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Yousef: So we're going to go through a Watson primer. Now what is the Watson difference? So, the simplest way to kind of think about what the Watson difference is, is if you have a problem that requires an understanding of human language, communication, or expression, then you have something that Watson can help you with. I'm going to repeat that. If you have a problem that requires an understanding of human language, communication, or expression, then you have a problem that Watson can help you with. If you don't have one of those problems, Watson isn't going to be able to help you. Watson's not an analytics engine that's going to predict the next best thing to do for you or what segment of the population you're in or anything like that. What it's going to do is it's going to maybe evaluate things that you write to help do those things, but really it's looking at human language, communication, or expression.

Now let's talk about what human language, communication, and expression are. So when you write something, that's human language, communication, or expression. When you post something on Instagram, that's expressing yourself. That's a form of expression. Music is a form of expression; Poetry is a form of expression. These are all things that Watson can listen to, read, see, to basically help understand things. So now once you kind of understand that concept that Watson is about understanding human language, communication, expression, what can you do with it? So now let's go to this slide.

So these are the Watson patterns. Now I'm going to kind of bounce around on this slide. So the first thing is engagement. You remember that first cognitive icebreaker where we had a conversation with one another? So that's this pattern; that pattern of being able to have a conversation back and forth.

Now when we first started Watson, how many of you saw *Jeopardy*? How Watson played the game of *Jeopardy* and that's where it started and that's great. A question-and-answer system or an answer-and-question system, technically speaking. So the interesting thing about Q&A is that it's very discrete. I ask a question, I get an answer, flush. I ask a question, I get an answer, flush. I ask a question, I get an answer, flush. What's really interesting about humans is they don't quite communicate that way. First of all, we don't communicate in questions and answers. And the second thing is, is we actually contextualize what we're saying now to what we just said before.

So if somebody asks the following question, what are the minimum bodily injury limits in New Jersey? And I give the answer. And the next question is, well what about New York? You don't want the computer to say, well what about New York? You want the computer to understand that what you're asking is contextualized to the previous thing you asked. And so, we actually had to build

this conversational ability to actually have a conversation instead of just Q&A. So when we tried to rollout just Q&A to people, we basically saw it didn't work. So we had to go and build the ability to actually have a conversation. So that's the engagement pattern.

The other pattern over here, I'm going to move over here, is exploration. So this is really no different than what you're all used to in the world of business intelligence, reporting, analytics. It's the same essential pattern. I look at a set of historical information and I try to glean some type of insight out of it so that I can help make a better decision either now or in the future. The only difference is now is I can use that human language, communication, and expression, which a lot of people will talk about as that unstructured data. Now I personally don't like to call it unstructured data because when my daughter sends me a selfie she doesn't go, hey Dad, do you like the unstructured data that I just sent you? But I'm going to give you an example.

We had an apparel company that basically took all of their Instagram followers and they ran all the postings of their Instagram followers through our image recognition software and they basically discovered two new segments of people that they didn't know really were interested in them, hikers and golfers. So that's an insight from information that they gleaned out of this basically human expression. People were expressing themselves in Instagram and they were able to glean that insight from there.

I'm going to move over here to discovery. So what discovery is, is discovery is very, very similar to exploration except there's one basic difference. Exploration is on information and discovery is on knowledge. Now what's the difference between information and knowledge? Knowledge is things that humans create. We write things; we write articles; we write newspaper stories; we write journals; we write research papers; we write all kinds of things. So when you do that kind of exploration pattern, but what you're doing is you're doing it on some form of knowledge, then you're really doing discovery.

So an example of this is our oncology advisor. So my daughter is a cancer survivor. She had hepatoblastoma, which is liver cancer, when she was a year old, and if the doctor would have had – the oncologist would have had this solution, what he would be able to do is he would be able to take my daughter's case, he would have run it through Watson and Watson would have come back, would have read all the medical literature, which is knowledge -- that's why it's discovery -- would have read through all the medical literature and come back say here are the maybe the top three or four chemotherapy treatments that might be efficacious for your daughter. And then he could click in and see all the evidence. And then we could ask them, and questions, well are any side effects. So we actually did ask that question and one of the side effects of one of the drugs is that it could potentially damage your heart and the other drug was that it could

potentially damage your hearing. We're like, we'll take that one. So that's discovery.

Policy is basically – so you guys are all familiar with the concept of rules or guidelines. We all have to follow have them. We learned them in kindergarten. Well, if I were to give you a set of rules, would you turnaround and write a rules engine or would you just read it and interpret it and then if I gave you a case you would apply those rules to it? So today the technology that we have, you have to write a rules engine. It's very discrete -- if, then, else. Well imagine if you could just basically teach the computer to read the guidelines and then as a case came through, probabilistically determine whether it met the guidelines or it didn't. And that's policy.

Now these four patterns on the outside are all technical patterns. The middle one is not a technical pattern. The middle is just the amalgamation of any combination of these patterns, because ultimately what we're trying to do, if you recall all the way at the beginning, is we're to improve human decision-making. That's what we're really trying to do. So when we say AI at IBM, we mean augmented intelligence. Because what we're trying to do is augment the human being and make them better by taking the expertise of others and making it available to them. So that's really the decision pattern.

Now I talked about these different patterns, but the interesting thing is, is that I had a 10th grader ask me one time, who knew what I did, he said, Mr. Hashimi, how do you sell Watson? And I said, you don't. He's like, what do you mean? And I said, well, you don't sell Watson. What you do is you sell a transformational experience for the user. Because if you try to sell the technology or talk about the technology, the people's green eyeshades come down. But if you can show them how the person that's going to use Watson's life is going to be better and different, then they can kind of start to get a feel.

So we've divided people into three basic groups. There's customers or consumers; there's advisors to those customers or consumers; and then there's knowledge workers / employees that never really interact with customers or consumers. So this could be your call center representative, your insurance agent, a financial advisor. It could be your cable technician that comes out to repair your cable every time it breaks or doesn't work. These are the people in the back office like a risk analyst or an underwriter, somebody who's never really going to interact with the customer. And then obviously you have the customers over there on the left.

And so when you go to build the cognitive system, the first thing that you need to start with is who is the user of the system. Who is the user of the system? At IBM we're into really into design thinking, so we want to know the persona of the user and what's their hill that they have to overcome, and what are the challenges that they face. And then we're going to ask, what could their life be like differently in the future? So once we do that, when we're going through that design thinking

method, we actually – so although I kind of walked you through the slides this way, the way to actually think about how to build the cognitive system is the other way; is to go backwards. Start with the user, say what are their challenges, and then ask what cognitive reasoning functions do they do on a daily basis that they're challenged with? Do they have to shift through mounds of information? Do they need to glean insights? Are they a marketer that's looking for insights from historical information? Are they a customer who's trying to get their simple questions answered? What is that cognitive reasoning that they're doing, that they're struggling with that the computer could potentially help them with. And then you pick the patterns. And it's not just going to be one all the time. It could be some combination thereof.

I happen to work in the insurance industry and we've come up with a paradigm for underwriters that uses literally all four of the patterns to basically help the underwriter. So then once you've kind of come up with the patterns, then you go and ask yourself, do I have the data? Do I have the predominantly the unstructured data to do this and is it in a form that the computer can read? So although I walked you through the slides this way, when you go to build the cognitive system and think about how to build the cognitive system, you need to go from the user backwards.

We're almost done and then you can ask me some questions. So remember I said all the way back at the beginning about that pattern theory, recognition of – or pattern recognition theory of mind? That's a tongue twister. So our brains basically, in different parts of our brains we do different things and the pattern recognition to recognize your face or your voice or your handwriting is not the same. It's different algorithms that we use in our brain. So what we've discovered at IBM is that we're trying to create a cognitive computing platform that can solve all these different types of cognitive reasoning functions. And so the same machine learning algorithms don't work for every problem. And, in fact, I personally lived through this myself at the very beginning of this journey about three years ago when I tried to use one of our services to solve a particular problem and it did a really horrible job of it. And as a result, they went and created a brand new service for it. And they actually had used different machine learning algorithms to actually solve that other problem.

So when I show you this slide, it's not the words that matter. The words inside the tiles don't matter because they're going to change because we're IBM and we change the brands of things. What's important is to understand that just like our brains, we have to actually have different services to do different cognitive reasoning functions. That's the important part of it. And so when you think about this, Watson is not monolithic. It's basically all these different services and then you weave them together to basically accomplish what you're trying to accomplish on the behalf of the person that's using the system. And so that's something I really want you to walk away with. And we're going to continue all the stuff in the gray, who knows when it's going to show up, and we continue to

add these services and to refine and improve them. But that's really what you need to take away is that cognitive computing is about trying to replicate. And in our brains, we do thousands of different cognitive reasoning functions.

I have a friend, Kyle, he likes to say, when I say thanks United, delayed again, what is that?

Audience: Sarcasm.

Yousef: Sarcasm. So say basically, sarcasm is a pattern. We've all learned what sarcasm is. When I raise my voice to my children, they know that Dad's not happy, etcetera, etcetera. These are all things that we do. And there's thousands of these little tiny things that we do in our brains and our mission is to try to replicate as many of them as we can. And at IBM we're never going to be able to do all of it and there are going to other vendors that do other things. But that's really what cognitive computing is all about.

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