AI and You

Transcript

Hello, and welcome to episode 70! I was fretting a bit after last week's episode about disinformation and worrying that I didn't tackle it right, did I leave the wrong impression, did I overemphasize the foreign power role; all of that because it's such a huge topic and obviously could be a podcast series of its own and that would be useful and important. But this isn't that podcast. So as much as I might feel like talking about the psychology and the politics of disinformation, that wouldn't be what you came here for. Ultimately, whatever we do in this show has to illuminate your understanding of, or reaction to, artificial intelligence.

But nevertheless, we're not done with disinformation, believe me.

Now to today's episode. Listener James wrote to me and said "Some time ago I was reading a book (I think it was *The Inevitable: Understanding the 12 Technological Forces That Will Shape Our Future* by Kevin Kelly) where he was talking about AIs winning Jeopardy, chess and Go games. At the end of the essay he brought up the idea of people training with an AI to improve their chess skills. He called them 'centaurs'. I thought this would make a great topic for your podcast."

Well James, this one is for you, because today's guest is Dr. Jonathan Rowson, and he is a chess grandmaster, and that is exactly what we are going to talk about. He won the British chess championship three times in a row, and was awarded grandmaster status, the highest title in chess, in 1999. His 2019 book, *The Moves That Matter: A Chess Grandmaster on the Game of Life,* is a wealth of stories and reflections on not only chess but the human condition. I've read it cover to cover and it is spellbinding.

Not only that, but Jonathan is a philosophical activist who founded the think tank **Perspectiva** to foster a revolution in how we understand each other and how we solve the hardest problems of our age.

I'm sure you already have a lot of questions, and I tried to ask them. We're going to start talking about the effect of computers on the culture of chess, of course, but believe me, we're not going to stop there. Let's get right to the interview with Jonathan Rowson.

Jonathan, welcome to the show.

Hello. Nice to be here.

So you're a chess grandmaster turned philosopher. Is that a common sort of transition among chess grandmasters?

It's been known to happen, but it's pretty rare, I think. I think mostly chess grandmasters remain chess grandmasters because to become a player of that level, you really have to give much of

your life to the game. And having done so, it's very hard to leave it because the game is so singularly enjoyable and it's not so easy to find a sort of similar level of expertise elsewhere.

Is there a shelf life among chess grandmasters? It seems that the best one is always the youngest.

Shelf life is kind of a harsh way of putting it, but I mean, I hear you. I mean, I would put it like this. Before computers came on the scene, they used to say that a chess player's peak would be around 35 or so. Now I'd say it's more like 25. You know, as a rule of thumb, of course, there are exceptions. People are getting better more quickly because the level of assimilation is so much more rapid based on computer reinforcement of various kinds and the ease of learning positions, the access to databases, the use of engines to sort of help us understand more quickly what's happening in a position. But nonetheless, you get grandmasters playing well into their '40s, '50s, '60s, even '70s and still performing at a decent level. So it's not as though you can't play anymore. What gets a bit hard is to believe that it matters. I find that's the hardest thing. It's like the sense that the game means something dwindles over time.

And have computers affected that? Have you become tired of the conversation about computers dominating the discussion about chess?

I wouldn't say I'm tired of that. And it depends where you are. I mean, there is a sense in which it hasn't dominated. I mean, if you consider what's dominated chess for the last little while, it was the Netflix series, *The Queen's Gambit* where it was actually refreshingly analog, it was a pre-digital world, and all the more charming and enchanting for that. I thought it was quite curious that it came out during the pandemic, where we were sort of surviving as cultural creatures entirely through digital media, you know, our Zoom calls and our smartphones and everything else. And along came the series that was spectacularly successful, much more than anyone could have predicted. And it's not just because there's a beautiful actress and the aesthetics of the series were very well done. It's also because it showed you this pre-digital world in all its enchantment, which, okay, it had its problems, and I'm no technophobe, but still, there's something about that world where people were making long-distance phone calls and that was still exciting. That was, for the time kind of refreshing and humanizing at some level.

I love that show. I watched it several times now. To get back to the philosophy transition, is there a connection? Is there something in the mentality of chess at that level that lends itself to philosophy? Maybe the bridge is something like Lao Tzu, *The Art of War*? What do you think?

Well, it's an interesting bridge. I mean, I've written books about these things. As you may know, I wrote a book called *The Moves that Matter: A Chess Grandmaster on the Game of Life*, and that was philosophy in this sort of playful public sense of reflecting on life and its meaning and purpose. But to answer your question more directly, the first thing I thought of actually, is, you know, there may be some philosophers listening to this, who think that the only real philosophy is sort of academic analytic philosophy. And insofar as that's right, and it's maybe not very far, but insofar as it is, what goes on in philosophy is that you move quite slowly from premises to conclusions. You sort of sense check an idea. You test it to destruction, and you come up with

hypotheticals, you create stories to see if things make sense. And on the basis of those tests, you carry on, or not. And they often say that if you're not going slowly in philosophy you're not going anywhere at all. And I think something like that applies to chess too that what we know now about the best players, is that they tend to approach the position with a kind of scientific method that is based on falsification. In other words, I'm looking at a move not so much to confirm why it works, but to consider all the reasons it might not work. So the mindset is very much philosophical in that way. It's sort of saying, "Here's an idea. What might be wrong with it? How else might we look at it? What might the other side say?" And the most viewed philosophy at university level is, if there's any sort of philosophy undergraduates listening, you know that if you just argue something, you won't get very far. But if you argue and you present the counterargument, that's progress, and if you present the counterargument to that, you make further progress. And so it goes on until you deepen the discussion. And chess is a bit like that. There is a sort of implicit dialectic in the game, which is why I feel these worlds are not so dissimilar in some ways.

And were you studying philosophy while you were actively in the chess circuit?

So although it's true to say I'm a philosopher, and my undergraduate degree was predominantly in philosophy. And then in my master's degree, and PhD, it featured quite strongly. So it's always been there since I was about 19 or so. But by the age of 19, I was already an international master, quite soon to become a grandmaster in a few years. So they always kind of coincided for me, a way of looking at the world, just a kind of questioning spirit, really. I mean, really, that's what you do when you play chess, you just keep on asking questions with a position. What happens if I go there? What happens if she goes there? What if this? What if that? It's almost all this kind of subjunctive clause, this kind of "what if" mentality.

And this is where I want to dig into your way of relating to and thinking about chess because I don't know what that is. My approach to the chessboard is like Godzilla to Tokyo. It's no more sophisticated than that. I'm rather proud of my daughter, who's now 11, in that I started teaching her the game about a year ago and had to spot her five pieces, and now she beats me most of the time without any handicap. And I really like that. And she's actually progressed, she's thinking beyond the primitive levels that I can. But it's those higher levels of abstraction of playing chess that are foreign to me. And when we look at how computers play it, there's a lot of this brute force. It's all about how many moves ahead do they look? Although there's some nuance to that with the newer engines. But expert chess players talk in terms of much more sophisticated abstractions that sound like a general on the battlefield. And has the advent of computers in this space reduced the discussion of chess to an unfairly mechanistic approach?

Well, I like the question, and I'm inclined to say Yes, is the quick answer. Although there are many qualifications for that. I mean, first of all, there's different levels to this. There's computers in general, there's AI in particular, and there's the internet. And they're all somewhat different things, but with some relationships between them. I mean, the internet as such has been a huge boon to chess, chess is absolutely thriving. So on the one hand, computers, writ large, good thing. AI, in particular, some of the gains by the strongest computer programs, and particularly

those coming out of DeepMind, are extraordinary for chess players because it really has moved on our understanding of what's possible in the game, particularly the level of aggression surprised players. Now obviously, there's an anthropomorphic notion that the computers are not aggressive as such. But the sense that to make the most of a position often involves a fairly forthright attack and a strong willingness to sacrifice material. In recent months and years, I think this has been quite surprising to chess players. So AlphaZero was the most important example of that. And I even spoke to former world chess champion Viswanathan Anand about that match, and he said what struck him the most was one game where the computer was a connected pass pawn down. Now, that won't mean much to most of your listeners, but a connected pass pawn is quite a serious asset. If you're down that much material, it's not just a pawn which might be one back. If it's connected and passed, it's like a real asset. It's a serious positional advantage. And what White had in return for that was a little bit nebulous. It was a little bit hard to put your finger on. You could sort of see there was compensation, but the fact that the computer was willing to play out that position, and over 20, 30, 40 moves begin to show the advantage was quite shocking, because the compensation for the material was so long term, that it was unlike anything we'd really seen before. But your question is slightly different, I think, which is that there used to be this narrative bluster and the sleight of hand of the expert coming in and saying, "Well, it's all about what happens on the queenside now," and meanwhile, the computer is beeping away saying, "Well, actually, there's something else going on here that you haven't seen. So the gap between the kind of narrative, and the way the expertise is coded through narrative, and the actual fact of the matter that any punter can figure out by having access to that engine, has created this kind of dethroning of human expertise, on the one hand, that when I'm analyzing with another grandmaster, we may well have our views about the assessment. But quite often, especially when the position gets very integrated, and the forces get very tactically enmeshed with each other, we do wonder, "I wonder what the computer thinks now?", because we feel as though it's a bit beyond us. There's a sort of horizon effect where if we know that there's more going on than we can make out—and to be fair to us, that's a kind of epistemic skill. It's a way of recognizing your own limitations, using the computer as it's meant to be used, as a kind of servant to augment our ends. But yeah, people still admire strong chess players, and the grandmaster title hasn't really lost its allure. But I think there is an acknowledgement that most smartphone engines can beat the likes of me quite straightforwardly. And I don't feel any great loss in that. It would only be sad if people ceased to want to learn to be better. And that doesn't seem to be the case at all. The chess improvement industry is thriving.

The AI chess engines are working by constructing patterns, very complex, deep patterns, but they're finding patterns; but those patterns don't mean anything to them. They haven't deconstructed them in terms of grand strategy, the way that you construct those patterns *out of* grand strategy. It's doing it backwards, but it's got so many patterns, and they're analyzed so well that it amounts to the same thing. But now I'm wondering—this is again, one of those things I know absolutely nothing about it—was that centaur chess when you've got humans cooperating with computers. What does that conversation look like? Because the computer surely can't explain its ideas in terms of a grand strategy.

Well, it doesn't usually need to. In essence, I mean, I haven't done it that much, but I do it informally, in the sense that almost any analysis of a position now is a kind of centaur chess. So when I was working with the world champion in 2008, it's quite a long time back, but even back then, what happens is, we run the position with the computer. So we're looking at it as grandmasters but we're also seeing what the computer thinks. Now, if we're doing this well, we're kind of guiding it and trying to sort of ask it questions of "Does this work? Does that work? Could we try this?" And the way it goes is if the computer is seeing deeply enough and the processor is fast enough, in effect, it would just be saving you a lot of search time because it can very quickly tell you, "No, this way is closed. This way is open." Sometimes when it does that, you say, "Are you sure?", and you play a few more moves. And then it says, "Ah, actually, maybe this way is open" and you keep looking further. So what it's like is that the computer doesn't have to tell us what it's up to. We recognize chess as very concrete—I mean, brutally concrete sometimes. So you may have all the fabulations you want about the nature of the pawn structure, the control of the light square color complex, the safety of the king, the coordination of the forces, the potential of the two bishops, all of these kind of narrative constructs. But meanwhile, the computer, through brute force, is pointing out that one move is winning and one move is drawing. And it might even see that very far before we have any sense of why that's the case. But quite quickly, and usually two or three moves in, we realize what it is that we haven't seen that the computer has seen. And that makes all the difference in the world. So you develop this respect that the computer has a different kind of intelligence. And it's complimentary when done well. In essence, the computer is very concrete, and it has patterns and evaluation functions, which is based on those patterns. But ultimately, it's sense testing every move, and then it's using a filter to decide which are the more promising and communicating that to you. Now, for about 90% of the time, we'll have the same idea about what's most promising, and the 10% that's different is where it gets interesting. Because sometimes they'll suggest something very counterintuitive, very much sort of heterodox or subversive to human understanding. And that's when we get really interested because that's when we start looking at it more closely and saying, "What does the computer see that I can't see? What does it 'understand'?" Because it doesn't really understand. "What does it grasp," let's say, for want of a better term, "that we cannot?" And usually, those features are just things that are outside of our repertoire of narratives and patterns and experience. But there are still legal moves, and they still somehow "work". And that's ultimately what matters in chess - what works to get to your end result.

Right. I sense some of your qualms or hesitation around what vocabulary to use because there's this unavoidable anthropomorphization of computers, and we end up saying they understand, and we know that's not what we want to say but there isn't a better word. Chess has long been this example of AI encroaching upon human space because it was really the first incidence of computers dominating a field where we thought it would take something that thought like a human, a human analog in some other form to equal a human player and it turned out not to. But that time with DeepBlue and Kasparov really cemented a different reality. That was when Douglas Hofstadter said, "My God, I used to think playing chess required thought. Now I realize it doesn't." And he was talking about DeepBlue, but sort of inadvertently threw shade on the human players at the same time. And Kasparov actually monetized the losing to an AI very well.

If you want to be the world champion, be the one that was the first one beaten by a computer, because everyone will remember that. Should we consider chess as a harbinger of the relationship between humans and computers, in the sense that this same thing, this same pattern is waiting for us in other fields, and that we should look to see what's happened in chess to take our cues as to how to partner with AI?

Chess is prismatic in a certain sense of the relationship between human intelligence and AI, there's no doubt about that. It's a controlled environment. It has a certain degree of complexity. It has a certain history. It has cultural resonance. And there's a great deal of cognitive psychology that we already know about how the human brain functions in relation to chess. For all of those reasons, yes, it's a good gateway. However, I've always felt that we sometimes make mistakes when we're talking about the progress of AI. And chess is no different. What's going on is something about cognition. So it's showing the limitations of human cognition with respect to algorithmic cognition, let's call it, for the sake of parity. It's not really cognition, as such, we already know that we stretch the meaning of the terms, but the algorithmic functionality that leads to accurate moves, good moves, is up against human cognition and tends to defeat it, right? So in a sense, AI has already sort of trumped human cognition at that level, and people think because of that, it will trump human cognition elsewhere. But there's a big category error between what works for cognition and what works for consciousness. And I think this gets into sort of questions about what AI can ultimately achieve, and what are general AIs possible, and so forth. But my own sense is that you're never more sure the computer is not conscious, I mean, you're playing it at chess somehow, because it's such an abstract game, it's so disembodied, that I'm not too troubled by the fact that the computer can get really, really good and make humans look relatively weak, because it doesn't experience the game. It has no sense of how the pieces look, really. It has no aesthetic relationship to it. It has no emotional relationship to it. And these are the things that make us human, right? This is what human intelligence is about. And therefore, the fear with AI, if you consider it with chess is not that Terminator will come over the hill and suddenly, we're all doomed. It's that we forget what it is to be human, right, that's the real fear, that AI will somehow distract us from what we're really about. So, no problem with cognition, no problem with AI getting absolutely brilliant with cognition. Consciousness is an entirely different category of thing. And I think if chess taught me anything, it's that the meaning I derive from the game is something that is inaccessible to AI. And that's what makes me human, not the fact that I could previously play at grandmaster level.

And you're heading in a philosophical direction there that I want to pursue with your current activities. But before we leave this, I want to get one rather technical discussion under our belts, and that's about the patterns in chess. You talk about chess patterns on the board, you compare them to sentences and conversations and this hierarchy of patterns. Learning is a hierarchy of patterns. Like music, you first learn that note on the page is a D, and then you recognize a chord, and then you recognize an arpeggio and these other patterns so that you can play a piece of music at the speed that it's supposed to be played. That's a pattern that I know. What are the equivalent patterns in chess? Because I only know the very lowest level patterns.

To someone at your level, what are the abstractions, the strategic patterns, some examples of how you look at the board at that highest level?

There are many of them. And to give some examples by name, a castled king position would be a standard pattern, where the bishop and knight nearest to the king move out as they develop quite early in the game, usually, the king moves two squares to the right, the rook comes over to the other side. Now, once that's happened, typically you have king next to the rook. And in front of them, you have what's called the king's pawn shield, which is the pawns that are the h, g, and f pawn, to put it in algebraic notation. And that would be a very standard pattern for the king. And you would have variations on that theme. So sometimes the pawn would be on h3, one move pushed up, for a range of reasons. Sometimes, the bishop might not be out in the long diagonal, coming straight from its starting position. It might be something called fianchettoed, which is where you move the knight's pawn up one square, and the bishop tuck behind it, which controls the center from there. And then the king when its castled would be just sitting behind that bishop. That would be a castled king position with a fianchetto. And then the knight would typically be on the f3 square, which is actually blocking the bishop temporarily, but often moves away. But sometimes knight is on what we call e2, which is the square in front of the king when we started the game. So all of which is to say, the castle king position would be a pattern, and there'll be many variations on that theme, all of which would be quite familiar to us. Another would be control of the center, for example, central pawns supported by the pieces. And then you would have things like Back Rank Mate. Back Rank Mate is where there's nothing on the very final rank of the board. And a rook or sometimes a queen goes to the back rank and checks the bare king which can't escape because its pawns block its exit, and they can't be blocked, and the piece can't be taken, that becomes checkmate. So those are just two examples but are there are literally hundreds more. Literally, there are certainly thousands, maybe hundreds of thousands.

Sure. My daughter checkmated me with that move that you just described on our last game. And those are static positions, like they're single shot. Are there patterns that extend over multiple movies where you're working on strategies that take a while?

Yeah. So classically, patterns would be used to describe clusters of information. And they would be equivalent to maybe words or possibly grammar. But hold that thought for a second because what I was about to say was the patterns that you're asking about, the kind of sequences, the classic maneuvers, or exchanges or transitions from one kind of position to the other, or tactical sequences or strategic ideas; these would be something more like idioms in language. Just as we can sort of say "until the cows come home" and know what each other mean,s and the computer would have to learn that, and it would take a while because it isn't literally what it means. Likewise, idioms on the board are forms of information and meaning that a strong human player assimilates very early and can then use flexibly and in variation with each other just as a good poet can use words together to create a particular image or idea. So in those cases, it would be things like—changing the pawn structure would be an example of that, or playing on two flanks would be an example of that, or the principle of two weaknesses or maneuvering or these kind of terms. These are all kind of idiomatic in the way they manifest on the board.

And just before we leave this, what about psychology? I know poker, and psychology is everything in poker. Where does that come into chess? Is there a point where you've analyzed your opponent's psychology, and that changes how you react to the board?

Well, it definitely comes in, and it comes in principally through cognition that we've just discussed. So the psychology of chess is, at least partly and possibly largely a matter of cognitive psychology, perception, memory, these kinds of things. In terms of competitive psychology, or sports psychology, which is, I think, the spirit of your question. There's a lot going on there. I wrote more or less two books about this, *The Seven Deadly Chess Sins* and *Chess for Zebras*. In their own way, they're both books about chess psychology of that kind. And it's not trivial, it's not just about wearing a pink wig to distract the opponent, nor is it kind of banging your pieces down to intimidate them or suddenly playing really quickly to unnerve them. I mean, these things are a bit superficial, that's the sort of gateway drugs to chess psychology.

I was wondering more about things like are they unusually protective of their knights or something like that.

So there is a whole literature in chess, not massive, but it's there about these psychoanalysis and psychoanalytic impressions of chess players about their attachment to their queen, the Oedipus complex, and how that plays out on the chessboard. Much of it, I think, is bogus, but it's all quite interesting. And there are issues like that. Some players are overly attached to certain pieces, maybe even over fond of certain squares. And there are some players who just struggle to take the initiative, they want to be defensive, others who barely know how to defend, and if they can't attack, they don't know how to play. And chess is a kind of sublimation of identity, it's very much about people trying to experience over the board, what they can't necessarily experience in real life. And so, you see a lot of, you know, let's just say, and I mean this with the greatest of respect to anyone who fits this description. But let's just say middle-aged accountants, who are finding life a bit lackluster, turn up at their chess club on a Thursday night or whatever, and suddenly, their heart is absolutely ablaze with their kingside attack. And they're sacrificing their pieces, and they're in an entirely different world. They're in a world of warfare and where everything matters very intensely, it's vivid, and they're right at the center of it. And they're getting this resistance from an opponent that they don't often get in real life. So they're all the more challenged and enchanted and charged by it. So yeah, psychology is absolutely rife in the game, let's say.

And that reminds me of when I was talking to some guides on a river rafting trip, who said that they'd had a raft full of accountants the week before and that they had been the most risk-favoring, reckless clients that they'd had. But just to wrap up that psychological thread, you had described earlier, the computers being seen as aggressive, isn't that a psychological assessment?

It's a strategic assessment, I think. It's a judgment of playing style, which, yeah, has its own loading, again, anthropomorphically somehow. I was just going to say though, when you mentioned that little anecdote that there has been one empirical study, I think, by someone at University College Dublin, I believe, that showed chess players to be thrill-seekers like bungee

jumpers, you know, that actually, we look like we're sedate and studious but inside what's going on is this kind of thrill-seeking, the chase, the hunt. It's all about that kind of experience of kill or be killed that we're experiencing on a regular basis. And of course, the computer doesn't feel anything like that. In fact, in its own way, it's a little bit tragic that they have no idea what's going on.

Yes, reminds me of the movie about AlphaGo's victory called *AlphaGo*. And the victory was not experienced by AlphaGo, it was experienced by the DeepMind team. And the defeat was experienced by Lee Sedol, but AlphaGo had no way of experiencing victory.

Okay, we're going to finish this interview next week because we really got going in this interview.

We topped 5,000 downloads last month alone, thank you so much, please keep telling people about the show and rating us with 5 stars wherever you're listening from. If you've got ideas for improving the show, or topics, or potential guests, please let me know at peter@humancusp.com.

I was watching the show *Foundation* on Apple+, or at least the first episode of it, it's a miniseries based on Isaac Asimov's series of novels, which actually started out as stitched-together serialized short stories, about the fate of a galactic empire far in the future, spanning thousands of worlds across the galaxy. That's been a favorite of mine since I was a kid and every few years I reread it. You're probably wondering what this has got to do with AI. Bear with me for a bit.

It's long been said that *Foundation* is unfilmable, and while I don't agree, I think this effort tends to bear that out. Why? Is it the visuals? Clearly not, they're stunning, incredible special effects, sets, and costumes. I hope it wins an award for at least one of those things. Some fans might want to pick at their design choices but—be honest, Asimov didn't give a lot of detail, and there's no significant divergence between this and what he wrote.

Is it the characters? I can't imagine anyone saying that, because Asimov's characters have virtually no personality. They're comfortable to be around, but they are there to advance the story, nothing more. As much as you or I might get emotional about what happens to one of the characters, I think that comes more from projecting their experience onto our own psyche and imagining what it would be like to be in that situation. There are only fleeting moments when what we feel for a character becomes the dominant reaction in any scene, like when the Mule leaves at the end when he realizes he's defeated. The main character, Hari Seldon – and the only character to be present for anything like a majority of the time – is a professor, there to take a stand for science and explain things.

And that's why this was considered unfilmable, because it spans a thousand years and from one chapter to the next you jump maybe fifty years and you have an entirely new cast. I remember when I first read it, the shock of starting the second chapter and realizing that none of the characters I had grown comfortable with were going to be in it, because they were dead. And over and over through *Foundation* you have to experience this letting go of one set of characters and getting to know new ones.

I'm getting to the AI connection, trust me.

And that's where this effort falls short, because as far as I can tell from the synopses, they wanted you to be empathizing with a particular set of characters, so it seems that they do a kind of juggling act

bouncing back and forward in time so we're always coming back to the original characters as a kind of anchor. And that's not what *Foundation* is about.

If you wanted to film it and be true to its arc, you would have to make it a documentary, with dramatized interludes, because what it is, is a science fiction remake of Gibbon's *Decline and Fall of the Roman Empire*, and Asimov said as much. It's about tracking how an empire falls, which is momentous, and it's about making you understand hat and making you appreciate this enormous intricate machine, but it doesn't happen in the lifespan of an individual. You have the rise of rebels in the periphery while the central command, drunk and lazy on their own success and power, fails to realize that until the barbarians are at their gates, when it is too late, and there's a descent into a dark ages of regression and superstition.

But Asimov went a step further and he thought, what if there had been a scientist during the Roman Empire, not only that, but a scientist armed with even an more superior science than we have today, which was capable of measuring the behavior of people *en masse,* and using statistical techniques and knowledge of crowd psychology, and could predict the direction of society? The Romans didn't have such a scientist, but what if in the future there was one, what could he or she do? And that's what *Foundation* is all about. History on a long scale tends to be punctuated by dramatic events, and in between it just continues on the same course, like a ball thrown in the air, until a big change comes along. Think about for instance the fall of the Soviet Union. It looked like it happened within a few days – certainly the Berlin Wall fell within a day – but the underlying causes of that had been brewing for many years; and what if you had enough data and enough math, to see that? And Asimov called this science *psychohistory,* and Hari Seldon had worked out the future with a huge number of equations that were stored and projected from a device called the Prime Radiant.

So each chapter was about one of those pivotal moments like the fall of the Berlin Wall, when a crisis was occurring, and the potential for history to diverge from the predictions was at its greatest, and a recording of Hari Seldon would appear to the members of the Foundation, recorded in advance but set to play only at this point in history, telling them what kind of event was happening and why, and giving them hints on how to make things go the way they needed to make the dark ages last only a thousand years instead of thirty thousand years.

Now maybe you can see where I'm going with this, although it's certainly a long journey to make a point. Could we realize psychohistory with AI? Asimov saw it as equations, but that's a lot of work; that corresponds to what we call Good Old Fashioned AI, or GOFAI. What we need to do is predict developments in history; but they follow patterns, do they not? And those patterns may be described by complex equations, but do we need to know the equations if we can predict the results anyway? This is a description of what AI is already doing quite well – figuring out and predicting patterns. With enough data about the historical behavior of people and society, and a way of mapping that data to neural network layers, who's to say that AI couldn't be the psychohistory that Asimov invented? Maybe not just around the corner; but maybe not impossible either.

In today's news ripped from the headlines about AI, Ph.D. student Robbin van Hoek at Eindhoven University of Technology has designed a new platform for automated vehicles that integrates the benefits of cooperative and autonomous vehicles. In his PhD thesis, titled, "Cooperative Trajectory Planning for Automated Vehicles," he worked out how autonomous vehicles could communicate with each other and harmonize their speeds to avoid compression waves on the highway from cars braking

and speeding up. The thesis calls this the harmonica effect. I think that was lost in translation; I'm pretty sure he means the accordion effect. There's a joke somewhere in there.

Next week we will conclude the interview with Jonathan Rowson, when we will get more into more of what he hopes to achieve with Perspectiva, how he wants to transform how we understand and communicate with each other, and he will tell us what an 'antidebate' is. That's next week, on *AI and You.*

Until then, remember: no matter how much computers learn how to do, it's how we come together as *humans* that matters.

http://aiandyou.net