Introduction
Hi, welcome to the Sayers Conversaytions Podcast Series. Today, we're here to talk about AI, we have a very special guest and that is Matt Kuperholz, enjoy!

Russel
So welcome to a Sayers Conversaytion. This is actually a special edition, I'm calling this a special edition because we're all reading about AI. And as a result, I've asked our friend, and AI scientist and advisor Matt Kuperholz from Kuperholz consulting. He's also I was very pleased and interested to see he's now a professor of practice scent of the practice into the AI and future work at Deakin University. He's been operating in the AI business for a very long time. That's how I in fact, first had a busines interaction with him around I think what we were calling it was ethical AI. Anyway, Matt, welcome.

Matt
Thanks Russ.

Russel
Great to see you. This is the Sayers Conversaytion, and what we try really hard to do is have a top chat with people that are experts in a particular field, and see if we can't learn something. Certainly my intention is to learn something from you Matt, and I'm hoping that if I learn something, then some of the listeners will as well. And as I said in the intro, you've been in the AI world for a long time. So maybe just give us a bit of background on your AI life.

Matt
So Russ, I started life as an actuary, which is what you did when you were good at maths and you wanted to get into business. And much to my horror at the time, I actually failed a subject in first year uni, which meant I couldn't go on to second year actuarial, was the first time I'd ever failed anything. And I took up computer science, I'd always been into computers as a hobby was not particularly cool at the time. We're talking about late 70s through the 80s, and fortuitously failing, the subject meant I picked up another major in computer science. So I actually started studying AI in my undergrad in the early 90s. And then, as I was doing this actuarial work with a fantastic company that had put me through uni on scholarship, I realized that every opportunity I got, I was trying to integrate more and more computers. And I turned around one day, and thought I could probably do what I loved for a living, if I took the actuarial rigor and maths and combined it with computers and got involved in the late 90s in an AI startup. So it was very early days. Very, very good luck. Yeah, with the benefit of hindsight, right place and right time. Yeah. So I've been using AI almost daily for probably over 25 years.

Russel
Okay, so when you say "I've been using AI almost daily for let's call it 25 years", so let's go back 20 years ago, what was what did AI look like then?

Matt
I think this is probably a really important point to make. Now Russ, AI is a tool, we are essentially as a species, a smart, hairless tool using type of ape. And we should only think of

it as a tool. So it is a means to an end. So what AI looked like then, is actually how AI should be thought of now, which is I have a problem, or a challenge. Usually, in my field of consulting, it's a business challenge, or a societal challenge. And AI is a way of working with usually data, but some information space to bring value or to help solve that challenge. So what it looked like in those days was a way of working with multiple dimensions of data to shed light on a problem, the problems were often around customers. So my clients had customers who often churning they were leaving a telecommunication service or utility service. Or, most interestingly, leaving an airline because leaving in airlines not porting your telephone number, I just start seeing you less. And the traditional way of looking at that was you know, we want to understand why they're leaving, we'd like to stop them. Maybe it's with marketing, maybe it's with direct communication, maybe it's with pricing or product offers. Maybe it's just with a bit more love. All we want to forecast or predict who's going to leave so we can intervene early. And without AI, with traditional statistics, you might look at that data and say, you know, here seem to be factors that are important. It's that prices rose or the net workforce failing. AI as a tool in that space was just a great way to look at more data at the same time and not reduce things to you know, small low dimensional relationships, but rather consider the entire customer relationship.

Russel
I got it. Okay, so plenty of variables. Okay, so, when I think about AI, I can go on the optimistic side I go well, in 1980 I was pretty keen on and I liked the idea early 80s of being a drummer, I fully thought I'm going to be professional musician, and I'm going to be a drummer and then the drum machine came out. I thought, oh my god, you know, there's going to be there's no future for drumming, when, of course, all the drum machine did was just my drumming better. I'd say, drummers now, using both drum machines and the traditional method in order to be even more awesome at what they do. So I suppose I can look at AI like that. Or I can look at it and say, people believe that there needs to be global guardrails. This sounds like nuclear, you know, we could go nuclear.

Matt
You should hold both ideas in your head at the same time. Kranzberg law of technology is technology in and of itself is neither good nor bad. Nor is it neutral. And that last bits, the confusing bit, right. It's ultimately what we do with it. So I think both of those things are correct, Russ. Look at chess, we might have thought that chess was destroyed when computers started beating grandmasters, first off in 98, with deep blue beating Kasparov. Chess has never been more popular on the global stage. And then it is today. And every single one of our mobile phones can beat Magnus Carlsen

Russel
So, the other part of it is, you know, concepts like the machine is going to fill space. When the machine becomes smarter than humans, it will just fill the universe, which ultimately leads to the singularity. And then as Isaac Asimov said, So what then what happens after that? Well, the machine says, Let there be light. I like thinking about those sorts of concepts. Is this in the world of, you know, space fiction? Or is there some truth to that?

Matt
There's definitely some truth to it. Science fiction has usually steered reality, if you like. The printing press took away handwriting scribes and actually helped knowledge spread. The Knitting Loom took away manual creation of textiles. We've seen examples in the agricultural revolution. We've seen examples in the Industrial Revolution. We've seen examples in the first digital revolution, and we're seeing some great examples now in the artificial intelligence revolution. Possibly this is different, same same, but different, in that without anthropomorphizing too much and saying these are machines trying to be smart like humans, the access to knowledge and the automation, the ability for these machines to self modify and use themselves, does pose new risks. But then again, then knitting the steam driven Knitting Loom has entered new risks to humans as well, you could fall into the thing and get your arm torn off. So beware the hype. I think a Balanced View is important. I think our first great AI experiment was social media, and we failed dismally.

Russel
In terms of regulation?

Matt
Regulation and forward thinking about the implication of a goal seeking function. So this is the essence of it, AI and computers in general, will only do what they're told to do. And social media was told maximize time on site.

Russel
Yeah. Okay. So that was the goal, the goal seeking function, maximize time on site, which therefore meant?

Matt
That the algorithm determined that the easiest way to predict accurately greatest time on site and to continue with next best offer of video, was to nudge people towards extremes where they're more dependable.

Russel
And the reason why we want people to stay on site longer, of course, time spent viewing is to generate revenue.

Matt
Under that model, yes, I can think of some other models of government subsidies where time spent on site to increase education and awareness and a balanced view, might give a tax break, and therefore we'd have a different type of goal seeking function.

Russel
Oh, I like where you're going there. So does anything like that exist?

Matt
Well, technology is neither good nor bad, right? Nor is it neutral. What about in the education sector, where we're not purely profit driven? And we're under pressure to reinvent the education model, especially in the face of this AI? And one thing to do is say, oh,

no, everyone's going to cheat, this is horrible. Another thing to do is say, Wow, what an amazing tool now at everyone's disposal, we could really have a phase change in an industry that has remained largely unchanged for hundreds of years.

Russel
Yeah, it was interesting to read, I think was Greg Jarrett and today he was talking about AI offers an amazing opportunity to go back to the classics. And to pursue creativity for creativity sake.

Matt
Augmented creativity, right? AI in terms of augmented intelligence, which is that idea of we're leaving humans in the loop. It's not autonomous or automated intelligence. That's two other AI's I use where humans are out of the loop, but we're augmenting them with creativity. So one of the ways my son actually uses these tools is for inspiration, not the final product. Imagine you're creating a new science fiction movie and you want to have an alien that looks different to anything you've seen before. You deliberately raise the temperature of an AI which means you let it behave more randomly. You let it hallucinate a bit harder. You give it some prompts, and you start to see some crazy idea for aliens that the human then comes back in the loop and refines and then maybe uses another tool.

Russel
It's interesting that you use the word hallucination, then, because I have heard recently that actually, chat GPT, which I suppose is the headline, act, chat GPT does hallucinate?

Matt
Yes.

Russel
And so explain that.

Matt
It's, again, you know, borrowing a human term and redefining it for computer science, hallucination states something and it states it so confidently, that you believe it to be a fact, but it's actually completely made up, it's hallucination.

Russel
So it's bringing together a number of inputs, data inputs, and coming up with what it thinks is the answer, but it's not. Also it's not wrong, though.

Matt
No that's wrong.

Russel
It is wrong?

Matt
It's wrong. But it says it in a way that's correct. Now, if you are asking for medical advice, that's not a good thing.

Russel
We don't want it to be hallucinating.

Matt
And when it's brand new, it's two minutes old. We're moving towards safeguards to stop hallucination. Remember that the knowledge compressed into generative, pre trained transformers in GPT, and chat GPT, were frozen at September 21. So ask it anything beyond that, and it's got to be making it up. But there's also ways of using it to limit those hallucinations. And there's a lot of clever thinking around safeguards and programs that work in tandem, to fact check and this is only one technology AI is in fact, a whole field. And when these things combine, you'll have a more reliable, stronger results.

Russel
I think what's interesting about the notion of hallucination in that that's it's a negative word. Right, it's hallucinating. You could though, say it's just being creative.

Matt
Well, I don't think hallucinating is necessarily negative. When someone is being creative, some of the, you know, the most creative novels, ideas and works of art, non traditional thinking, I'm playing with something called Dream GPT. Dream beach GPT is a version of this algorithm where it's deliberately encouraged to hallucinate. And it does that to try and spurn creative ideas and new things.

Russel
So I suppose that's where that is where I was going. And I'm wondering, do I like that?

Matt
Why not?

Russel
Because the bit that makes us different from machines is our creativity.

Matt
Not anymore. I'll give you my theory on creativity.

Russel
Please!

Matt
Because I think we should talk about consciousness as well. And I think that these machines for the first time or giving us creativity, without consciousness, and I think how that works, is nature creative when it when it makes some interesting swirls on a beach with a wave? I'm not sure. But let's talk about the creativity that you get from novel prose or an image

program. There are three factors involved. The models are very large and complex. Right? They weren't creative until they hit a certain size, it was the same approach just more of it, like our brains. I'm not sure a worm is creative with less neurons. But something happened when we got enough neurons that it became crowded. Second of all, they've been exposed to a lot of data. Yep. I'm not sure a newborn baby is inherently creative. And the third thing, and this is, I think, the most important change from what's happened in the past. Our brains work on chemicals, neural networks, with electrochemical reactions, and they are imperfect. In other words, neurons will misfire. You know, it's not a binary yes or no, like on a computer. And I think that misfiring together with being large and complex, together with having stored lots of data actually is where creativity comes from. An idea was accidentally linked to a memory was accidentally linked to something that you're about to say, and creativity emerges. All of these technologies that we are seeing as creative actually have randomness. And I think that inventive randomness, when you run GPT with no randomness and only picks the most likely next word, it's distinctly less creative.

Russel
Got it.

Matt
It's when it picks from a distribution with some randomness, or when mid journey or Dali creates an image, essentially by working backwards from random noise. So I think randomness was the missing piece of the puzzle that allowed machines to be creative.

Russel
And does the idea I assume the idea of inventive randomness may lead to breakthroughs that we haven't seen before? Let's say in the world of science, in the world of medicine

Matt
All kinds of things were genetic algorithms for design where you give a computer a parameter, like we need this thing to be strong and light. And a genetic algorithm is something that evolves. So it works on it's previous one, and it starts with some random seeds. So there's randomness in it, and you get these most amazing, organic, almost lifelike bone structures that have solved that problem of being light and strong. In medicine, you know, protein folding through Alpha fold, I'm pretty sure has got a bunch of random seeds in terms of how it tries to find the best solution through what we call the recurrent deep learning neural network. So yeah, I think the addition of randomness, has been a real breakthrough.

Russel
There's already been some breakthroughs that, you know, like practical breakthroughs in terms of medicine design.

Matt
And let's not, let's not not attribute this to the humans

Russel
They created the thing. And the AI was created by humans in the first place.

Matt
And now the AI is helping create other AI. It's bootstrapping. Yeah. But we started this. It's our crowning achievement as a species, maybe splitting the atom was as well. And look where that took us.

Russel
Okay, well, so which is interesting, is it not? Because you know, the notion of well, so nuclear is interesting, isn't it? The parallel is there, it can wipe us out, but equally can power us in a wonderful Green way.

Matt
You can hammer it in an aisle or you can hammer my head but you know, there's there's an ancient part of us that is still very warlike. Yeah, it's not that ancient at the moment, if you look at the world, and sometimes our tools, we work naturally with this idea of make us better to the detriment of them. And the sooner we think of us as not just the entire species, but the entire planet. And them as well, other things. Viruses. I mean, we would never have had a vaccine, both developed and then distributed as quickly as we did without these technologies.

Russel
Wasn't that incredible? I mean, one of the things which I don't know that we, we didn't celebrate, in I don't think we celebrated here at all, actually. The most emotional I got during the pandemic was when the woman from Oxford, who designed AstraZeneca, when she turned up at Wimbledon, do you remember that? And she was just given a standing ovation that went for a very long time. And it struck me that they appreciated what had been achieved so quickly, and everyone appreciated that was what was going to get us out of the situation that we're in. Operation warp speed. Well that was Trump's version. But still, I mean, it's so weird, isn't it? Is it not? He did create operation warp speed, and the vaccine was created in warp speed. In the meantime, he was doing press conferences and saying silly things.

Matt
But not just Trump. I was on a roller coaster ride of emotions when the virus hit. I said AI is gonna get us out of this in record time. And then when that happened, and we then had such massive rejection

Russel
Oh it was utterly insane.

Matt
For anti scientific reasons. It was it was a lost faith in some of humanity with that Russ

Russel
It was leadership, at it's worse.

Matt
I'm more worried about the followership, you know, the large number of Australians and elsewhere that immediately leapt to the distrust of probably one of the most amazing things we've done. It made me very sad.

Russel
Yeah I buy it. War, we mentioned that, you mentioned that a moment ago. Did you see that the Ukrainians created a fake Putin.

Matt
Yep.

Russel
At what point are we going to believe...are we going to know what to believe?

Matt
I love this topic.

Russel
I didn't know, but I thought you might!

Matt
Russ, this is about trust. And I think that our successes as a species with these tools, and moreover, the interconnectedness that the bombardment of information that comes from the interconnectedness and the speed of information is both breaking trust, and these technologies with deep fakes are harming trust, and the spread of disinformation - ultimately, the ability for anyone to publish, only going to listen to Elon Musk saying, this is the reason why I think Trump should be back on Twitter. And I'm not going to weigh in on good bad or free speech. But I also think that these technologies are going to solve this problem. It's neither good nor bad. It's what we do with it.

Russel
Yeah. Okay.

Matt
So think about in the bottom of your browser for a long time, you've seen a padlock, which lets you know that it's really your bank. And that's an incredible invention, again, of humanity called asynchronous encryption and digital certification. And that uses the fact that very, very, very, very, very large numbers, easy to multiply together, but difficult to factorize. That's essentially the maths behind it. But what it allowed us to do was to use math to certify that that is that certificate holder. Okay, so that's the first breakthrough.

Russel
So that's the blockchain world.

Matt
No, this is before that, this is asynchronous encryption, which solves the key distribution problem of World War Two. So in World War Two, when you wanted to have a key to decrypt something, you had to get those code books out to all of your submarines and all of your fleets and they looked it up, okay? Imagine I give you a box with a padlock. But I had to ensure that everyone who wanted to open my box had a key. Now imagine instead, that I gave everyone a padlock. And you could put a padlock on anything and send it back, and only I had the key.

Russel
Very cool.

Matt
So it's the maths behind that. And that is just a very clever mathematical trick. If you look up RSA, named after the three guys that invented it, that was a huge breakthrough in the key distribution problem. And that's how we can trust when there's a padlock in the bottom of our browser that it's actually our bank.

Russel
Has the world of data...as we've digitized the world, has enough money, has enough effort been put into the padlock.

Matt
The padlock had to take another important step. And I'll finish off why I think trust is a solvable problem. The trust that you bring up of was that a person. Even though we had the padlock, the asynchronous encryption, we still had centralization in terms of certificate issuers, or we still only really trusted our bank. There was another challenge to be solved, and that was the challenge of decentralized trust. And that is the world of blockchain, or rather distributed Ledger's, and that's another phase change in the ability to have trust between parties in a distributed network without having to have someone in the middle. So I can put something on a ledger, imagine it's just like a very big book, and everyone can write in it. And if I write in it, you know that I wrote in it, you can't change what I wrote. And you can look at what I wrote. So, imagine if what my phone automatically writes, and I'm actually very tempted to do this for the Android and the Apple infrastructure but I suspect it will be part of all operating systems before too long. Every photograph you take has a unique digital signature. That signature is signed with your certificate that belongs to your phone, that's placed on a blockchain.

Russel
Got it.

Matt
I don't think that any photo was taken by Russell, unless it was. So, we move from not knowing what not to trust, to only knowing what to trust, we moved to a whitelist world because deep fakes are so pervasive and so real, but it'll be in the background. That's genuinely your child's voice. Not a copy.

Russel
Okay, but we need that, don't we?

Matt
Yeah

Russel
We sort of need that now. It was interesting. I was having dinner with a few people, young 20 year olds, and they were talking about how they'd like they liked the idea of having a wax seal. Like literal, not a digital wax seal. But literally, you know, like, a ring, wax bang. That's mine.

Matt
I've got one of those. I like mixing old tech with new tech. I sealed a bunch of letters with a wax seal the other day and burned my finger. But um, yeah, this is that Rus, but to make it easy for everyone to use, it's got to be in at the operating system level. Whether it's Windows or Mac or your iPhone or otherwise, it's just got to be part of a system that we inherently trust. That helps provide trust in a world where technology means trust is challenged.

Russel
Okay, so the digitization of the world. I'm putting you in charge, you're in charge of that. I assume you think guardrails are important? Maybe you don't

Matt
No I absolutely do. I like regulation, David Walsh wrote a fantastic blog defending why he needed everyone who worked at Mona to be vaccinated. He talked about these annoying laws that stopped him doing what he wanted. And he was talking about traffic lights. Why do I have to stop at a red traffic light?

Russel
Yes I remember, yep.

Matt
Why should you not drink drive at .15? Or drive 180 down Collins straight? Why should you pay taxes?

Russel
Because there's stuff that just makes society work.

Matt
Yeah. As soon as there's more than 150, roughly of us living together, we need stuff.

Russel
Yeah, exactly. So we need the regulations. And no matter what field we're talking about,

Matt
and it doesn't have to be top down centralized regulation, there are ways that we regulate behaviour all the time with consumers voting with their feet, for example. But we need trust, we need transparency, we quite often need independent third parties who we can trust to audit and sign off on these things. But absolutely, I believe in guard rails.

Russel
Does there need to be a minister for digital trust?

Matt
There probably needs to be some sort of global consortium that works on it together because this is ultimately borderless.

Russel
Yeah, indeed. Okay. So you need something like the nuclear Non Proliferation Treaty for the digitization of the world.

Matt
Adam Smith's invisible hand, did not solve for everything. Adam Smith's Invisible Hand is what led social media to perpetuate hate and misinformation, interfering elections.

Russel
Yeah. Okay. Yes, it's an open marketplace for ideas, but when the ideas land, we need to just assess

Matt
and not just be driven by the dollar, but by some other measure of value.

Russel
Okay, so the, the notion of what triple bottom line is that where we're going or is that too consultancy?

Matt
No, that's fine. Triple Bottom Line just said, you know, we might now call it...look at ESG regulation. How great is that, that you actually have to look at your supply chain for modern slavery.

Russel
It's very good.

Matt
So that sort of thing, for digital trust.

Russel
So globalization, where do you stand on that?

Matt
Which part of it?

Russel
Any part of it. That's not a great answer from me!

Matt
Tell me what you mean.

Russel
Okay. I think there's an argument that we actually had peak globalization pre pandemic, I don't mind reading about that and thinking actually, I can half buy that

Matt
you know, it's very easy for us to travel the world and access our files anywhere and put a piece of plastic in a hole in the wall and get out local currency. But you still have Russia sitting with the EU in security forums you know, we still have still have this stuff that's going on

Russel
That are in the tent.
LBJ?

Matt
you know, I think parts of it are certainly accelerating Russ and connectedness we've never been more connected than before and in my holiday recently in Japan just returned, the ability to hold my phone up to you know, incomprehensible Japanese text on the wall and have it usually translated for me and my partner talked about how her ex husband and her used to fight because they couldn't find an address in Japan because impossible and now we can do that easily with Google Maps anywhere. These things are fantastic and they're bringing the world closer, and they're still allowing cultures to be unique and hold appeal, we're not talking about turning everything gray or vanilla

Russel
so Matt I didn't introduce you to Freddie earlier I should have, so Fred is from Good One they produce the Sayers Conversaytion. And what I asked Freddie, in a minute, is if he's got anything he might want to ask you. Alright? So he might even be as smart as you. So just watch out. So I've written two random things down here for no reason other than they're just random things. Asymmetrical warfare.

Matt
So weaponization of AI, has probably already happened when I talked about the social media experiments and the ability to target misinformation at certain parties and create discord. There was a view that enemy, well, unfriendly nation states were deliberately proliferating on both sides of the abortion debate to create discord, but more significantly, very, very intelligent computer viruses and cyber attacks are assisted by AI to find these vulnerabilities. And, you know, I think there's a fantastic example of that which put the

Iranian nuclear weapons program indefinitely on hold by infiltrating the centrifuges that were trying to enrich the uranium. You know, that's asymmetrical AI warfare. Right.

Russel
Got it. Black Swan event?

Matt
pandemic?

Russel
Yeah. So can you see a black swan event in the world of AI?

Matt
Great question. Yes. You know, you've heard me talk a lot about exponentiality. And the fact that these things just continuous but now so steep that they appear to be a different place, and that they all combined. But we could have a very rapid breakthrough, let's say in quantum computing combined with a new type of AI algorithm that mixes the best of a transformer model with a something else model. Transformers are still only one way they don't have feedback and recurrence. You know, even absent quantum they might be mixed in a certain way. We've seen the resurgence of analog computing Russ, right, which is cheaper because one of the concerns with this technology is it's expensive. And I just use that mainly in terms of power district power consumption. So when you're trying to do a bunch of AI at the edge, let's say intelligent computer vision, it turns out these neural networks, these deep neural networks that have already been built, which we're now attempting to just run, they have an analog paradigm. And if you build back an analog computer, and a lot of people are doing this investigation at the moment, you can run them much, much, much, much, much more cheaply. So the black swan event might actually be that neural networks are, you know, much more available at much lower cost because we've switched from digital back to analog or a hybrid of the two.

Russel
I was reading Katherine Wood from Ark, uh, last week, she was actually in Australia ,very famous, you know, investor. She was big on Bitcoin.
Anyway, she said this time next year headlines are going to be AI's improved productivity to such a level that there's no longer an issue with inflation, interest rates are on the way down.

Matt
The economy is a very complex thing and it's hard to see what effect something will have. But the first part of that statement is already here.
My own personal productivity, as a coder, as someone that has to use computers to get a job done. I used to have a team of 300 people where I would say, Hey, I need you to do this and this and this, and then make it, do this, this and this. And I was worried about no longer having access to that team to get the job done to solve the problems.
I am using GPT to write that code. It's not writing perfect code, but because I know enough to perfect it, I conservatively estimate a 10x increase in my productivity. And not only that, it's helping me enter states of flow.

Russel
I love it. There was a woman in the Fin Review today and she says that Chat GPT is saving her 5 hours a week and $150 a week on her grocery bill.

Matt
Boring, meal planning. Come on!

Russel
I was just very interested in that because of course the article above it was going, Oh AI what's going to happen to the world, you know? So I love the fact that the editor put a very practical article and you know, you yourself are using it practically.

Matt
Russ we gotta be aware of they hype, you know more than anyone else if it bleeds, it leads. Of course we should have a balanced view and we should be considering not the dangers of the technology today, but the pace at which it's moving and now able to self improve. I highly recommend Max TEGMARK, who runs the Center for AI at M.I.T. and was interviewed by Lex Fridman on his amazing podcast. He was his first guest, and he's also a 305th guest. And Max is down the conservative end, he led the letter for pause. Lex Friedman also interviewed Sam Altman, CEO of Open AI, who's putting these tools out there, who's kind of on the other end of the spectrum. But Sam Altman is also calling for guardrails and responsible AI, or as you wanted to call it, AI Right, which I think is perfect.
I'm seeing Sam Altman talk on Friday and I'm super excited. I'm like a fanboy, he’s here in Melbourne.

Russel
Oh really? I might come with you.
Freddie, any questions for Matt?

Freddie
Thanks Russ and thank you, Matt. So hearing you talk more generally about AI and hearing about it hallucinate. So thinking about me, myself, I, I have or I am a bio economy, meaning that I know I sort of, I am connected to reality because I need food or there are parts of reality that can kill me.
So all of my thoughts are regulated or informed by, you know, how fitted I am to the environment. Thinking about that, is AI connected to reality at all?

Matt
That's that goal seeking part of the AI. What is it trying to do? You ultimately are trying to pass on your genes. Society has meant that not everyone needs to pass on their genes. You can be a priest or a gay man and not have to pass on your genes and still contribute meaningfully to society. But ultimately, if this organism doesn't do what it's meant to do, which is procreate and feed yourself and not get eaten by a sabretooth tiger along the way, you have failed. AI is shaped by, for example, maximize time on site, optimize the very routes for newspapers, pick up rubbish more effectively. Its connection to reality is given to it by its programmers and that is the goal function. That's what it's seeking to optimize.

Russel
Well, I love it. Anything else there Freddie?

Freddie
No that’s me.

Russel
Matt It's been really, really enlightening. Invigorating. A wonderful discussion. Thank you. On behalf of all the listeners, I want to thank you.

We've been speaking to Matt Kuperholz from Matt Kuperholz Consultancy. He's an AI scientist and advisor. He's also at Deakin Uni, where he’s a professor of Practice at the practise centre of AI and the future of Work. Thanks, Matt.

Matt
Thank you very much Russ, thanks Freddie.