

Ep. 58 An Intelligent Look at Artificial Intelligence

00:07

Welcome to the federal tech podcast. My name is John Gilroy and I'll be your moderator. Breaking news. Breaking news, artificial intelligence can't pick up a newspaper can pick up your phone without reading about artificial intelligence, this artificial intelligence that and it's the end of the world as we know it. Well, I thought I'd bring in someone who knows a little bit about artificial intelligence and, and maybe help our gummies I was trying to understand a little bit more about it and, and how it can help them reach their agency goals. Our guest today is Daniel Serfaty. He's the chairman and CEO of a company called Aptima, a P T. I m a. And Daniel is no stranger to this realm. He's been involved in this role for many years. In fact, he appeared on a radio show with me a couple of years back and and we did the first radio interview was artificial intelligence, a person creation something again, so we had a lot of fun with that. So Daniel, maybe you can give our audience maybe a little thumbnail sketch of your background? And we'll dive right in on artificial intelligence helping my federal listeners.

01:05

Yes, John, great to be here. Thank you for inviting me back. I don't think that's the end of the world, it's the beginning of a new world. Certainly,

01:15

it's the end of the world to the world, I can't believe

01:18

it's the beginning of a new one. And maybe not the beginning. Artificial intelligence has been around for a while now, you know, this is the third wave. Now, since the late 50s. Actually, were the first meetings and thinking and planning about what artificial intelligence could be. But certainly the this time, it seems like it's grabbing the attention of the public much more. And primarily because artificial intelligence is very hungry for data. And we have more data. And without data, the artificial intelligence is very limited. With more, the more data you have, the more quote unquote, intelligent it becomes. And so this is really why there's so much talk right now about artificial intelligence. And the second reason, especially in the past, couple of months, few months, we have brought artificial intelligence to everybody's desktop. And I found with Chad GPT, for example, and this is the first time people are full contact with something that sounds like artificial intelligence. Those are GPT applications. And so I think this is, I've been fascinated as a as an aerospace engineer, which is really my background, too. Learn how the pilots in the cockpit can share the management and the driving of the airplane, literally the flying of the airplane with automation, and now with artificial intelligence. And so the role of the pilot, for example, has evolved a lot over the past 30 years, because certainly there is another intelligent species in the cockpit. And that teaming with between the human and the artificial is really what makes magic happen.

03:15



Well, here's my take on the human and artificial AI. In about an hour, I'll be driving downtown to Georgetown set my classroom, I've got six graduate students down there, and we go for about two and a half hours, we have regular little slugfest back and forth. And they have to write for me, and I tell them, I don't care about, I don't care about this chat. GPT stuff, I care about you. And we go back and forth face to face. I know if they read the book, you know, I know if they're up I know what what they prepared for our guest next week. And so, you know, I'm I think there is some people maybe in academia, kind of kind of wary of it. But I think at a certain level, I mean, you're gonna I mean, I've seen so many stories about GPT. And the good things and bad things. And I'm just very wary of it, whether it's the third wave or the fifth wave or wherever. So so let's talk about this third wave here. And so I look at as iteration I think there's another way probably in the next year or two, is that right?

04:07

Yes, actually, there is another version that just came out a couple of days ago, called GPT. For and what it is, it's basically look at GPT as a language model. Imagine a computer that you teach language in a very sophisticated way, not just the words of the collection. It's not just like a static library. But it learns from the language patterns from the the ideas and can link things in a way that perhaps sometimes the human brain cannot. And so because you feed instead of how many books do we read in lifetime as human beings 1000 Maybe, maybe 2000. Here is a device or a being that can read 10s of millions of books. And so, in a sense, it's not here to replace us and the exam. You gave with two classrooms. Excellent. The question is, can the human your human students, I assume they're all humans fared up paired up with Chad GPT, for example, and Chad GBD is just one example of an application can reach levels of proficiency, that will be higher than they will without it. That's really the idea. The idea is not one of replacement. Like Robots are coming here to replace us, but rather one of augmentation. Can we together teaming up in a smart way, in an intelligent way, with artificial intelligence achieve level of professional performance and proficiency that are higher? can we achieve those level maybe faster? That that we would have without it, and a lot of my work with my company and my colleagues are working on that notion of an optimal pairing and optimal teaming between those two intelligences. And the application of use leave for our federal customers, especially in the Department of Defense.

06:20

Well, I went to your company website, a p t, I m a, and looks like you guys started around 1995. Well, I want to bring up a topic that was 20 years before you started your company, mid 70s. There's this guy in Washington, DC here, right down in Rosalind exactly where it was. He's called Deep Throat. And the advice he gave to the Washington Post writers was follow the money. So it's all to follow the money here. And the federal government's pretty easy to follow money, a lot of it's transparent. So if you follow the money, what you find out is that the agencies in the federal government that tend to be investing in artificial intelligence, it sure looks like from the you know, the NAICS codes at the US seem to be more in the DoD area rather than other areas. So is there a specific reason for that? Or? Or is the DoD just having a free for all and, and throw money to 1000 companies and see which one works? Or what is going over there? And what's going to happen with all this investment?

07:15



I think it's it's a very well placed investment. Look, there is a race around the world. And like many things, we initiate things in this country, we invent things. And then when we don't continue to invest in them, other countries copy and catch up. So it's not just a question of a technology race, it's a question of national security. **It's a question of national security in which our competitors or potential adversaries are also investing seriously in artificial intelligence in all kinds of applications.** Not just in weaponry, but in intelligence systems in command and control systems. In systems that help decision makers, commanders make better and faster decisions. And if we are not there, if we don't capitalize on the Headstart, that our extraordinary creative, intellectual reservoir that we have here in this country gives us we're going to lose that race, we lose that race, it's almost like giving the enemy weapons for free. And we cannot afford that. And therefore we're still ahead of the game. But unless we double down, we other adversaries may catch up. And because everything is based on data, as I said, it's not just with real like, metal or traditional weaponry that they're gonna win, they're gonna win also the information war and the cyber war. So we better stay ahead of the game.

08:56

Well, Daniel, the next time you're in Washington, DC, flying to Dallas, and we'll take the train into DC. And as you're taking the train in, you'll see all these big companies, I mean, big buildings, their usual suspects is when they call them you know, and and you would think that these usual suspects and we don't have to name names here, we all know the names there would be, you know, at the bleeding edge of this, but it looks like there's smaller companies. I mean, if you look at this distribution of the money, it says like 300 small vendors here so it's like everyone's got different take on it. I mean, it's just it what is it going to be once someone is successful, then the larger company is going to get on this or the larger companies actually making investments in artificial intelligence help Federalists as well.

09:35

I think they've made the already making that investment they get that they got that wake up call, I would say about 10 years ago, when artificial intelligence cease to be an exotic things you can you can invest in and real differentiator in terms of competitive differentiators. So the big guys so to speak, the big companies also very heavily invested both internally, we're investing very large sums of money in internal research and development in data science, and artificial intelligence, everything that can give us an edge on the compute the what we call the compute side of the equation. **But for the first time, maybe in more so in artificial intelligence, it's the barriers of entry are not very high.** It's not like you have a, you're an airplane manufacturer, you cannot be an airplane manufacturer, if you're a 20 person company, but you can be an artificial intelligence company with 20 people. And so there is a new collaboration that's happening between, say, Silicon Valley, and those small businesses, that small startups that have an idea, and the big companies, I mean, open AI, the company that that is producing those GPT tools is a good example. It's relatively not a very big company.

11:04

You know, Daniel, I listen to a podcast just yesterday, and they're talking about artificial intelligence that took the medical exam to be a medical doctor, and past. And I was thinking about my friend in Los Angeles, who is a shoulder surgeon. Now she gets pushed a lot. I mean, she has a lot of pressure, and really important. And it could be that I'm thinking it, it's late into Thursday, and she's got 500 problems. And so it wouldn't be nice to have someone next to you that you could say, oh, geez, is 1212? Or what should I do in this particular



situation? And I think maybe that's if you look at, I have a bias towards the VA, and doctors in the VA going well, we have this guy, Daniel here and and I've been up for 24 hours, and maybe this artificial intelligence can help me make a better decision. I think that's, that's the human and artificial intelligence combination, isn't it?

11:56

That's a beautiful example. John, I think in **the field of medicine, the first domain that has been affected by artificial intelligence is already implemented on a large scale is actually radiology**. Ah, in which new radiologist have learned to, to team up with systems that have entered the market, you know, there are a lot of companies making a lot of money in that domain, in which interpretation of imagery like MRIs, CAT scans, X rays, etc, is being left to those machines, those artificial intelligence machines now, are they replacing the radiologist now, we don't have enough radiologists in this country, what they do is that they seriously improve the performance of that radiologist that can be swamped, and doesn't have time to go through hundreds of images, right, exactly. And he or she or he has an assistant, let's call it an assistant, that that went through 10s of millions of images,

13:02

exactly what I was thinking of, and exactly with all good doctors are busy, because they're good. So it is.

13:08

So this is an example when AI can be used for the good of all, by making the life of our doctors more bearable, so that they have more time to invest in those cases that really require their expertise and their attention. That's the one that do not why

13:27

well, we'll take and locate that and use that as an example of what this podcast interview is all about. Well, I'm gonna go from serious to something kind of simple. When my son was in high school, he paid lacrosse, and rappelling down the field with a stick and the coach used to scream out head on a swivel head on a swivel. And he had look everywhere and, and they just beat each other the sticks. I was at a satellite show yesterday. And I was listening to a couple of real smart people talk and they talked about situational awareness. And so the Space Force now has to look at satellites. And they have to consider situational awareness or head on a swivel, swivel, you know, and so, so your situation now and I think many listeners realize this, but there's, there's 1000s and 1000s of people, pieces of space debris out there. Now, there's going to be 30,000 more satellites, all kinds of constellations popping up there. I mean, I don't know how Daniel safty can sit down and get a piece of paper and figure out where everything is. You could get the top PhDs in United States top 20 of them and you're still not gonna figure it out. I mean, situational awareness in the military. Boy, this would have been nice to have, or what do you think's out there? You know,

14:35

yeah, I think that you gave her that. That's a beautiful example of where as smart and thoughtful use of artificial intelligence can pay off I mean, in order to have to be situationally aware, you know, we call that as a, you know, situational awareness in the military, in order to have a say, in a system as complex as a space system



that you describe when they attack have 1000s of objects flying around, not all of them nice objects, by the way, right?

As you can imagine, you need to do two things, you need to be able to track them all. So there is a question of size and scale that you, you know, you miss one you can endanger really a mission. And the second is to make sense out of what out there, which is really where the artificial intelligence can help. It's not just counting them and being aware that they exist. But what does it mean? Is there a pattern that is being developed there. And **if if there is one thing that artificial intelligence is very good at is detecting patterns.** That's really what most of the algorithms you may have heard about deep learning or neural networks, which are the the algorithms that underlie artificial intelligence, they are very good at looking at complexity. And simplifying it by showing there are two or three patterns you should pay attention to. And this is where then the space commander, or the Space Force commander can enter and say, Okay, you highlighted what I should pay attention to, now I can put my brain and my expertise to deal with that problem. So essay, or situational awareness is a very good example when that AI can help with that enormous complexity that, that we have in in space. But also, frankly, in other theatres of, of concern,

16:29

I want to pull back the curtain here and talk about behind the scenes, kind of like in Wizard of Oz, pull back the curtain behind the scenes. So I have a friend who has got a PhD in math, and she taught for many years. And she decided to leave academia, and she took a job with a company in town here. And they paired her up with a software developer. And so the way I understand it is, there are very bright software developers who understand all kinds of coding and can do circles around everyone. But sometimes their mathematical capabilities may may have a limit. Now you get someone who understands complex math, and they can really dive in and talk about, you know, the mathematics required to assemble code for artificial intelligence. And this is like, a, I don't know, it's pizza and beer or something, it's a real nice combination. And that's really what you need to really implement this, isn't it this mathematical capability and the the development knowledge,

17:21

exactly they are, you cannot do one without the other, by the way. And I think the the, that that software developer is probably also a data scientist of sorts, who knows how to exploit those algorithms that are being developed by the mathematics to apply to those large sets of data. So it's a give and take that you have between those two, in my company, for example, I do have those applied mathematicians working hand in hand with the software developers. And in order to produce insights that cannot be done with one way or the other. We have a third element that is really important for us to understand, literally the future of work here. But this is what we're talking about when we are transforming the job of a commander or a radiologist, etc, we are imagining how all our jobs are going to be affected. And that third leg, besides the mathematics and the end, and computer science, so the software is really understanding the human dimension of that you cannot develop a great artificial intelligence system that's going to be on the shelf somewhere, unless you understand it is designed to serve as a partner, or an augmentation to the human expert, you're supposed to help. So the design itself, you need to have a deep insight into the human mind to be able to optimize that.

18:57



Back when you started your company back in the 90s. In fact, before the 90s a lot of computer science is to say garbage in garbage out. Yeah. Well, you know, I don't know if that's changed much in the last 30 years. Because I think when you consider I mean, this is sorry, here of the scenario of the woman with a PhD in math and software developer, and they get to see what's going on, and everyone's gonna bring a bias to the game. And so how do you prevent bringing a bias to that? If, for example, the analysis involved in understanding radiology, I'm sure there's a bias based in there and, and so how do you make sure that the data that's used to train the systems, there's an old phrase and Latinus called who, who watches the Watchmen, you know, who, how do you guard the data?

19:39

So this is a brilliant question, John, I wouldn't expect less from you. But it's, it's still it's still an open problem. Because at the end of the day, it's not so much garbage in garbage out is that if you feed if you take, for example, I mean, the the issue of the ethics and the bias came up on data about about court cases, if you feed all the precedents to an artificial intelligence system that happened over the past, say 50 years in the United States, and then you offer a new case, and you try to analyze that new case, all the biases, all the wrong judgments, all the, perhaps even racial, or gender, or any kind of other biases that happened in the past are going to be reflected for that new judgment. Now, obviously, the there are some systems today that are looking at that, and trying to so called D bias the data. And there are some folks whose specialty it is to do that today to try to balance it. But it's a huge open problem. Because until the we develop an artificial intelligence that reflects about itself, like a human will do, and say, I have to be careful not to be bias, if I render that judgment, until we can reach that level, and we have not all the systems are going to reflect basically what you fed them to begin with, as you say garbage in. But it's it's one of the open problems, right now, many, many smart people are working on.

21:22

And I don't want to, you know, hit a delicate subject here. But I think you have to have a wide variety of people working on this problem. You can't have all your engineers are from Duluth, Minnesota, and you got to have an engineer from Rio de Janeiro, you gotta have someone from Kyoto, you have someone from Chandigarh, you gotta have someone from, you know, middle of Africa. I mean, you have to have a diversity of opinion, because everyone's going to have that bias. But my experience has been is, the more you put into salads, the better taste, the more the more stuff you put, the more different inputs you have, someone's gonna say, Well, you know, by the way, Daniel, we don't pay lacrosse over there, we play soccer, bulk. And then you have to, it's a slight difference. But this whole hetero, heterogeneous input, I think that that's important.

22:08

That's very important. And really the good companies and the newer system that can absorb more and more data are actually very conscious of that. It's literally data engineering that you have to do before, before you feed that to those systems. Because the more the more complex the system is, say you feed the the let's go back to our our radiologists, experts, you have fed that system 10 million images. Really, this is a scale that those systems absorb before they can give advice on case number 10,000,001. And so let's let's, let's assume that we have fed that to that system. And that that system can only reason the more diverse the cases, the better, because that systems becomes much more inclusive of all the cases that are on the margin of the



cases what I mean, in terms of diagnosis of whether or not these brains can show the tumor are not a tumor. And therefore, I think the more diverse the data is not just for ethical reasons, even for accuracy reason, the better the performance of the system will be. That's absolutely.

23:34

So let's say it's 100 degrees outside down the road from when we recorded this interview here and one of my listeners wants to get more information. A PTIM a.com. Do you have any articles here or any information that would specifically apply to federal situations, the medical may apply to both the federal VA and outside? Are there good articles that you recommend? Maybe it's your site that might be of interest to my listeners?

23:57

Absolutely, they are on the site. Some articles are listed actually, on our website, I one domain that I'm very fond of, is in education and training, the application of artificial intelligence education of training, which is about half of our work at Aptima, in which we use artificial intelligence to do what we call precision learning. And that's that's a fascinating way to use AI to do adaptive training. So if you and I go and need to learn a new skill, the AI will learn will know how to teach you very differently that how to teach me depending on my progress or preferences etc. We have several articles about this domain called adaptive training that is based on advanced method of artificial intelligence. I would really recommend to our to your listeners that they go there,

24:52

or what I recommend to my listeners is a podcast that Daniel has, you can go to website lists the podcast it's called mind works out hosted by Daniel surfacey. So if you listen to one podcast, you tend to isolate six. And so if you enjoy this topic, he go into deeper dive and find out even more about this because Danny really has a very, very, it's the company didn't like, you know, last week higher assigned company and put artificial intelligence are the front door is like this has been baked in for decades now. And, and they can talk about the iterations and the generations and more there. So I think it's a, it's a real good place to start, especially if you have some kind of a funding problem. If you're bombarded with all kinds of information or, or new information. I mean, we can take like the amount of information coming from the satellites, what about from the railroads, all of a sudden, they may increase numbers. This is seems very pedestrian, but apparently very important. Railroads all over the place, and the sensors coming in. And so the sensory port something, how can you keep track 24 hours a day from the sensors for the 1000s of miles? And I'd say it's I mean, from from the, I guess real trendy satellite stuff to something down and dirty the railroad tracks bringing some iron ore into Pittsburgh, you know, this is practical, isn't it?

26:03

I think this is key John, and I am I am very optimistic, you know, you have the doomsday predictions here about the robots are going to take over the world. It's not the case, I think it can, it can signal if it's used properly. AI can signal a new era in our in our conditions, even as humans to understand that there is what people call the new species in our midst, that is different from us that is not more or less intelligent, that is differently intelligent that we are. And I think that's going to transform not just our work that's going to try and form our entertainment that's going to transform our lives. And we better embrace it. But at the same time, be careful about it, not to try to anthropomorphize it, which is a fancy word to say make it human. It's not. It's not



we have some human qualities that I think are never going to be attained by those artificial intelligence. And I am very optimistic that society is going to evolve in a positive way. In the future when integrating artificial intelligence in a thoughtful and graceful manner.

27:14

But Daniel, Daniel, you'll never get a movie contract talking like this. Hollywood won't talk about it. You're okay, we can actually use it as a tool. It's like when the inventor first plow. No, it's not gonna take off. It's gonna help a human maybe grow more food. And so I'm telling you, I'm gonna your Hollywood contract for \$10 million. Dan's gonna be canceled this afternoon. You're in big trouble.

27:35

I would rather cancel my Hollywood contract and give the equivalent one from the Department of Defense.

27:42

Yes, that makes sense. Well, unfortunately, Daniel, we're running at a time. You've been listening to the federal tech podcast with John Gilroy. I'd like to thank my guest, Daniel surfer, the Chairman and CEO of a company called Aptima. Thank you, Daniel.

27:55

Thank you, John. And pleasure.

