



Guest

Kartik Hosanagar is the John C. Hower Professor of Technology and Digital Business and a Professor of Marketing at The Wharton School of the University of Pennsylvania. Kartik's research work focuses on the digital economy, in particular the impact of analytics and algorithms on consumers and society, Internet media, Internet marketing and e-commerce.

His book - "A Human's guide to Machine Intelligence" has recently been published by Penguin Random house in India. The book is a comprehensive overview of the impact of AI and ML on our lives. It is written in simple language and is accessible, relevant and insightful even if you are not tech-savvy and familiar with AI, ML and related topics. The book delves into various implications of AI and ML including how we should think about consuming content, making decisions, diversifying our perspectives, solving for privacy while benefiting from the convenience of AI and more.

We spoke about some of these elements and discussed how we should think about staying relevant in a world of exponential change that human beings are not prepared to process and make sense of. Albert Allen Bartlett (Professor of Physics) famously says "The greatest shortcoming of the human race is our inability to understand the exponential function".

Context to the conversation

Welcome to the 44th conversation at the Play to Potential Podcast. This is your host Deepak Jayaraman here. I am an Executive Coach and I work with Leaders during high stakes transitions – whether it is related to an organization or the Leader's career. I feel just like companies need to be coherent about the 2 questions – where to play and how to win in the context of their strategy, we all need to be clear about our responses to the two questions – where to go and how to grow? I work with leaders to address those two questions especially during key points of transition as they go through their journeys.

In this podcast series, I talk to leaders from multiple domains (CEOs, Sportsmen, Artists, and Thought Leaders) on three broad themes – Leadership, Transitions and Careers. I am excited to talk about the next guest on the Podcast – Kartik Hosanagar. Kartik is the John C. Hower Professor of Technology and Digital Business and a Professor of Marketing of the Wharton School at the University of Pennsylvania. He holds the distinction of being the first guest to appear for the second time on this podcast. Our first conversation was about his journey, thoughts on entrepreneurship and perspectives on academics as a career path.

His book – Humans guide to Machine Intelligence, published by Penguin Randomhouse has just been launched in India and I caught up with him this time in that context. Given the pervasiveness of AI in our lives and given the exponentially of it and how it could impact the future of the world we inhabit, I felt it would be a great opportunity to sit with him to understand how he thinks about the various elements of AI, the challenges, the opportunity, the trade-offs involved and how we think

about staying relevant and reflect about preparing ourselves and our children for the future which might look and feel very different from what it is today.

Before we dive into the conversation with Kartik, a quick heads up on what's in store in the coming weeks. I recently caught up with Michael Watkins, one of the leading global authorities in the space of Leadership Transitions and will be publishing that conversation in a couple of weeks. We speak about how leaders can effectively settle into a new context and how the strategy needs to vary depending on the specifics of the type of transition. Now let's get back to AI jump straight in to the conversation with Kartik Hosanagar.

Transcription

Deepak Jayaraman (DJ): Let's go back to the basics Kartik why don't we start with just understanding the definition of Machine intelligence, what do you have in mind and also why you write this book and why now?

Kartik Hosanagar (KH): Artificial intelligence or machine intelligence is the idea of getting computers do the kinds of things that takes human intelligence. For example, understand language navigate the physical world, meaning pick up objects, manipulate objects, recognize people, recognize things in the visual world. A reason, learn all those kinds of things so that's AI and a sub-field of AI is Machine learning which gets a lot of attention recently and it's focussed on how do you get machines to learn from data and arguably it's the most important sub-field of AI because if you have a system that can learn faster than us but it's very basic at the beginning it won't take a long time for that system to catch up, on the other hand you have the system that got all our knowledge but it cannot learn. It takes only a day for us to leave it behind so machine learning is arguably the most important soft field of AI and you know, why I wrote this book is because AI and ML are entering into all kinds of technology that we touch today and most of these technologies have underlying algorithms in them so, these algorithms essentially for people who don't know an algorithm is simply a glorified term for a series of steps one follows to get something done, so any software you use it follows the set of steps to do what it's doing, like Amazon makes product recommendations, people who bought this also bought this that is its recommendation algorithm and so any software has algorithms these algorithms are becoming more intelligent, more AIs coming into them and they are also making more and more decisions for us and so I think we should care about it and people don't understand how much of an impact they have on decisions we make. For example, my research shows that over the third of the purchases people make on Amazon originated from algorithmic recommendations over 80% of viewing activity on Netflix and over 70% of the time people spend on YouTube is driven by algorithms. Deepak you were in recruiting, recruiting is using a lot of algorithms to skim resumes and figure out which applicants to invite for job interviews and they are also being used in medicine, doctors are consulting algorithms to make personalised treatment decisions, in court rooms in the US you have algorithms being used to guide judges on sentencing decisions, we are working on driverless cars, so the stakes are just getting higher and higher.

DJ: How do you see the role of humans in the world where the Machines are getting smarter exponentially by the day?

KH: So, I think some of the studies have shown that man plus machine beats man and it beats machine, so it seems like there is some role for man to play but I agree with what obviously our huge chess legend Viswanathan Anand is saying which is that eventually the role of humans is going to

diminish in something like that and with more and more activities around us it's going to be the case that for a long period of time, man plus machine will beat both man and machine and it will be the case that machine will beat man but the man plus machine will beat machine but then eventually as machines advance the role of the human diminishes. So I think as we move towards what is known as Artificial general intelligence which is this idea that AI can be generally intelligent like us not at very narrow tasks like you know you have a system like Deep blue or more recently Leela Zero or Alpha Zero which play chess, which can beat humans at chess but they can't treat diseases, they cannot understand language and so on but as we move towards artificial general intelligence which are systems that are generally intelligent like us I think our role will diminish and there will be a lot of questions that we will have to answer about what is work? How do we engage with meaningful work and so on? I think this idea of jobs or roles which require compassion which require a human touch which requires personalization, I mean you do something that is very interesting which is personalised exec coaching, so that's I think these are the kinds of things or you look at what a doctor and a nurse does, you can automate a lot of things they do, like diagnose diseases, maybe even figure out the right treatment options but I think for a patient the value of speaking to the doctor or have a nurse right their talk to them, those things are you know hard to sort of quantify and replace and so I think some of those kinds of roles will be once that will become more important.

DJ: Maybe picking on one of the things that you said Artificial General Intelligence, how do you see the curve there and do you see a certain point of singularity where the dynamics completely shifts?

KH: Yes, so the point of singularity would be the point where the system is as intelligent as us but then it has more processing power than us and can handle more data than us. So it leaves us behind in no time and once we get there you could as well ask what's the point of humans doing anything because let's say you wanted to come up with the cure for cancer but why even try? Because the system can process data faster than you, is super intelligent so it will beat you to it and clearly that is a very interesting and both promising and scary scenario. In terms of your point on when this might happen we can only speculate, there was a survey that was done I believe by author Nick Bostrom, he asked some of the leading AI researchers on when singularity or super intelligence might, when might we hit that? And the survey the vast majority of the leading AI researchers who had surveyed gave a projection in 25 to 75 years range. Now, I personally don't subscribe to 25 years but let's say you go with the high end of the range 75 years or you even say 100 and 150 years that's not that far and so I think we have to start thinking today in terms of how we prepare for those kinds of scenarios.

DJ: And moving to another game like chess you talk extensively about the game Alpha as well and specifically you refer to a particular game where a 37th move got everybody puzzled and in that context you also talk about the notion of predictability resilience paradox so talk to our listeners about, what's this paradox and what does this mean in terms of how we think about, AI systems and what does it mean and what is the implication for various stakeholders here?

KH: So the story I mention in the book is about, there's a system Google's deep mind division created called Alpha Go and it was all over the news so most of your listeners have likely heard of it but just to set context 'Go' is the strategy game like chess but far more complex than chess there's many more moves that one could explore and so it's hard to conquer 'Go' with just brute computational power unlike chess which you can conquer with brute computational power and so 'Go' was this one game where humans were beating machines for quite some time but that changed with 'Alpha Go' which beat the world go champion Lee Sedol and I describe one particular game in which go made a move which was very unexpected that game was you know going like any other game for a while it seemed like 'Alpha Go' had an advantage over Lee Sedol who was a world champion but then all of a

sudden Alphago made a move which was the move no. 37 which stumped a lot of people and I recollect the European Go champion saying this is not a human move and in fact Lee Sedol had to step out of the room, come back and he slowed down and he was trying to make sense of the move and initially some people even thought that's a poor move, a bad move and it turned out that it was a brilliant move and it's not a move that humans would make and some people called it a move from an alternative dimension so it kind of brings up this question of, where is this ability to go beyond human kinds of moves coming in and I used that to set up this idea that I refer to as predictability resilience paradox which is a paradox I mention in the context of designing algorithms and I make the case that it's hard to build an algorithm that is simultaneously highly predictable and highly resilient and so let me clarify what I mean by that, so if you wanted to build an AI system to do something amazing like drive a car or diagnose diseases there's many ways in which to build that sort of system. It used to be the case that the old way of doing this was that you interviewed experts, let's say I want to build a system to diagnose diseases I would interview lots of doctors over several hours and ask them what are the rules they use to diagnose a disease or what are the rules they use to interpret an x-ray image or whatever it is and they give me the rules and I code those rules, it turns out you can build reasonably good AI systems with that but they ultimately cannot match human intelligence they are subpar as far as humans are concerned that's because we have a lot of knowledge that we don't even know we have, so it's hard to even share that knowledge or share the rules associated with that. For example if I asked you Deepak give me the rules to identify your mother's face in a photograph, you can give me bunch of the rules like the shape of her eye, the colour of her eye, the shape of her nose, hair and so on but I code all those rules that software will fail with the very first photograph I give it, because that's a lot of knowledge you have which you are not even able to express, you are not even aware of that knowledge and so the question is this, is there a better way to build AI? And the better way to build AI over the last 10-15 years has turned out to be machine learning which is the idea that instead of asking experts for rules let's observe them in action, let's collect that data and ask the machine to find patterns. So instead of asking doctors to give us the rules for diagnosing diseases we observe maybe a million or a crore patients coming in to hospitals and we observe what were their complaints? What were their symptoms? What were their clinical markers? And what was the final diagnosis by the doctor? And we give that data to a statistical system or to a machine that observes that pattern and learns how to diagnose disease. And that's how now we are building systems that can match humans in terms of diagnosis, we are building systems that can drive cars on their own because nobody has to give the system every rule it has to follow it just observes thousands or hundred thousand of people driving and learns how to drive with that but the flip side of this is this systems are highly capable they can beat humans they match humans they are highly resilient as well when they face a new situation they might fail but they immediately learn from that, they use the data and they improve and so that highly resilient but then they are not highly predictable the old rule based systems the expert systems were highly predictable because they followed a fixed set of rules. You could say what it will do under any scenario because you program those rules but these new systems while they are more resilient, they are not highly predictable because you didn't code the rules so it's all based on the data and how its learning...

DJ: That's the 37th move I guess

KH: That's the 37th move and sometimes the data might not even be data on human moves so 'Alpha Go' use was trained on moves made by go champions in the past but it also played millions of games on its own through simulations and against itself so its generating its own data and it's trying crazy moves and seeing what happens and it's learning that here's the crazy move no human has tried but it seems to work so I am going to use it next time.

Reflections from Deepak Jayaraman

DJ: This is your host Deepak Jayaraman here. This insight from Kartik Hosanagar reminded me of something that came up in a very different context in my podcast with my guest Arun Maira (AM). He is the Ex-Chairman of BCG India and ex Member of the Planning Commission. I was talking to him about his book on Listening. And I asked him about the art of framing a good question....

AM: *"We look at data and so there are a lot of questions about data, where is the data? How does the data add up? So you go down that path about the data and trying to see reality through, re-organizing and adding or subtracting in the data itself and you can go down to the path also into the logic behind in the data itself. So this way it could lead to that so it comes to next level on that which is not just addition or subtractions but you go to more calculus maths and so there's a more ways to thinking about how to make sense of the data and I say fine now the data is being interpreted by a mind, the data is also collected by the people who felt that, that was good data to get so that was mind who chose which data to select, what data to select so there are minds here so there's a reasoning about mind. Why this is important data? So I learn to switch myself off the deductive track pretty quickly and to ask why you think one should be looking at this data. And then I would notice quite often that why the person thinks this data is important is... the reason to probably ask the question I think is what the point of this data is? I don't think this data is important but this person is presenting all this stuff, why do you think it's important? So I am learning about another person's way of thinking and what another person gives value to? Which apparently is not what I give value to, is not my way of thinking so this is how I am 'people not like us' as I say I am listening to someone who's not like me"*

DJ: Just like the 37th move of Alpha Go surprised a lot of experts, I find that we often get surprised by certain behaviours of others but we end up seeing them from our perspective. The first challenge is to put ourselves in their shoes and see the world the way they see it and then develop a view on the issue at hand. If you want to know more about the art of Listening, you might find my conversation with Arun Maira of value. This particular snippet was from Nugget 34.01.

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Now, let's get back to the conversation with Kartik.

DJ: How should we think about the trade-off of predictability versus resilience and you also in that context talk about the contrast between the US constitution and the code of Hammurabi?

KH: So, I kind of bring up question in this book which is called a human guide to machine intelligence and in the book, I bring up this question should we go with predictability? Should we prefer resilience over predictability? What is it? How do we make the trade off? And the contrast I bring up is that, one analogy for that is, if you look at rule systems that humans have used one of the oldest rule system we know of the society has used is the code of Hammurabi which we all have read about in history books when we were in middle school or high school and the code of Hammurabi obviously has some of these very famous maxims like eye for an eye things like that and it's very precise set of rules which in modern times actually seems sometimes cruel things like eye for an eye

but even outdated because there are certain rules for what happens when your neighbour doesn't maintain their dam well and the water flows over from their field to your field and so on and which is relevant to a lot of us today and the point being that the code of Hammurabi follows the fix set of rules, its highly predictable but it's not resilient because as times changed and human civilisation changed it couldn't adapt and be relevant then, the US constitution interestingly is again a set of rules that is used to governed in the US, it's one of the oldest constitutions that are still being used today and the reason it's still successful and still being used today is because a constitution is not fixed set of rules, the constitution allows for new cases to set a president for the constitution to be amended for new situations to arise and to set a president for supreme court for the constitution itself and so on and so it adapts and that has allowed it to survive longer and so clearly if you want a AI system to function in the long run then you need to allow it to adapt as the environment is changing and so that's why we are moving in the direction of ML over predictable expert systems even though these systems are bit unpredictable, they can actually deliver they can perform well and they can adapt and so that's one of the trends that I think will stay that we will see this switch towards machine learning but the question arises OK! We want machine learning because it's highly resilient but how do we build some checks and balances to make sure it doesn't go out of control and I am sure we will talk about that in a bit.

DJ: How we as a consumer should think about convenience versus privacy.

KH: So, especially when we talk about algorithms that serve consumers meaning the algorithm most of us see in our life, whether it's a Google's personalised search results or Amazon's personalized recommendations or Facebook showing ads all of these systems at the end of the day the machine learning relies on data and so these companies are greedy for our data as a result, and how do we look at that trade off, I think there is no doubt that these algorithms that are making decisions based on a data add a lot of value. The ability to find a video that's interests to you on YouTube within 5 seconds, worst is searching and searching and finding the right kind of video or Amazon saying people who viewed this eventually bought that product these are all incredibly valuable. The flip side as you mentioned is the privacy concerned the way I think of it is that, couple of things the first is I think we need to less passive in terms of how we use technology, we need to be more deliberate in terms of asking how is the technology changing decisions I am making, is the technology trying to learn about me, what are they doing with that data? And I think we just need to not treat technology as a black box, so I think we all need to get educated a little more about how all this works? And secondly, I think we also should ask for certain protections and demand certain protections from these companies and certain information. So, in the book I have kind of mentioned a few things just knowing how are these companies using our data? What do they do with it? Can we access the data? Can we ask them to delete it? These are important things that we should demand. And when we demand it changes do happen like look at Facebook's recent announcement where Zuckerberg said that they are going to start encrypting messages in the near future and they will also create this feature where you can let your message kind of disappear after some period of time, so that a message you post 10 20 years back doesn't come back to haunt you later in life, and so I think those are features that they are launching not because regulation forced them to but because ultimately there's been a lot of pressure from their users over the last year or two and so I think it really comes down to let's use these systems because they offer a lot of value but let's make sure we understand what they are doing with their data and lets push back when needed and when we do that collectively I think there are actions taken, also I think we should ask for some good regulation in this space, not over regulate the sector but ask for some good sense regulation which also means that we need to elect people who are savvy about technology, who are able to push for the right kinds of technology regulations as well.

DJ: What are some of the headline themes around the kinds of regulations you have in mind?

KH: Yes, so if you look at the set of issues here, you could talk about issues related to privacy which has been around for some time and issues related to automated decisions or algorithmic decisions which are the newer issue that's come up. So, if we look at the first one which is privacy, there has been increasing regulatory interest there Europe passed a regulation called GDPR which I believe was a bit too excessive there is a lot of compliance, requirements that companies have to meet but it also raised awareness of the privacy issues and it created several changes that companies made in order to comply with GDPR and in fact in the US, the state of California passed the lighter version on GDPR which I like more and it got several interesting provisions in there. For example, the ability to inspect and ask companies what they know about us? The ability to ask them to delete certain information, so today on Google for e.g. you can go in and check what Google knows about you? And Google has to share what it knows about you and you can also uncheck certain information that Google knows about you and say forget that you know about it, so you can ask, there's a right to delete in the regulation. There are also lots of provisions about what they can share? With whom they can share? And so on and I think these are important issues for all of us to look at and it's fairly easy to find on Google on Facebook all of these platforms not many people are aware, so not many people even use this so I think these are some of the issues that I would kind of mention.

DJ: FAANG. We talk a lot about diversity of thought in leadership teams and in Board rooms, but how do we drive diversity of thought in the living room? How should we think about the efficiency of an algorithm giving us what we want, what we are likely to want versus opening up our minds to newer ideas?

KH: Right, I think that issue becomes particularly relevant in political news content as you were mentioning elections and so on where people's opinions are being shaped by the information they consume on digital platforms. I think, there are aspects of that, that are related to algorithms and there are aspects that go beyond algorithms. Let me start with the algorithmic portion certainly if you look at platforms like Facebook, there is news feed algorithm that is trying to figure out what kind of news posts you will engage with and what to show you? At any given point you log into Facebook there are thousands of different posts that Facebook could show you and it's based on your past engagement, which of your friend's post do you engage with? What topics do you engage with? All of that feeds into an algorithm that decides what to actually show you? And there is no doubt that there is an echo chamber there that we tend to see more and more what we are already engage with and so that diversity of thought might be stifled when the algorithms are trying to personalise our experience, I think the algorithm clearly is trying to maximise the engagement and it's going to show you the stuff that you would demonstrably engage with and so that's not surprising, but I think there are things that we all could do, I think certainly it is everyone has seen or heard of situations where a friend posts something on Facebook which you disagree with and what happens sometimes is people unfriend the other person and if we start doing that then I think that diversity of thought goes away and it's sometimes important to get exposed to other viewpoints similarly people don't engage or click on content that shares a different perspective so I think it's important for us all to try and make sure we get out of this filter bubble that the algorithms put us in and sometimes we cause it ourselves by unfriending people, who have a different viewpoint or not engaging with their post or content and that becomes pretty important so one of the things that I did after this happened during the 2016 election was, I usually used to go to two news sites, New York Times and Times of India to consume my news and now I have increased that set to about 5,6 news sites so I am looking at news stories from that are right leaning that are left leaning that are more moderate to just get other perspectives and I think it's important to try and do that and then of course as I said there are things that are beyond the algorithm. Things like, you know on WhatsApp, there's so much fake news circulating on WhatsApp and most of it is not because of algorithm, it's saying hey this is what you should see but a friend of yours on some groups in

WhatsApp circulated the news and mostly it's people not verifying the truthfulness of what they are sharing and they consume it and sensational stories get shared more and more and so there's actually research studies that show that the top fake news stories are circulated more and seen by the people more than the top true news stories, because the fake news stories are more sensational and so people share it more and more and that's the huge problem for democracy itself because we are making voting decisions on information that is just baseless and so, I think we need to also have growing awareness that the internet is not like the newspaper the newspaper has editors has a duration process and even that process leads to accusations of bias but you think about the internet, people can put whatever they want over there so we just need to also wake up and be more savvy when we see something sensational just go outside go to the browser, verify the truthfulness of the information before you circulate it those kinds of things are important, so all of these steps are important in terms of making sure we have a diversity of perspective but also truth in those perspectives.

DJ: Moving to a different theme in the book Kartik, you talk about a likely hood of unanticipated consequences in the world of AI and you speak about the initial momentum in a certain direction suddenly can snowball into an avalanche and you also quote I found the metaphor of the cobra effect interesting in this context so could you talk to the listeners about insight here?

KH: Yeah sure, the Cobra effect is an interesting effect where we don't know the exact details of this but legend has it that way back during British rule in India, specifically in Delhi one of the governors there wanted to get rid of what he perceived as a cobra menace, there were just too many cobras and therefore the government announced the bounty for anyone who catches or brings the cobra head and so the idea was this would result in hunting or cobras and snakes and would ultimately help bring down the population. Now, initially it seemed to bringing lots of people who would come in and produce cobras and collect the bounty but again the legend has it that what was happening was that once people realised that there is a bounty if you bring in Cobras they started breeding cobras and they started breeding these and bringing it in and collecting the money and so it wasn't really addressing the problem and in fact when the government realised it and said the bounty is no longer available people just released whatever they were breeding into the wild, making the problem worst so it was one of those situations when there were perverse outcome awaiting this person and essentially what I call unanticipated consequences, you thought what this would do is reduce the cobra population but the unanticipated consequence was that it actually might have increased the cobra population and I bring that up because this notion of unanticipated consequences has been around and sociology for a while and certainly with a lot of human decisions we know these things happen where you intent to fix something and you make it worst by your intervention and there's many examples of where this is happened and when it comes to algorithmic decisions again we have to worry about the same thing that sometimes you bring in an algorithm to fix something and if you will not careful it can make that worst and because it's automated decisions it can make it worst very fast and there will be many examples of this so, late last year there was a news story about Amazon using recruiting algorithms and the news story essentially kind of was talking about the fact Amazon hired over 100 thousand people last year probably got millions of job applications, it's hard for a team of human recruiters to shift through that many resumes and figure out who to invite for job interviews, so they wanted to automate that process and they looked at previous data on what kinds of applicants did well in interviews, what kinds of applicants did well at Amazon and got promoted after they joined and they essentially used that as a training data for a machine learning system that did the resume skimming. Now, according to that writer's news story it turns out the internal investigation later showed that this AI system had big gender biases and it had gender biases because, you know if you think about it the training data is decisions made by humans on who to promote? Who to give offers to? And if there's a gender bias in those decisions,

those biases get captured by the AI system and it learns it and it almost institutionalises that bias. Now, fortunately Amazon detected it, it's a savvy tech company and so it detected it and stopped using the system. There are many companies using these kinds of systems who are not as savvy as Amazon, not running these tests and there's other examples ultimately these AI systems are making decisions based on data and so if there's problem in data they pick them up and then it snowball and could go out of control. It was the study that showed that algorithms used in court rooms in the US to make sentencing decisions are the ones used in Florida has a race bias and these race biases they are probably because of biases in the data itself there are many other settings, there are examples of biases and the auto-complete suggestions that Google makes and again the Google auto complete suggestions are based on search queries people are typing and so it picks up some of their biases as well and so there's many examples where some of these problems may go out of control if you are not careful, a classic example one that I mention in the book is when you have recommendation algorithms recommend to you, you know what you should listen to or what kind of music you should listen to, what videos you should watch? If you have very narrow set of interests and the algorithm isn't careful it can just show you just more and more of what you like and so you go further and further down this tunnel and maybe you are enjoying what you are seeing but you don't know what else is out there? And so again this narrow interest can become narrower and could snowball out of control if the algorithms are not carefully decided.

DJ: As a consumer how should we make the choices in each of these paradigms (Spotify etc.) maybe talk to us about how these systems work for a couple of minutes and then I would love your insights on what it means for a consumer for us to keep the broad interest going while leveraging the advantage of the algorithms?

KH: So, the idea is how do we recommend good music to consumers? That's the question that Pandora is trying to answer, that Spotify is trying to answer, Amazon music is trying to answer all platforms are trying to figure out, how do we show music? Or play music that the user will like. Now let's look at how humans would do it. If I had to recommend songs to you Deepak and you were to tell me that you like let's say Pashmina by Amit Trivedi, now I have to figure out what other songs to recommend to you and it maybe that I know the music well and I know OK this is a certain kind of song the music director is Amit Trivedi there is a lot of music orchestration or instrumentation in the music and so on, and I might recommend a song to you based on, my knowledge of the music, I might find other songs that are similar and so I might recommend for example songs from Kai Po Che to you because it has similar instrumentation this has again this Amit Trivedi's style and so on that's the approach that Pandora uses. Pandora essentially looks in music you like looks at the musical attributes to those songs, attributes like how rhythmic is the music, how much instrumentation is in the music and so on and it finds other similar songs to recommend, that's one way to do it. Now, suppose I didn't have a lot of knowledge of music, suppose I don't know anything about the song Pashmina by Amit Trivedi, then how do I recommend songs to you? One way I could do this is by asking my friends and asking which of you likes Pashmina? And say six or seven of them say hey I like Pashmina then I will say OK what else do you like? And they will say, well we also like let's say a song by Arijit Singh and then I say OK you know what among my friends who like Pashmina a lot of them seem to like songs by Arijit Singh so I am going to recommend that to you that's the Amazon music approach, that's the approach that last.fm also uses which is essentially the people who like this also like this that's the other way to recommend songs and these are two ways to recommend music and my research has shown that these simple algorithm choices have a huge impact on what kinds of music or products or movies or even news stories these algorithms expose us to when you recommend songs based on people who like this also like this it turns out that these kinds of designs have a bit of a popularity bias because they recommend stuff based on what others are consuming, so if there is a song that's perfect for you Deepak but many other people are consuming it then this

design cannot recommend it to you because it relies on people who like this also like these other songs and it requires other people to like it and so it has a popularity bias it cannot help expose you to these novel niche kinds of songs or indie music indie bands or even indie movies that might be perfect for you. The Pandora design recommends songs that are similar but doesn't look at others listening to it? And so it does not have that popularity bias but the flip side is that it has no social component to it and I think we all like first of all this idea that we are consuming songs that others are consuming we also want to discuss the music with others we also want to catch up with others and make sure we are listening to the kinds of music that others are listening to and so it doesn't have some of the social appeal of the Amazon like design. And so the question is can you combine the two in interesting ways and Spotify does that today. Spotify actually started with the social design that Amazon has, which is people who listen to this also listen to these other songs but they quickly realise that it has a popularity bias and they incorporated Pandora like features and that allows them now to recommend songs to you that you like that have some social patterns to them meaning others are consuming but it also allows you to find songs that are perfect for you that others are not consuming, so it provides that balance. Netflix has done the same, when they originally launched their recommendation algorithm it was completely social like the Amazon or approach but now they have added the Pandora like features so, now they are balancing the two and so it's a good example of how even engineers need to think about algorithm design carefully because it has a big social impact, I mean you use these systems in music, in movies or better yet in news it influence the kinds of things people get exposed to so it's one thing to say yes it's showing people what they like but you could also ask is it showing people what they like and diversifying their test and allowing them to discover new interest and its allowing them to discover stuff that others are necessarily consuming all those kinds of considerations might lead to a different design and that's kind of a point I make there.

DJ: And I guess it's moving to other elements as well which is possibly being lost in the narrative today in terms of what do we need to think about as we use these machine intelligence related services or products.

KH: Yes, and that's a big message for consumers and to firms and to product designers which is I think we shouldn't think about algorithms very narrowly in terms of there is one goal and it is improving that one goal I think we need to think of these as parts of a social system with multiple goals and so when you deploy a system let's say for recruiting we could ask is it effective in finding people who we are likely to actually hire and promote and that's a very important and probably the number one metric that firms should use, but it shouldn't be the only metric, we should also ask has it been tested for fairness? Does it have bias in some ways? We should also ask are there privacy implications? Are we looking at people's social media data without their consent when we are making recruiting decisions and this of course happens a lot where sometimes our data like our social media data are used for recruiting or for say even loan approvals and so on and we don't know about it and so what are the privacy implications? What are the implications with regard to safety and securities so I think we need to think about it more broadly as firms deploying these systems as users who kind of say OK I am willing to use this technology and be part of this because I know the company has done the right thing in terms of evaluating it more holistically.

DJ: I am curious about line between decision support versus decision making how should leaders think about leveraging the power of algorithms and where should they take it and run with it versus use their judgment on top of what the algorithms tell them?

KH: I think we are finding in many settings that algorithms can make as good and sometimes better decisions than humans and so there's a temptation to make them autonomous, so to not use them decision support but essentially make them decision making entities, meaning – why bother having a

human figure out who to invite for interviews to have the system figure it out and maybe humans interview the applicants or something like that and certainly you could ask in the medical setting as well, in fact one of the god-fathers of modern ML his name is Geoff Hinton he in fact got the Turing prize this year which is the top prize in computer science, sort of the Nobel prize in computer science, he once made the statement that we can as well stop training radiologists because there is no point even having radiologist try to interpret x-rays and MRIs when machines can beat them easily. And so it's kind of arguing for not decision support but decision making through algorithms, I think we need to be a little bit careful about that, I think AI has a lot to contribute when we are augmenting humans when we are allowing humans to process more data than human brains can process and machines become a way to augment human limitations and augment the human brain and there are many settings where we want to actually replace humans with algorithms as well completely and that's also fair but I think when we get into socially consequential decisions, when we get into safety critical decisions we need to be a bit careful and make sure there's human in the loop. So, I don't believe for example that even if a system is diagnosing better than doctors, that you replace them, what you do is you use that to complement the doctor to allow the doctor to be able to see more patients, to allow the doctor to be more faster with the patients, to allow the doctor to say that I will focus spend more time on the more complicated cases and the simple cases whereas just a fever, a viral cause and you don't have to do much beyond just give a pain killer let the algorithm do some of that or maybe use the algorithm to help a nurse do some of that and things like that, so I think the goal shouldn't be lets replace humans, the goal should be to figure out what are the things that are easy and when things go wrong? The consequences isn't high and therefore we completely automate that, what are the things that we automate for the human to free up their time to do the more creative things to do the more complex cases and then what are the things where we augment and guide the human and we kind of say tell the doctor we think it's the diagnosis is this and here's why and then the doctor make the call or we could say, you know this things are probabilistic, we could say 40% chance we think it's this, 30% we think it's that, 10% chance we think it's this and here is why and provide the explanations and the doctors make the decisions, so the goal I think should be in figuring out how we augment and not just replace.

Reflections from Deepak Jayaraman

DJ: This is your host Deepak Jayaraman here. If I bring this back to the nature of the work I do, I find that there are several psychometric tools that are available in the context of assessing a leader. When I see people around me using just the psychometric as the sole data point in assessing a leader, I start getting concerned. Let me give an example here. I was talking to a CEO and a CHRO of a rapidly growing tech company on how they think about leadership transitions. When I asked them about how they had done transitions before, they said that they would have an incoming leader take a psychometric, have a coach provide feedback to the leader on the psychometric for what he or she would have to do differently in the new role and that was it.

Couple of points here right:

- I find just working with the psychometric as a characterization of the individual as a gross over-simplification and borderline insulting to the leader in question
- So much of the transition is contextual and a function of the people in the new organization, the culture, business situation and so on

I guess a similar logic applies when leaders are thinking about career paths. So much of the choice is contextual. What does your spouse want? What are you solving for? What gives you energy, what is

the role of money and so on and so forth? At best, some of these diagnostics can give you hypotheses to work with.

The reason I mention it is that with machines getting good at probabilistic predictions, it is very easy to get into a mode of false confidence that we have the answer. Like Kartik says, I would like to believe that there is an opportunity for humans to bring in empathy and understanding of the nuanced context to provide augmented value based on what such tools provide us rather than taking the output of these tools too literally.

Let's now get back to the conversation with Kartik.

DJ: What's your take on what kinds of jobs, careers are at risk due to evolution in AI, which ones are AI proof and also what are the new avenues that didn't exist earlier but get created as result of this movement?

KH: So, I think one of the things that's happening clearly with AI is that the jobs at are risk, are at risk are not just blue-collar jobs or the labour-intensive jobs but all kinds of jobs are required thinking, white collar jobs managerial jobs and so on. I think the job that are at risk certainly that involve simple number crunching processing data in a very straight forward manner I think those clearly at risk. The things that goes beyond number crunching, you know even things like we were talking about medical diagnosis but pretty much any job any industry you look at AI can automate a lot of things and do it better than humans, so I think there's a lot of jobs at risk the way to think about it is that if there is something that is repetitive in nature and that is done by lots of people then AI can automate that, because if its repetitive in nature and done by lots of people then you can collective massive amounts of data on what they are doing and then use a machine to learn to do what they are doing? It's things that involve personal interaction, things that are not highly repetitive in nature where there isn't that magnitude of data, things that are inherently somewhat creative in nature that are highly personalised in nature, that are harder to do and that's why I mentioned something like let's say my career switch or my career plans, because that is so individualised it requires a careful focus on what is right for me focusing on my own experiences and it's not as simple as taking data on million other people and saying that based on what worked for a million peoples here's what will work for you because I think there is so much of a very subjective individuals, life satisfaction, job satisfaction aspect to it and so it's hard to automate something like that, and so similarly I have mentioned a lot of what doctors do and nurses do is not just look at data and interpret the data and make decisions based on it but it also includes things that involve empathy that ultimately assures a patient and so I think the aspects of medicine that involve empathy are clearly protected from AI so I think those are the kinds of things and of course you know creating AI, so far so if you look at data science AI of course these are going to be jobs of the future because it will take a long time before AI can create AI but for now that's protected but ultimately I think of creativity, empathy some of these software skills will start to matter a lot more.

DJ: Given the research you have done on where do you get concerned when you look at the education system?

KH: Well, I get concerned at all levels whether you look at primary school, high school, even college. I think AI is improving at an exponential rate and sometime we are not good at understanding exponential change because we kind of look at where things are today? We kind of feel hey we have enough time but the rate of change is exponential and by the time you react three years later it might be a bit late and for certain people and certain jobs so it's really important that we act superfast, that kids in school today grew up with things like algorithm literacy, so that not only jobs,

as users of technology they know how to use this there are people coming out of colleges, out of high schools that are now going to be using systems like WhatsApp and TikTok and all these other social applications and they have amazing potential but these systems also can cause a lot of damage, I talked about fake news on WhatsApp, you know serious damage if people don't understand how they work, so as part of you know we are talking about digital literacy but we tend to think of it in terms of teaching them programming skills, I think that's great, let's teach them programming because you know it will be a very valuable skill going forward but also let's teach them life skills for using technology, understanding how the technology works, what are its limitations how does the AI work? I think all that literacy is going to be important at all levels, it's to be even important I know a lot of your listeners are executives, look at managers, look at CEOs, most of the C Suite today doesn't understand what is AI and they are now being tasked with leading AI driven business transformation, using AI to come up with game changing interfaces with consumers to change how they win over consumers and most of them don't know what is AI, what is ML or even basic analytics so how do they going to do that? So even at those levels executives now need to be retrained with AI.

DJ: And maybe making it tactical Kartik if we take two types of people, one is leaders in companies CEOs, CXOs the others let's say the common man on the street for them to build a working appreciation of AI what sorts of resources would suggest and how would you suggest that they go about doing it?

KH: Well, selfish plug for my book but the point of this book and I called it the 'Humans guide to Machine Intelligence' to specifically bring up the point that this is meant for lay people, this is not an engineer's guide to AI while engineers will get something out of it this is meant to get regular people whether it's the executive company or lay people understand how this system work, what is that stake and why you need to pick up and so on but beyond that I think it's important to further educate themselves talking first about execs you have mentioned that group first, I think the point is to have more training within the organization for executives and for middle managers and everyone in the organization to understand what is AI, what is it doing in different industries, a few case studies and then having lots of internal discussions and debates on how your organization can use AI and get benefit from it, I think that certainly needed and it requires maybe a decision of top to invest in this and create as part of exec training lots of program for AI education for executives and I think the other aspect of this is going to be as you mention for common man or for lay people. How do they educate themselves? I think then again there is no substitute to taking a few courses or reading a few books and again I am not saying you need to get familiar with the intricacies of AI, you don't have to read the books meant for engineers but I think you need to have at least high level of understanding so go read a little bit about this go attend a couple of talks that might be offered at an education institute that is open to the public things like that I think are going to be important.

DJ: How do you see the world play out in the next five or ten years?

KH: So, the context of that quote was, James who is a well-known author and documentary film maker. He wrote a book about AI and whether it possess the existential threat to human and we were having this conversation and we spent time talking about how AI has conquered various games of course things like chess but also in recent years more complex games like GO and Poker and so on. And so I post the question what game is next and he kind of said well the next game is reality and I think that's the way we should look at the next five ten years we have had this fascination with AI and lots of the media stories with AI over the last 10-15 years has been, you know AI beats chess champion, AI beats the Go champion and so on but I think now it's going to be, AI replaces these jobs and AI beats humans at these tasks and activities or also some problematic scenarios such as a driverless car involved in this accident or that accident or an autopilot system that failed and an

airplane crashed like we just had recently with the Boing crash and so I think we are going to see lots more of these kinds of things and we should prepare for that, in terms of what the world looks like over the next five ten years I think what excites me as far as AI over the next five ten years that's really a long laundry list I have but I am going to pick two one is driverless cars, I think the technology is advancing very rapidly and even though we hear about the occasional crash and we will continue to hear about those crashes, periodically it seems like its autonomous vehicles behave like drunk drivers and they will happen these kinds of incidents will happen but in the end they are going to be better than humans and so we want to see lots of these systems in the next five ten years we probably won't be able to walk into a car dealership and walk out with a driverless car but I think we will see companies like Uber and others use these kinds of systems it maybe a while before a driverless cars become a reality in India but I wouldn't rule out that possibility as an impossible because you know 10-15 years back I was kind of thinking you know I don't know how Google maps will ever figure out how to give driving directions in India and it works reasonably and in fact quite well today and I think same things will happen with driverless cars we will start to see it I think in more organised roadways as same as the US initially but we will also see it in china where China is going to roll it out and then from there it will also enter in India so that's one area, I think the other area is going to be medicine I think that excites me. There is a lot of interest in what is known as precision medicine which is the idea of taking our personalised DNA profile our micro biome profile and so on and personalising treatment options, imagine cancer treatment that is known to work for an individual's DNA profile as oppose to saying you know we tried it on 100 people it worked on 30 but it didn't work on 70 so let's just try it on you, so instead of that you could have more precisely targeted treatments and I think that's another exciting thing. On the positive side these are the ones that excite me on the negative side as I mentioned earlier you know we have biases in AI talked about autopilot systems failing, we have talked about autonomous vehicles crashing and one that worries me a lot is fake news getting circulated on platforms like WhatsApp and others so these are the worries but I think overall if we put the right checks and balances in place the value created will far exceed some of the risks that come up as well.

DJ: How can we leverage the power of machines or what can we learn and how can we take advantages of where the machines are going and play to our potential, where's the opportunity?

KH: My whole thesis is around augmented intelligence, so it's around let's get tech savvy, let's start using more and more these systems, let's understand how they work, let's understand when they work well when they don't work as well and use them to guide our decisions and use them to augment our intelligence and I think that's the way forward, whether it's a doctor kind of saying, should I be using AI system that my Hospital is bringing in, and in fact in India itself there are hospitals that have started trialling some of these systems like the IBM Watson health care system and many more or you know lawyers using these systems or you have marketing people using AI recommendations for ad. Design for bidding in ad. Auctions on Facebook and so on creative professionals and so on and I think the goal at the end of the day should be, often times we think about, what's our secret sauce what gives us competitive edge over other competitors which usually we tend to think of his human competitors but I think we should also think about what gives us a competitive edge over machines and I think those are skills like creativity, empathy, social skills and knowledge and I think we should invest in some of those skills which ultimately will allow us to do better and of course also the technical skills to be able to use these machines, I think that's the combination that we should look for.

Reflections from Deepak Jayaraman

DJ: Hope you found the conversation purposeful. I was talking to the Principal of the school where my children study. It is an IB school and I happened to ask the principal, his views on what we should be solving for in equipping the kids for the future. He very lucidly responded saying, we should be equipping our kids with 2 things for them to be relevant.

- Critical thinking
- Empathy

He went on to say that Critical thinking is not the ability to crunch data or analytical horsepower as we understand it. It is possibly the ability to find patterns across disciplines and connect the dots, the ability to observe how different parts of a system interact with each other and the inter-dependency between the various elements. It is also the ability to frame the right questions that we need to think about and solve. That will be more important than knowing the answers.

The world of the future will be an interesting one indeed to put it mildly. It is going to cause a lot of anxiety to a lot of people but at the same time, if we are willing to be agile and open ourselves up to new experiences and learning, I don't think we have had a more exciting time from that perspective in terms of the number of possibilities that open up.

Thank you for listening. The next guest on the Podcast is Michael Watkins (MW), Professor of Leadership and Organizational Change at IMD Lausanne in Switzerland and considered one the leading thinkers in the field of accelerating leadership transitions. We spent time talking about insights from his recently launched book "Master your Next Move" where he talks about different types of leadership transitions and what CEOs and CXOs need to bear in mind as they move from one context to another.

MW: "and one easy way to set people to fail is to bring them into an organization as in quotes, change agent. When there isn't really consensus the change is necessary, I mean I have my little jokes in this again right in the organization decides that some level intellectual clear out of emotionally necessarily the change is necessary so the hire change agent and the person comes in and my goodness they start trying to change things. So, and then the reaction begins. I guess that is the essence if the advice you know but it is the trade-off right because the other thing is you stay too long operating by the way the organization operates the risk... that kind of change if necessary."

DJ: And may just trying to map it to a time clock have you noticed any trend in terms of let's say leaders moving from observe and assimilate mode to taking calls mode is it 90 days or is it 6 months

MW: It's funny...actually I have never asked that Deepak and it's just an interesting question and 6 months just an wash it my mind I can't tell you why I think that right but I can tell you 3 months is the enough time"

DJ: Look out for this podcast episode. We should be publishing this in a couple of weeks.

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End of transcription

Nugget from Arun Maira that is referenced: [Art of asking good questions](#).

Nugget from Michael Watkins that is referenced: [On boarding a leader](#).

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Kartik Hosanagar - Nuggets

- 44.00 Kartik Hosanagar - The Full Conversation
- 44.01 Kartik Hosanagar - Staying relevant as machines get smarter
- 44.02 Kartik Hosanagar - Predictability Resilience paradox
- 44.03 Kartik Hosanagar - Convenience versus Privacy
- 44.04 Kartik Hosanagar - Diversity of thought in the drawing room
- 44.05 Kartik Hosanagar - Unanticipated consequences and "Cobra effect"
- 44.06 Kartik Hosanagar - Exercising consumer choice - balancing efficiency and diversity
- 44.07 Kartik Hosanagar - Machines - Decision Makers or Enablers?
- 44.08 Kartik Hosanagar - Jobs at risk and new avenues
- 44.09 Kartik Hosanagar - Re-skilling ourselves to stay relevant

About Deepak Jayaraman

Deepak seeks to unlock human potential of senior executive's / leadership teams by working with them as an Executive Coach / Sounding Board / Transition Advisor. You can know more about his work [here](#).

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