The Future of Work podcast is a weekly show where Jacob has in-depth conversations with senior level executives, business leaders, and bestselling authors around the world on the future of work and the future in general. Topics cover everything from AI and automation to the gig economy to big data to the future of learning and everything in between. Each episode explores a new topic and features a special guest.

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Jacob: Hello everyone. Welcome to another episode of the Future of Work podcast. My guest today is Chetan Dube. he is the CEO at IPsoft. Chetan, thank you so much for joining me today. Why don't we get started with a little bit of background information about you and IPsoft.

Chetan: Thank you, Jacob, for having me on your podcast. IPsoft, prior to joining IPsoft I was an assistant faculty at New York University. Part of my doctoral work at that time was being done with Professor Venisha Shah, where I remember one summer afternoon just like this one walking into his offices and suggesting to him that with were using deterministic finite state machines to clone engineering brains and given a couple of summers we should be able to extend it to general intelligence.

Chetan: He had this smile on his face that talked about the father of artificial intelligence, John McCarthy, gave up on the problem saying that it turned out to be a lot harder than anticipated, but you're of profound ignorance about the challenges that lay ahead and you set sail. If the opening sentence of Turing's thesis when he had said, "I propose for you to consider the question can machines think? If that has really haunted you for more than a couple of decades, you set sail into making real thinking machines possible.

Chetan: It has been a pursuit that has lasted more than a couple of summers. It's now been about over 21 years now, but I think you can be the gauge of, when you meet Amelia, of how close is one company in sincerely embarking on that use of Turing horizon, of making really thinking machines possible.

Jacob: Amelia, for those people who don't know, that is something that ... You know, we should have Amelia on the podcast one day. I wonder how that would work to have her as a podcast guest. For people not familiar with Amelia, can you give people a little bit of context around, I should say who or what she is?

Chetan: Amelia, by the way, she would far better than I would on the podcast but that's not saying much. Amelia is the cognitive agent, the embodiment, the epitomization of our intelligence platform. Now Amelia also graduates from college, goes to college and becomes a banker in the form of one bank. Has graduated into becoming an insurance agent in the form of one insurance. Has gone into IT operations college and become a one desk agent for handling service desk issues. Has gone into call center management and gotten training there and has become a copilot for call center operations.

Chetan: The base platform for intelligence continues to be Amelia. Amelia, the choice of the name to me was I felt strongly about the fact that Amelia Earhart really challenged the conventional wisdom and conventional horizons that that had limited the ability of man at that time. In the days of early flight nobody had really gone around the globe and she was the first one that tried to go right around the globe before somewhere in the Pacific, but I feel strongly about that concept and that's why she was named after Amelia Earhart.

Jacob: How big is IPsoft? How many employees do you guys have?

Chetan: Just over 2,000.

Jacob: 2,000, okay. Basically, ...

Chetan: That's 15 countries.

Jacob: 15 countries. Okay. You guys are basically, your entire reason for existence is to create these thinking machines, cognitive softwares, AI, technologies, all those different types of things right?

Chetan: That is our entire reason.

Jacob: This is a fascinating area and I've had a couple of people on the podcast in the past, CIOs, CTOs etc, talking about AI, but not many people who are actually building and designing these things. Maybe you can give us a little bit of insight into what are you building? What are you creating? You guys are one of the world's leaders in this space, so what is it that you are actually working on and trying to do?

Chetan: Yeah, thank you Jacob. It's a little self serving for us to brand ourselves, but we're being kind enough to have all the leading analysts and partners of stature rate Amelia unequivocally to be the leader in artificial intelligence. I think that what we are trying to do is to sincerely emulate human brain. The difference lies in, there's an interesting article that came out from University of Nebraska just about a year ago that talked about, this was a research paper done by these professors and students at the University of Nebraska that talked about the average IQ on a Stanford-Bene score of zero to 140, you have the average IQ of a 19 years old being 98. The average IQ of a 12 year old being 84 and the average IQ of a six year old being 55. The average IQ of the smartest chat bot, as a VPA, virtual personal assistant that exist in the market was found to be 47.2. That's the IQ of less than a six year old.

Chetan: The challenge that most CEOs and CIOs face today is how are they going to deliver good customer experience and good customer service from a five year old's IQ? That is a challenge and that's where our motivation has been to be able to deliver a solution and an agent that it of comparable intellect to human agents. The way to model that, I think a large part of what has been done typically in the industry is that we have, if you talk to the global CIO of NTT Data, Chris Fitzpatrick will tell you that it is mostly IVR. We are

living in a world of IVR 2.0, which means that we are living in intelligent voice recognition 2.0.

Chetan: We still have the same decision trees, but we simply put this thin veneer of support back to machines in front and we actually classify whatever you're saying, instead of making it appear that we're making you press 17, press 11, press 13, press 14. That makes you drive crazy and makes you want to yell operator and representative. What we are doing is that we are putting a thin veneer of support back to the classifier, which in essence is making it appear to you that we are understanding natural language, but what we're doing is taking the natural language that you speak and simply classifying it into one of the buckets. We're doing essentially the same thing except for the front little thin layer that we say would map you to one of the buckets. It works fantastically where shallow intelligence is required, like atomic tasks, "Book me a flight. Cancel that reservation. What's the weather like outside? What is the temperature? Play me a song from La Via Rose."

Chetan: These things work fantastically for those atomic tasks, and those administrative and secretarial tasks also, it works fantastically, but does it really suffice when you want to do mortgage? Does it really suffice when you want to do claims processing? Would it work for you if you want to do an actuarial analysis? Does it help you if you want to do a policy administration for an insurance company? That's where you need real intellect, not just a decision tree. That's where you need to be able to really study human brain and say, "What is the human brain doing?" Human brain, the approach changes from looking at a decision tree to starting to look at the centers of human brains and human thought.

Chetan: Human brain has got a center for semantic, the thinking part, which is the hippocampus, and has got an episodic part, which is the frontal lobes which are event based memories. Has got a center for analytic which is doing trend analysis and which has got a center right at the back of it which is for affective emotional part. Of course, the language center, which is somewhere in the front and center, those parts are the ones that make human brain. You see the radical, the octagonal difference in the approach? I'm sorry to ... this obviously is for those members of your podcast that like beautiful kidneys. This is the inside of the algorithms where on one hand you have a typical decision tree algorithms and mimic IVR behavior. On the other side you have algorithms that mimic human brain and it's different centers of thought. The difference and the results you get are radically different.

Jacob: Quick question for you. I think probably most people listening to this podcast have, at some point, encountered an IVR. When you call your bank, when you call your cable provider, I've encountered many of them and every time I do, I want to smack my head against the wall. It is frustrating. Oftentimes I just randomly push digits so that the IVR eventually gives up and says, "Transferring you to a human." It's extremely frustrating, yet a lot of companies still use them. I'm really fascinated in how you create this more human-like AI, Amelia. Did you actually study human brains or how do you even begin to emulate human thought and how the brain works? It just seems like a very, very difficult thing to do?

Chetan: Actually I underestimated the complexity of it a couple of summers, and you know it has taken us about 21 years. You're spot on. Human brain is, by far, the most profound and most fascinating machine at the same time that exists. I think to answer your question, I think that absolutely IVR, if you're interested Jacob, I know that you've written about some of these things, I'll send you a copy of it. You can see that the average IQ that is represented by the IVR solutions are the equivalent of a five year old. For instance, if you say to a typical banking agent, you say, "If I have more than $10,000 in my account, please transfer $2,000 of that to this person to my investment account at 3 pm day after tomorrow." If you say that, almost all different banking applications that you find in the market will actually go ahead and will do the transfer. They'll do the $2,000 transfer. If they are somewhat sophisticated, they will do it at the temporal time of 3 pm day after tomorrow. Almost none of them will actually be really aware of the condition that says, "If I have more than $10,000 in my bank account."

Chetan: I think that if you had started to have a conversation, what we're doing is that we are mapping the altruance to many megabytes of training data that we have, into a model for executing a DNN, a deep neural network, or it's mostly a shallow neural network. We execute that and we hope to be able to execute and perform the task that is requested. The challenge is that what is wrong with the IVR systems? One, fundamentally, they do not understand. A brain understands, a human being understands you. Switch me to a chat bot says nobody ever, even if you're being services off shore and you're getting substandard quality would you rather suffer with a human than say, "No, no. Please put me with a chat bot."

Chetan: First they don't understand, so you need to really understand what is Jacob trying to say? That requires the mimicking of human hippocampus. That requires an orchestration of a symbolic logic layer on top of the deep neural network layer, so that you can actually understand the semantic tree, the entire mind map of the person and what is the person trying to communicate to you.

Chetan: The second is that you also need to be able to, what is the other thing that IVR's don't do? The moment you say, you do the classic application which you will find a dime a dozen. Many, many different applications you'll find for ordering pizza. You'd say, "I would like to get a pizza." He will say, "What toppings?" Then you say pepperoni, then you say what size and you say, "Medium large or this." You say, "What's your address?" And you say, "I changed my mind. I'd like an ice cream." You'll be done.

Chetan: IVRs are inflexible. Even if they are flexible somewhat they cannot do it in a contextually aware, stateful manner. Humans can. A true cognitive agent has to be able to switch from getting you a pizza to getting you an ice cream, back to getting you the pizza. That's why you find yourself in a white jacket with an IVR. Even if you're heading down the wrong direction, an IVR will typically not allow you to be able to take a U-turn or to be able to context switch out, unless you are pressing the odd combination of buttons you pointed out. If you have discovered that, Jacob, please share it with the rest of your audience.

Jacob: Oh, I just randomly mash every button I could find until the IVR just loses its mind and says, "You know what. We're just going to send you to a human because we don't know what you're saying."

Chetan: Then that's exactly the experience that a lot of our customers have, exactly the same. The third part is that an IVR, do they really understand that Jacob is getting frustrated? Do they have an affective connection with you? Do they have an emotional connection with you? Do they have an emotional EQ vector? Do they have a mood vector, which is the integration of EQ vectors? Do they have a personality vector, which is the integration of mood vectors, that tries to be empathetic to you? McKenzie had an interesting research that said that emotional quality and empathy of the response that you get from a customer care agent is more relevant to driving up the value of NPS, net promoter score, as opposed to the logical, even the logical component of the service that you are getting.

Chetan: Do you get that? What is the difference from the IVR? That's a very insightful question and why are they incapable? First they don't semantically, truly understand you. Second, they really are not able to context in a stateful manner. Third, they're not able to have any emotional and affective connection with you. Fourth, which is very important, they're not able to learn. They do not learn and a true cognitive agent, such as Amelia, is able to learn and automatically build the mind map. With every conversation she's able to rapidly learn and continue to build the mind map. I apologize for the elaborate nature of the answer to that question, but I think it is important to be able to distinguish a true cognitive agent from the typical chat bots or from the plethora of IVR solutions on the marketplace.

Jacob: Why are so many companies, everyone hates IVRs, why are so many companies using chat bots and IVRs if nobody likes them?

Chetan: Everybody knows that, McKenzie predicted that we are going to head into this automation of knowledge work is going to be $14.6 trillion market. McKenzie predicted 35% of the tasks, of the global payroll costs, are associated with knowledge worker and that's going to be done by cognitive agents. When you have a market of that unprecedented nature, you can expect there, ... I was told by the CEO of this forum that six years ago when we started, I think it has been a quest for 21 years now, but six years ago when we unveiled Amelia, there were no other chat bots in the marketplace. Now Gartner tells us there are 1,600 chat bots in the marketplace.

Chetan: Obviously when you have such a big market you will find everyone jump into the marketplace. I think it's a welcome thing because I think you want to be able to invite the level of interest in the market. You are also finding it as a natural, the buyers are getting much more savvier. You're finding that these are not the first generation buyers that are graduating form the POCs. What happened in the last couple of years is you had to be able to sit on a board and you had to say that you had a digital strategy and you had to say that you were employing AI related agents. You'd done some pilots and AOCs, you had to say that because you did not want to be the other side of the digital, Darwinistic curve, because we are living in a digital, Darwinistic time.

Chetan: You were piloting mostly so the buyer was the first generation experimentalist and today we are finding it to be the buyers are getting much more sophisticated with what works and most importantly what is able to drive good net promoter scores and what is not. That's a welcome thing. You don't have the largest telco in Latin America in telefonica being able to handle over 2.2 million calls in the month, last month itself, with an intent recognition success of 87.2%. Serving with at volume, the capabilities of having 610 concurrent sessions. Now that is true, digital revolution. The efficacy of it is born by what they presented to their board is that this is the largest, digital workforce on the planet. This is their representation. It is true too, because it is at scale, being able to do the job of several thousands of human agents.

Jacob: How do you define AI? Because I feel like there's so many different definitions and a lot of people are just calling their chat bots AI, they're called their IVR AI, everybody's using the word AI, but really what's happening is they're taking these old technologies and calling it something else, probably because most people in the world are ignorant, or they just don't understand what AI actually means or is. How do you differentiate true AI versus these old technologies that are just being rebranded as AI?

Chetan: That's a great point. AI has become mostly a marketing ploy. This microphone and this is artificial and this cognitive microphone that I'm speaking into. The water I'm drinking is Smart Water, and the light is definitely a smart light in the conference room I'm sitting in.

Jacob: Yeah, it's everywhere. Smart, all these terms.

Chetan: That's right. I would go back to McCarthy era and I would go back to the fundamental of artificial intelligence. It's so much so that a managing director right at the top at Accenture called it Artificial Intelligence. It is true that we are living in artificial AI times to a large extent, exactly as you pointed out. I think to me, as a student of this for now going on about three decades, I would say AI continues to be the ability for machines to mimic artificial intelligence that is artificial intelligence.

Jacob: Simple enough. You mentioned that you've been in this space for three decades. Can you share what it was like three decades ago, or 30 years ago, versus where we are today? What could you do 30 years ago, versus what are you now able to do 30 years later? How much progress have we made?

Chetan: There was the big AI winter. You know about the McCarthy and Minsky era when, if you'd been a student of this for long you would identify with the fact that there were predictions made that we would be able to rival human intellect in ten years time frame. This was in the '70s that we had confidence in artificial intelligence getting to that level of maturity. Obviously, we know that it entered into a period of what is classically in the research world known as AI winter, because the classic hike of the sense of exaggerated expectations and the inability of the technology to be able to measure up to it. We had that classic hype curve that Gartner puts together and we have endured that winter on the research side.

Chetan: Since then there arose these deep neural networks that are, and depending on which flavor of deep neural networks you're subscribing to whether it's long/short term memory networks or the current memory networks, whichever one that you subscribe to, what DNN and the explosion of data allowed us to be able to do is to be able to crunch massive amounts of data and have the computing power to be able to assimilate and decipher intent more accurately. That was one part of the equation. The connection is lost.

Chetan: On one side of the deep neural networks, we just started to focus on the DNN models as opposed to worrying about the symbolic logic. The logic part of how human brains think was often put aside. We find that over this period of time, we find that what has happened is the business world today has mimicked some of the transitions we saw in the research world. Research world had a big, huge winter of AI and the business world, again, had an excitement about AI. We see that a little bit even in the last couple of years, we have seen that transition of, "Well I've got a bunch of pilots going. I've got this VOC going and I'm having marginal returns, I'm having problems with my net promoter scores."

Chetan: To now what we find welcome is that you're having the largest bank looking at 1.2 billion credit card transactions a year with digital agents. You're looking at the largest telcos in the world doing over 4.5 million calls a month with AI, and getting good customer satisfaction by the way. That's the most important part. Good net promoter score. Not only do you get your cost of goods, cost efficiencies, which is a given, but the fact that you're able to drive good net promoter scores, classic example of that being, 75% of the inbound calls, Allstate for instance, done by humans, 4.6 minutes. Time to resolution. Done when assisted by Amelia, 4.2 time to resolution, 4.2 minutes. First time right, 67% done by humans, 75% when assisted by Amelia.

Chetan: You can see that AI, and true AI which is very rare. True AI, what is different in these years is that true AI has come of age. It can actually deliver not just equivalent, but in some cases superior than human experience because of it's ability to assimilate knowledge and to be able to truly mimic human intelligence. You're starting to see that in the examples that I've given you. The Allstate and telefonicas and the other such instances.

Jacob: Where do you think we are in the grand scheme of things of being able to recreate human intelligence? I know Ray Curtswell and there are a couple of other people out there, I think they said that by 2030 or 2035, something around there, that we will actually be able to create AI that is just as smart as a human, and then a couple of years after that we'll be able to create AI that is smarter than all of the collective humans on planet earth. If you look at the AI timeline so to speak, where do you think we are in maturity? How advanced are we really?

Chetan: That's a fantastic ... I have had the privilege of working with some of the giants in this field. The Professor Chris Manning's of Stanford, who are just intellectual giants that I hold in ... right from my early days when I used to work with Professor Venisha Shah, and I've worked with some giants whose knowledge and intellect way dwarfs mine. I can

tell you that, it's not a discussion anymore amongst them. It's not a discussion if true artificial intelligence will start to rival human intellect.

Chetan: The only thing that is of discussion nowadays is when. Is it going to be in, as you mentioned, the Curtswell, the singularity and you feel that, is it going to be in 2030-35, is it going to be as we maintain by 2025, you will pass someone in the hallway and you won't be able to tell if it's a human or an android. I think that's the real difference is that just the time horizon. If it's going to be in the next six years, if it's going to be in the next 11 years. It's inevitable at this point that you will get to the point where these agents start to mimic human intellect.

Chetan: I have to caveat that, because I do a lot of this research, and I don't see human creativity is, as much as I say that by the next 2025, you will pass someone in the hallway and you won't be able to tell if it's a human or an android based on the research that we're doing.

Jacob: You said by 2025?

Chetan: Yes.

Jacob: Okay, so this is just five years.

Chetan: Yes, that you will not be able to tell if it's a human or an android. That's because we are having that brain complexity come in and the conversational intelligence come in that somebody would be able to buy. We are able to have robotic motion has become fairly fluid, we know that dexterity is becoming fairly fluid, so what's left? The face. The face we know, we have got body mark applied with PMLs, are starting to give what is rendered in 2D. Star Trek had somebody rendered in 2D that was dead for the last over a decade. We can render that in 3D also and that's also becoming fairly sophisticated. The one thing that is missing from all the other ones renditions that you see of the cute little robots that you see out there, which are just cute. They are nothing but you press this button and sometimes comes out and it says something cute and we all are fascinated.

Chetan: One thing that is fundamentally missing from all those cute little things that are play toys is brain. Once you put the right brain into any of them, the rest, dexterity, the ability for them to move, the ability for them to have a conversation, the ability for them to be fluid, the ability for them to lift a cup, all that is fairly ... Thanks to our fascination with autonomous driving cars, the mobility part and the ability for them to recognize different objects, which we have benefited tons from collateral research being done for autonomous driving because you're able to distinguish between realistically what is a real child versus what is a picture of a child? That kind of sophistication exists today in these sight has come to that.

Chetan: What is fundamental is that, while I maintain that we will not be able to tell the distinction between a human and an android by 2025, I have to say that at least in the three decades of research that we've been doing, human creativity in the foreseeable

future continues to be outside of the bounds of current state of artificial intelligence. What do I mean by that? I can be the stupidest person, and I play chess and when I was at New York University I would go to lose a few dollars by playing chess in the park because no matter how good you are at chess, they will still manage to beat you at Washington Square.

Jacob: You're talking about one of my favorite topics by the way. I love chess, I'm obsessed with chess. I take lessons with a grand master, I'm going to play in my first tournament in a couple of weeks. I love it.

Chetan: Wow, well then you would do much better at the Washington Square Park than I did.

Jacob: Not with those hustlers man. Those guys are tricky.

Chetan: Actually the problem that I've found is that I think too much. They've got the first 20 moves just set, but I digress, so forgive me. I think I could be the stupidest chess player and I could still beat you. I have an 8x8 board and I would explode all the choices. I would say if I move this and Jacob moves this and if I move this and Jacob moves this and if I move this Jacob moves this. I would go down the entire tree and put a weighted number to each one of those positions, and I would say, "Okay, now I will pick the most advantageous position to be in. Best weighted position for me to make that move." I have a limited space here. I have a bounded space and I could explode that search space. Whether you call it chess, and I'm not diminutizing the problem, I'm just saying that whether you call it chess, whether you call it go, it doesn't make a difference.

Chetan: It's just an explosion of the state space. The state space is just known to me. I can completely explode that state space. I can say all the moves I would make and I can say, "I'm the stupidest person. These are all the possible moves I could make and these are all the possible moves that Jacob would make subsequently. Listen, I used to play maybe three-four deep. You can go six deep I'm sure. I'm a stupid computer programmer, I could go eight deep easily and I would be able to explode all the sets and then I would make a move based on that simple ... Obviously, if you have over laid the awareness of the different openings and the different position's, you obviously can come up with your deep blues and the things that can beat Casper out. Do you see the idea? The idea is that you've exploded the space. Why am I, I ask you Jacob, is that creative?

Jacob: No.

Chetan: Can that cure cancer? Can that cure world hunger? Can that give the next Monet? Can that paint the next Daigar? Can you compose the next Fur Elise by Beethoven on the basis of just random combination? That's where human creativity is far superior. Sometimes it is confused that we say we explode the states. Of course it is creative. Look it can beat somebody at go, or look it can beat somebody at chess. That's not creative. Exploding state spaces are not creative. Just exploding all the different things and all the trials and being able to say I am basically, from the data set I'm seeing this thing, we would never have been able to come up with the general theory of relativity, I can tell you that.

Chetan: We would never have been able to come up with the energy and mass. There would never have been a time that in 1905, one man changed the world the way we know it today. He published three papers, the third of which had a category that talked about photoelectric effect, energy and mass have to be inter-convertible. He wrote his [inaudible 00:37:20]. No artificial intelligence program today, I can tell you, is capable of coming up with creative thought like that. That, humans should concentrate on.

Jacob: I have a couple of questions. First with the chess thing, I know that there was an interview a couple of years ago with Magnus Carlson, who's the current world champion. Somebody was asking him about AI and Chess. He had this really interesting quote where he said, "Even though I sit across from a computer and I lose the game, I still feel like I'm playing somebody stupid that doesn't understand the game." I love that quote because I think it's exactly what you said. You just are playing somebody or something that's just crunching numbers and that's it.

Chetan: That's it.

Jacob: The second question I had for you, there have been a lot of articles and videos coming out recently, trying to show that technology is getting creative. I don't know if those things are true or not, but for example with Go, I know that they talked about Alpha Go Zero and then there was this famous Move 10 in the human versus machine match and they said, "Oh this is the beginning of creativity." There are videos being shared about how technology is recreating music and painting things and writing scripts. A lot of people see that and then they're like, "Oh it's true. AI is becoming creative." But that stuff, I don't know, is there any truth to that or is that just gimmicky stuff that we're seeing?

Chetan: With all due respect to all the different technologies that you mentioned, my humble opinion is that human creativity is far superior and there is no truth to the fact that ... Can an agent conduct the same interview that you are conducting right now?

Jacob: I hope not.

Chetan: I can tell you no. You can have a debate and you can have debates and things on classic topics and you can even have people who say, "Journalistic reporters, I can have them as artificial agents." Yes, there are what you can cobble together information that is picked from the net on different topics. Stock codes, this excerpt, that excerpt, piece it together and here you have a writer. That's the equivalent of George Bernard Shaw saying, "Give every man a pen and tell him he's the equivalent of GB Shaw." There is a human creativity that I hold and maybe I define creativity as too much, and maybe I am being a little bit biased here, but human creativity to me is the ability to create something which is unthought of, unheard of. That's creation.

Chetan: The ability to create a cure for cancer, the ability to create energy and mass that are inter-convertible, the ability to find a way to colonize Mars, the ability to plant hydroponic seeds on Mars and to be able to see that there is subterranean ice there and we can actually create life. We can colonize another planet. Those ability to extend

man's horizons. These are creative things and I think that these are not the same as exploding an information space and exactly as the grand master said, that is not creativity. That is mechanical computation, but it's not creativity. Creativity to me is being able to create things that have not existed before. To create the next big Deigar, these things have not been discovered.

Chetan: We have not found the cure for even common forms of even the malignancies that affect us. I think that's where humans need to focus their effort. That's the future of humans. Humans need to be able to go from the basics of where an auto insurance company employs Amelia and gets an improved customer care and starts to release just in time insurance or starts to release paper mile insurance. To where humans and new business model, reinventing the core with digital processes and extending to adjacencies and innovating on the adjacencies as we find that the boundaries between these different ... the silos that have separated us between these different verticals start to get dissipated by artificial intelligence and the digital under currency that exists between them. That, to me, is creative and that's an area where humans rein supreme today and with due respect to great minds, for the foreseeable future.

Jacob: Hey, I love it. It's good to know that humans still have a place. It's interesting because you mentioned the cancer research. I remember, I think it was a couple of months ago, I was reading an article and it was talking about IBM Watson and it was saying a lot of hospitals were actually pulling back from using Watson, because although it was promised to be this great AI that could help cure cancer, they found that it was taking a long time, there were still a lot of manual involvement of having to update the software, and they just found that it wasn't as effective as it was promised. Now, I don't know where these things are today. This was a couple of months ago, maybe even last year, but in general I kind of wonder if the world of AI is a little over hyped from the reality. I don't know what you would think about that?

Chetan: I would tend to agree. In its ability to creative, like curing cancer for instance, I think it is exactly. I would say Watson continues to be one of the most impressive, analytical engines that I have known. I feel that it is able to look at 100 million patient care records and recognize the similarities between what you might have as your footprint as opposed to what it has stored in its data banks. Obviously, it's a very fascinating analytic engine, but its ability to, I think it will obviously provide more and more assisted care for different surgeons and others and physicians and researchers to be able to move towards curing some of these malignancies. I think there is a little bit, as far as creativity in being able to ... That's where doctors should focus on.

Chetan: Jacob, that's a very interesting question to me, because do you think, you go to school for literally two decades being a doctor, before you have done your residency and everything else, you actually have gone to school for about two decades after having. Now you step out and what do you do for most of your life after that? If you're a general physician, and again, I have a great deal of respect for doctors and that's why I'm saying that. What you're doing is like most of the time do you know how much time you spend on doing research on average? This is just a map by the way, this is not a subjective opinion. On average, doctors spend about four hours a month doing research.

Chetan: Now I ask you, having gone to school for two decades, is it not a colossal waste of brain power to only exercise it for four hours a month and the rest of it to be lost in the actual practice of it? Do you think that the mundane practice of general physicians and other things should be done by cognitive agents while the doctors can actually rein supreme in the domain in which they, and only they, can govern which is finding cures, systemic fixes, not tactical looking at strategic advances to patient care? Do you think doctors should be absolved from common chores? This is going to happen.

Chetan: By the same 2025 this is going to happen where your common general physicians are going to be cognitive agents, that are going to know well before anybody else, just by your watch, that you are suffering from this, your white blood cells and these have gotten this drop, your fever and your heart rate and everything else, your systolic/diastolic has gotten this. You're likely suffering from this because I've got this patient care data on you and I'm going to be able to send you to the nearest CVS or Rite Aid, your pharma and you're going to get it dropped by drone. That's going to happen on your doorstep. That's a given. Now is that not a great deal of AI?

Chetan: We were invited by the Prime Minister's office in India on December 10th of the year before last, and we learned in some of the things that we've been doing, we learned that there are 472 million Indians that have got a cell phone. Over half of them do not have qualified healthcare. You tell me, would it not be a great use of artificial intelligence to bring them a qualified cognitive doctor? Really qualified cognitive doctor that can actually they can interact with on their phones and get quality healthcare? Talk about truly saving lives and truly affecting the cliched better world through artificial intelligence. That's going to happen. Doctors should focus on creative forms of systemic remediation which only their brains can affect for the world. If they were allowed the freedom to by having all these chores taken care of by artificial intelligence, the GP, all these common ailments and other things that they write prescriptions for day in and day out, if they were allowed the freedom to be able to concentrate on finding systemic cures which their brains and only their brains can actually give to the world, do you not at this point think we'd have advanced the state of medical sciences to be able to diagnose and fix the common maladies like cancer? The common maladies like NSIP and interstitial pulmonary disorders? We might have found the cure for that thing.

Chetan: That's what our focus should be, with again my cent and a half on this. I care passionately and respect the intellect and creativity of the doctors and I feel it should be applied to systemic fixes, not tactical, day to day activities.

Jacob: And of course, this can be applied to other areas too. Doctors, lawyers, managers inside of organizations. This can be applied to many, many other areas where we focus on those important human aspects. In the case of leadership, the ability to build relationships, to engage people, to build great teams, to motivate, to inspire others and let some of the other stuff like the decision making, crunching numbers, let AI do some more of those things so that we can focus more on that human stuff. I absolutely agree and I think we're moving in that direction.

Chetan: Brilliant. That's brilliantly observed by you. That exactly what you said, in all areas you find a similar trend. Bravo.

Jacob: Thank you. One of the big questions that we always hear about when it comes to AI is should we be worried? Whether you're an individual contributor or a leader at a company we see a lot of these scary numbers out there about jobs getting replaced and automated. We see that there could be some potential benefits like we talked about, but are there some threats? Should we be worried about not having a job? Should we be worried about losing our careers to technology?

Chetan: Well, I ask you that are we living in digital Darwinistic times? I ask you a second question, do we have a choice? People have asked about, is it a good thing, is it a bad thing, the utopia? People have a cure for all common maladies and world hunger and peace and the dystopian view that's completely polar on this is the Hawkins club that says this is going to be the final invention for mankind. We have these two different poles of scholarly views. I ask a third question. Do we have a choice? I have had the privilege of meeting many CEOs. CEOs of I can tell you six out of the top ten banks and similarly top insurance companies. I have yet to find a single CEO that I've met who says, "McKenzie estimates I can have a 45% margin enhancement by deploying a digital solution as opposed to a 35% margin compression if I'm a digital laggard." With 80% spread between my digital haves versus have nots, I'm not sure if I'm going to go digital or not. Is it not digital extinction that you face if you do not endorse?

Jacob: You don't have a choice.

Chetan: There you go. Voila. You don't have a choice. Why don't we just wake up to the fact that the spread is 80%. This is not about a 5% spread that we can say, "I can go beyond that." This is not incrementalism. This is that radical, this is that quantum. Why don't we face the reality, the mathematical voracity of the fact that the spread is so much that if you don't do that, you're going to face digital extinction. This is one part that I agree with, that if your competition has AI and you don't, you're dead.

Chetan: Given that, why don't we start with a mathematical antecedent of the fact that this is going to happen. When you have something that is so much more efficient that it can get 80% spread and 45% margin enhancement and it can yield 40% overall gain in productivity, why don't we start with the antecedent in this mathematical equation and say, forgive my preoccupation with numbers, I'm one of those students by training. Once we start with that we say, okay now the question becomes in this case we know we're going to go this way, we know that these robots are going to work nonstop for us, we know that they're going to produce, the overall GDP is going to surge by another 40%. Then the question becomes, "How do we thrive in this? How does man thrive in this? Who is driving this for the planet?" Are we still not driving this planet? Yes we are.

Chetan: Okay, then how do we actually come up with better equations for our companies and our countries and how do we actually come up with ... I've been invited to the Palace De Luxembourg and the French senate from ex-Prime Minister Raffarin to talk about the concepts of France obviously has explored the idea of minimum viable income with the Nordics. I was invited to the House of Commons in England which is exploring the idea of, should we turn the clock ... How to talk about artificial intelligence and should we turn the clock back towards vocational training that obviously is outside the bounds of AI today?

Chetan: Those things are, the government itself and the companies itself should start thinking about this AI revolution that is upon us, how do we thrive in this tomorrow? Nordics of Finland and others have actually explored minimum viable income and I think I continue to be a strong proponent that we should have a minimum viable income because the productivity is going to increase by 40%. What a beautiful world. There is a French scholar that said, "The whole purpose of artificial intelligence is man may spend more time at the beach." Isn't that fantastic that we would actually be able to give humans the, "Hey, don't worry. You have these faithful friends of yours working 24/7, providing you enough bread on the table so that you don't ..." human creativity is shackled by overbearing concerns of sustenance. Is that not the case? On any given day, even a person as scholarly as you spends only 30% of his time on creative thinking. The rest of the time we are driving a car, crossing the street, taking out the garbage. Is that a good use of your brain?

Jacob: Probably not.

Chetan: Should your brain be liberated from these shackles of ordinary? Should somebody come along and say, "I got the driving of the car, I got the taking the garbage out, I got vacuuming the floor. I've got all these claims and processing you have to do and I've got all the policy administration questions that you have and your Verizon bill will always be paid. I will take care of that, I'm your butler. You just focus on what you do well, creativity." Would that not be a fantastic world for us to live in?

Jacob: Oh, it would.

Chetan: That's where I see this world emerging to, but we have to be the drivers. There's a beautiful Volkswagen commercial that says, "In the road of life, there are passengers and drivers."

Jacob: Oh yeah, I know that commercial.

Chetan: Drivers want it. Fahrvergnügen. I would say that's the fascinating part. I think that companies and countries who are in the driver's seat, who are embracing this digital revolution and coming up with a formula to thrive in this digital revolution are the ones that are starting to assume a dominant stance. 40% of the fortune 1,000 are not fortune 1,000 anymore since the year 2000. Is this digital Darwinistic revolution and this digital Darwinism happening as we speak? Numbers tell an unequivocal story.

Jacob: I couldn't agree more. I know we only have a couple of minutes left, so maybe we can just touch on how do you start to embrace this? There's looking at this on the organizational wide level and governments and leaders of that, but there's also individual contributors, so people who work for these big, global companies but they're not leaders or managers. They're mid level or maybe entry level employees, maybe they're truck drivers, maybe they're accountants, and they're very much worried that technology will come around and replace their jobs as well. Maybe let's start with just individual, what does this mean for us as human beings? What should we be doing, if anything, to prepare and adapt for what's coming?

Chetan: Well, dust the rust off your brain and focus on creativity and coming up with things that are ... Do not play the machines on their playing field, you will lose. Do not play on mundane, ordinary chores and say I'm going to be the Luddite or neo-Luddite and try and stop the machines from driving cars or flying planes or driving trucks. They're going to. They're going to. That's what they do. They are just more effective at that. Humans are more effective at, and will continue to be, creativity. Humans should start thinking about, "If I'm a human and if I have a minimum viable income, I should start thinking about in the organization that I'm in, how do I drive better processes? How do I come up with just in time insurance? How do I come in with pay per mile insurance?"

Chetan: People are doing that actually. How do I come in for a way for me to ... If I'm a banker and I say, "Why will I not just have, as far as I'm controlling the digital token, I can actually be controlling the payment tokens so I'll be able to go ahead and outside of the vertical, siloed boundaries that have existed, I can actually permeate right through them." The largest bank in Scandinavia, happens to be only two years old. [inaudible] 76 million customers.

Chetan: You bank with a conventional bank there, you will have to go and if you wanted to, you charge their credit card and you buy a set of shoes and if you want to return the set of shoes, Jacob, you will first have to get an RMA, then you will have to package that set of shoes, and then you would have to go to the local post office or FedEx or something and get those shoes back. Carina, one touch, you press the return button on your mobile, done. Carina underwrites you, knowing Jacob well and says, "I will immediately transfer the funds over to you. I know you are a worthy client of ours and I will take care of the shipping and logistics of it."

Chetan: Has it not diffused the boundaries between retail and banking and is that not the reason why these new, innovative business models are starting to become the dominant business models. Reinvention of banking. Not just banking siloed, but banking and retail, convergence of those things, which is now made possible by the digital under currency. These are the things which humans should start focusing on and humans should start thinking of rather than trying to hold on to, but I want to be still the person that is laying the typeset or I want to still be the person that is actually spinning the wheels in the fabric, the Luddites and the neo-Luddites need to make sure that they move and embrace this revolution.

Chetan: My cent and a half, and they need to make a formula to actually try. There are 88 billion neurons that god has gifted us, and I can tell you, I continue to believe that the human brain is the ultimate Darwinian engine. It is 88 billion and continuing to evolve. We have to challenge our brains by not letting them pickle and say, "Let me come up with creative ways." Our governments and our companies should foster that. Our governments and our companies should foster intellectual outlets for our people in which they can contribute to the overall manifesto better. As I said, I've had the privilege of talking to a few governments and you can see examples of this in Astoria and you can see examples of this in certain companies that are thriving. They have embraced digitization and they have moved their people up in the value chain.

Jacob: I love all these different stories and examples you've been able to share. I know we are out of time. Maybe you can just share, what is your big picture vision for where all of this is going? Then you can wrap up and let people know where they can learn more about you, IPsoft, if they want to connect with you or the company, or learn more about this stuff. Anything that you want to mention for people to check out.

Chetan: I think your audience is rather knowledgeable, so I beg their forgiveness in advance of preaching to the choir, but where it's going is where they're writing today, where they will individually in their careers or collectively in their companies, they are self-electing. Companies are self electing where they will sit on this digital Darwinistic curve. Everyone has a choice to make today. Do they wish to be just informed? There is this big, digital tidal wave that is coming. Oh, it's here already. I have read about it. Okay. Do they want to be an experimentalist? You climb up on that digital Darwinism. I'll dip my toe in the water a little bit and I'm getting some marginal gains, two or three, four, five. I'm doing incrementalism.

Chetan: Do they wish to be a fast follower? This is the McKenzie curve. A company says, or an individual says, "I want to be a fast follower. I've identified on Barkley's and I've identified certain silos. My mortgage." 62% of the mortgage origination Barkley is doing entirely digitally. Okay, great. Or do I wish to be a market leader? JPMC. 1.2 billion credit card transactions a year. BBBA, all of Latin American banking, telefonica, all call centers operations, Peru and otherwise, at scale for tough accounting and billing issues. Leader and unfortunately I have a tendency of waving my hands, so I'm trying to draw a graph of this returns curve and you can see that the return curve goes up exponentially between the left side of the equation being of course the informed goes up a little bit to the experimentalist, goes up significantly to the fast follower and goes way up for the leader.

Chetan: We are living Jacob, in a very interesting time. Typically, the risk curve always follows the same curve as the rewards curve. The times we are living in, the risk curve is an inverse parable of the rewards curve. The risk of non-adoption, the risk of experimental adoption is still much greater than the risk of early adoption and the risk of leadership adoption. That is the awareness that we need to be able to have and we just need to be able to look at certain companies. The risk factors are choice of the right technologies. Nowadays, everything as I said, I've been drinking Smart Water, which is trying to cure my large amounts of profound ignorance, but I think the Smart Water ... Sorry, I don't intend to.

Chetan: I was in one of the conferences and I was talking about Smart Water when the person sitting in the front said, "I love everything we are talking about, but please know that Smart Water is a Coca-Cola product." This was the CIO of Coca-Cola by the way. The interesting part is that we have the risk factor as a determination of the right technologies, the choice of the right technologies as opposed to the propaganda and the marketing machine associated with different technologies. The risk factor is the organizational change. The choice of the right technology needs to be only one yard stick. Toss all the marketing brochures aside, just concentrate on the outcomes.

Chetan: Ask them what are the outcomes, tell me the numbers, give me the cases of where real outcomes are as opposed to the brochure and as opposed to just the logo ware, which you find tons and tons of logo wares everybody displays. I think that second is the organizational change. The ability to be able to attack the organizational change that is required to be able to change the machines of this plane that is flying from propellors to a jet engine while mid-flight. That's the main challenges that we should focus on in our leadership capacities. We are self electing at this time as individuals and collectively as companies, where we wish to be in the next 24 months. I'm talking about in the next 24 months this will all unfold where we will have self elected ourselves either to be on the leadership side or we will have risked losing ground to the extent of facing extinction.

Jacob: Seems like we all have a lot of choices to make. Where can people go to learn more about you and IPsoft? Anything that you want to mention for people to check out?

Chetan: I think IPsoft's home page is ipsoft.com. We can say that we are great at marketing but you can find some fundamental information about us in Ipsoft.com. My wife believes I'm having an affair with Amelia, you can find her at Amelia.com.

Jacob: Very cool. Well thank you so much for taking time out of your day to speak with me and sharing your insights about all these really, really fascinating technologies that are coming our way. I really appreciate it.

Chetan: Thank you very much Jacob. The privilege is all mine.

Jacob: And thanks everyone for tuning in. My guest again has been Chetan Dube, CEO at IPsoft. Make sure to check out their company and you can learn more about Amelia and all the fun stuff they're doing there. I'll see all of you next week.