the rebuttal doesn't get the press that the original claim did. And if you look back in The Washington Post, a recent article said that this computer program that was named Lambda was trained using dialogue of over a hundred thousand questions and answers. These were called crowd workers. These are guys that come in and you hire them to do something. And they were told explicitly, and this is a quote, "The crowd workers are explicitly informed to reply in a safe, sensible, specific, interesting, grounded and informative manner." And guess what the artificial intelligence was trained to do? It was trained to respond in a safe, sensible, specific, interesting, grounded and informative manner.

John Catsimatidis:

The computer didn't interpret what the answer should be, it was pre-programmed by the programmers.

Robert J Marks:

Yes. Yes. Exactly. There's the old thing of garbage in, garbage out. Computer programs, including artificial intelligence, will do exactly what the programmer said they're going to do. They will never be creative.

John Catsimatidis:

50 years ago, I was a computer programmer. When I had my first three stores, I programmed the computers, the basic four computer at that time. I'm just an idiot right now with these new computers. But can the computer sort out all the social messaging and predict who the FBI or the CIA should look out for really bad people?

Robert J Marks:

Yeah. In fact, I have an article written about this recently. Can AI help with school shooters? And the answer is definitely yes. I mean, we've known the characteristic of school shooters for a long time, and I think AI can allow us to drill deeper in there and better identify these people. One of the problems is, AI can tell us who the school shooters might be, but there is something lacking called an explanation facility. It can tell us who potential shooter is going to be, but it can't tell us why. And so, it can aid us in doing that, but this is never going to stand up as due process in the court of law. And there's actually legal history of where AI has identified troubling people, and the court has thrown it out because the AI could not explain why it reached this conclusion. So-

John Catsimatidis:

Dr. Robert Marks-

Robert J Marks:

... it can help. It can as a tool, but not as a final authority.

Announcer:

David Krieger hosts The Power Hour, which can be found on KCXL in Liberty, Missouri, and KTRW in Spokane, Washington. Here's Dr. Marks' response to a question about the artificial intelligence church.

Robert J Marks:

In fact, there's entire religions which are based on artificial intelligence. One of the most incredible ones is a guy named Anthony Levandowski who founded an AI church. And the AI church, here's some examples. We are told that someday we will be able to be uploaded to a computer and we can be reborn into an eternal life of silicon. And so, that's kind of copying from the Christian Church about immortal life. That's the way they want to do immortality. They also say that AI someday is going to write better AI that writes better AI. Now, that's going to assume that the artificial intelligence is creative. In order for artificial intelligence to write better AI, it has to do something that was not in the intent of the original programmer. So it has to come up with creative ways of writing better and better AI, and that isn't going to happen. But if one has the foundational ideology, one believes that we are computers made out of meat, our brains are computers made out of meat, and indeed there is ample evidence that there's something going on there which is not computable. The things that I mentioned, for example.

So this Levandowski guy founded something called the artificial intelligence church. This was for real. He was in California and he founded the church. And what do you do when you find a church? First thing

you do is, you write a letter to the IRS trying to get tax exemption, right? So he wrote a little letter to the IRS about his church. And in it, he said, "The Way of the Future church," that was the name of his church, "believes in the realization, acceptance and worship of a Godhead based on artificial intelligence developed through computer hardware and software." This was a for real church, which was founded in California, and Levandowski started this church. I don't think he got very many members. I don't know if he got any members, for example, but I do know that there's a lot of people that worship at this artificial intelligence church that believes artificial intelligence is going to take over someday. Interestingly, Levandowski... Go ahead.

John Catsimatidis:

No. Did the IRS actually grant him the 501(c)(3) status?

Robert J Marks:

I don't know. I don't know a 100%. I do know that he applied for it. And the IRS, knowing how they do these tax exemptions, probably did. I don't know that for certain, no.

John Catsimatidis:

Yeah. How do they greet each other when you walk in? Nanu nanu?

Robert J Marks:

I don't know. I don't know. Yeah. It was a curious thing. But interestingly, the AI church had no equivalent of the 10 Commandments because soon after founding the AI Church, Levandowski was a Silicon Valley wunderkind, as they say, he was working at Google under their self-driving company called Waymo, and he wanted to move to Uber's self-driving company. And when he did this, he took 14,000 files with him and he was convicted of intellectual property theft. So they didn't have a commandment about thou shalt not steal. So the really interesting thing is that he eventually went bankrupt. His church now is closed because he can't afford to do it. Google had a judgment against him in the millions, and Levandowski just couldn't afford it. So that's where the AI church went.

John Catsimatidis:

And I think that people may not understand AI is basically like two categories, artificial intelligence and artificial general intelligence. What's the difference between the two?

Robert J Marks:

Well, artificial intelligence is defined differently in different places. If you get into my field and you go to these specialty conferences, they tease apart the idea of computational intelligence and machine intelligence, and artificial intelligence. But I think for the purposes of discussion, we can go with the kind of media definition, which is anything that a computer does, when you see it, you go, "Wow. That was really incredible." So that's my definition of artificial intelligence at a very, very high level.

Artificial general intelligence is this hope, this religion, that in some way and some day that we are going to have artificial intelligence, which duplicates everything that a human being can do. We've already talked about the fact that it's never going to be creative or sentient or have understanding. Computer can add the numbers 15 and 20, but it doesn't know what the numbers 15 and 20 are, has no understanding of what it's doing. And it's kind of like a software of the gaps. They believe that someday that they will have this software that actually is able to duplicate humans.

And then there is this idea of even going further than AGI, and it's to go to super intelligence. This was the topic of Ray Kurzweil book. The Singularity Is Near, I believe was the name of it. But it was the idea that AI would be creative and write better software, better AI that in turn would write better AI. Pretty soon we're just up against just a super intelligence. And that is never going to happen because all the super intelligence and AGI requires that the computer be creative, and the computer itself is never going to be creative.

Now, you have to define creativity here, and we can do that. But no, there is no evidence that a computer has ever been creative. AI has never, ever been creative. Well, let me define it really quickly. Creativity is when the AI does something that is beyond the explanation or intent of the computer programmer. In other words, the computer does exactly what it's told to do. And that's the test for creativity. If the artificial intelligence can do something which is beyond the explanation or the understanding of the computer programmer or somebody with similar sort of expertise. Now that doesn't mean that AI, it won't give us things that are very surprising, they give us surprising results all the time and many times unexpected results, but in every case, the computer and the AI is doing exactly what it was programmed to do.

I don't know if you remember, but there was this artificial intelligence that championed the world's most difficult board game, Go. Or we can even take chess, which is a more familiar example, and you could go up and you could ask that software, "Explain to me the rules of chess," and it couldn't do it unless somebody came in and programmed to do it. So what this incredible program did was phenomenal. I mean, it beat, geez, I don't know, decades ago, the world champion in chess. But it's very narrowly focused, it is not creative, it can't even explain to you the rules of chess. And that's, in general, what is characteristic of AI, is the inability to do something that it wasn't programmed to do.

John Catsimatidis:

And see, the old saying, Dr. Marks, was that computers are only as smart as their human counterparts, and I still hold that to be true.

Robert J Marks:

Absolutely.

Announcer:

Pastor Greg Young is the host of the nationally syndicated talk show Chosen Generation on USA Radio Networks, which can be found on stations, including KTRB in San Francisco, KDIS in Little Rock, and KYAH in Delta, Utah. Here he is with Dr. Marks discussing artificial intelligence and patents.

Greg Young:

There he is. Hi, Dr. Marks.

Robert J Marks:

Yeah. Can you hear me?

Greg Young:

Yes. I can. Welcome aboard. Great to have you with me. Thanks for being here.

Robert J Marks:

Well, yeah, it is good to be here. We switched to Zoom real quick, so I had to go comb my hair.

Greg Young:

I completely understand. I have my bathroom brush and my desk brush here.

Robert J Marks:

Exactly.

Greg Young:

And you got to brush your beard, and then you got to brush your hair and I'm right there with you, my brother.

I'm right there with you. You look great, by the way. You look spectacular.

Robert J Marks:

Well, thank you.

Greg Young:

Yeah.

Robert J Marks:

You do too. I do have to admit, my beard is better than yours, but-

Greg Young:

I know. I know. I had mine like that, but my problem was, is I was carrying too much of dinner with me.

Robert J Marks:

Exactly. Well, in fact, Pastor Young, that's the reason my wife made me shave up here, my mustache, because she says that it contains the aromas of meals passed. So that had to go.

Greg Young:

Oh, dear. I hear you. I hear you. Well, one thing that AI doesn't have is beards.

Robert J Marks:

Yeah. That's right.

Greg Young:

No. They don't.

Robert J Marks:

They don't have beards, among a number of other human attributes, right?

Greg Young:

Yeah. Like conscience and things of that nature. So it's funny, when I put out kind of lead into this, I was like, "Well, it's like The Terminator has arrived," right? And I have Alexa. I think a lot of people have Alexa for lights and different things of that nature. And so, my Echo turned off the lights this morning and I said, "Thank you." And they said, "Oh, thank you. You have made this AI's day."

And I thought about that as we were rolling into this. Number of years ago, I can't remember which, but I had a guest on, pretty wealthy guy, that was talking about AI and saying, "Look, people need to understand, this is the greatest threat to humanity. This is it. And people need to understand it." And this is a guy who invests in AI, has been involved in development of AI and so on. But he was just saying, "Look, people need to be aware that there needs to be controls on AI."

Robert J Marks:

Oh, exactly. Exactly. I would argue that it is not the greatest threat. I would say that thermo nuclear weapons are a greater threat. I would say that EMPs that have the capability of taking out our power grid are a bigger threat. And AI, I think, is often overestimated in what it can do in movies such as The Terminator. AI itself will never be sentient, it'll never understand what it's doing, and it will never be creative. And all of these things are required for all of these dystopian future sort of things to happen.

Greg Young:

So your suggestion too, is that some of our... Now we're talking about AI and a patent, that's part of the question that's going on here. How did we arrive at a place where it would be suggested that AI, that's not an entity, it's not a corporation, it's not an individual, it's not a partnership, it doesn't really fall within any of the guidelines or terms that we would associate with an entity with autonomy that would be entitled to that kind of protection.

Robert J Marks:

Yes. In fact, the US patent office has said that patents can only be issued to humans. And then we have to fight back, or we have to push back because it's the truth of the reality of the assumption that computers can be creative. Computers do not have the ability to be creative, and we have to define creativity. Creativity is something... If a computer program is creative, it does something which is beyond the intent, beyond the expectations, beyond the explanation of the programmer.

Greg Young:

Let's talk about the patent issue, and then let's go back to the WarGames, and again, kind of what we see in that as this computer computing the end of the world, if you will, which I think maybe that's kind of the genesis for the whole concept of terminators and so on. But let's talk first about the patent issue. You were mentioning that the patent office says that patents are only available to human beings. So how do we get to a debate then about AI and whether or not AI should in fact be granted a patent?

Robert J Marks:

Well, it's like looking across the room. I'll dovetail into your answer here just in a second.

Greg Young:

Sure.

Robert J Marks:

It's like looking across the room at a bouquet of flowers, you don't know if they're real or not. And then you go up more closely and you examine the flowers and you say, "These leaves don't feel right. Ooh, there's no dirt in the pot. This must be fake flowers." It's the same thing with artificial intelligence. On the outset, when artificial intelligence does something, there can be the illusion of creativity, but any of the creativity that happens from artificial intelligence is due to the programmer. And I'm an engineer, and us engineers do things like design stuff, right? And design is...

Greg Young:

It's been known to happen.

Robert J Marks:

It's been known to happen. Exactly. So design is an iterative sort of process. You come up with a prototype, it doesn't work very well, so you do a little bit of changing on it, and you do another implementation, and there's still some things wrong with it. So you iterate. You do a search for the best solution. In fact, there's probably stuff in your household now that was so designed. You're familiar with Formula 409?

Greg Young:

Okay.

Robert J Marks:

You know why it's called 409? Because it took 409 tries before they got the proper chemical that worked very well. It's the same thing with WD-40. WD-40 stands for water displacement on the 40th attempt. And it was done by a industrial chemist who iterated over and over and over again. So artificial intelligence uses invariably, a lot of this iteration, either on the front end or the back end. And in one of those cases, what it does is... It doesn't need a wet lab like they needed for WD-40 or Formula 409. All of the design information is within the computer program.

Greg Young:

It's in the computer program. Sure. Okay.

Robert J Marks:

Yes. And so, we can do it over and over and over again. And the faster the computer program does, the better. One of the AI issues, this is not the one in front of federal court, but it was a new type of antibiotic, which was discovered using artificial intelligence, and they generated a number of different antibiotics. How did they do it? They searched through a hundred million different molecules. Now, the computer had enough knowledge within the computer program to do this search.

Greg Young:

Right. But it couldn't go outside of those boundaries creatively and come up with an answer that was outside of the scope, beyond the information that had been put into its brain, so to speak?

Robert J Marks:

That's exactly right. In fact, there's an old saying, you're thinking outside of the box. And that's exactly what artificial intelligence...

Greg Young:

Or garbage in, garbage out.

Robert J Marks:

Garbage in, garbage out. That's another one. That's another one. Yes. Exactly. So if you're a garbage programmer, you're going to get garbage out. And if you're a good programmer, the only thing the artificial intelligence is going to do is what you tell it to do. Now with that in mind, the results can be surprising, they can be unexpected, but that does not imply creativity. The programmer itself was the one that guided towards that solution.

Greg Young:

Yeah. And as you mentioned, processing speed. So the speed at which the conclusion... In other words, whereas it might take a human 50 years, for example, to get to a particular answer just because of how we have to process, you could go and put something into a supercomputer, put all the components into that, and based on its processing speed, it can arrive at that in, I don't know, however long, depending on processing speed and information.

Robert J Marks:

Exactly. The head of the Allen Institute for AI in Seattle said something kind of profound. He said, "AI is nothing but a pencil." In the following sense, no matter what a computer program does, if you were given a million or a billion years, you could work it out with a paper and pencil.

Greg Young:

Right. Right. Because really that's all we've done is, is we've created a processor. That's why they're called processors. It's a process and then we attach a program to that process. The faster the processor, the more information created within the program. It's really the genius of the programmer, not the genius of the AI.

Robert J Marks:

Which brings us back to the patentability issue. The AI itself is nothing more than a tool and should no more be granted a patent than my word processor should be given credit for an article I write. It's just a tool to get me to a final solution. And make no mistake, it's a very powerful tool, and like any tool, it can be used for good or it can be used for evil, but it's a tool that we have available now to us.

Greg Young:

And we're going to run out of time. So what I'm going to do have to do is, I'm going to have to bring you back on to go into the whole WarGames and Terminator thing as a specific topic matter for us to really break down and discuss to help people understand.

Robert J Marks:

If you do, I got to go back and re-watch WarGames? It's been many years.

Greg Young:

Okay. All right. Sounds good.

Robert J Marks:

But I'd be happy to do that.

Greg Young:

Sounds good. Non-Computable You is the name of the book. Non-Computable You by Dr. Robert Marks. Dr. Marks, thanks for being with us this morning, I truly appreciate it. It's been a very enjoyable conversation.

Robert J Marks:

Well, thank you, Pastor Young. I enjoyed it myself.

Announcer:

This has been Mind Matters news with your host, Robert J. Marks. Explore more at mindmatters.ai. That's mindmatters.ai. Mind Matters news is directed and edited by Austin Egbert. The opinions expressed on this program are solely those of the speakers.