Stuff to Blow Your Mind Podcast – June 2020
Smart Talks with IBM: AI That Can Debate

ANNOUNCER: Welcome to Stuff to Blow Your Mind, a production of iHeartRadio.

ROBERT LAMB: Hey, welcome to Stuff to Blow Your Mind. My name is Robert Lamb.

JOE MCCORMICK: And I'm Joe McCormick. And we've got something a little bit different for you today. Today's episode is part of a series that we're producing in partnership with IBM called Smart Talks. In each episode of Smart Talks, Robert and I are going to sit down for virtual chats with people using cutting-edge technologies developed by IBM.

ROBERT LAMB: In this episode, we'll be focusing on Project Debater, which is an IBM system designed to process evidence and persuasive arguments in text so that it can ultimately understand and participate in human debate. To get to the heart of the effort, we're going to share two interviews we recorded with leaders at IBM. The first is with Noam Slonim, who is a distinguished engineer at IBM Research and founder of Project Debater. And the second chat will be with Madhu Kochar, who is vice president, offering management for IBM Data and AI.

JOE MCCORMICK: So today's episode is going to be the third of four episodes in this series that Robert and I are releasing here on the Stuff to Blow Your Mind feed. If you'd like to hear more episodes, you can check out the ones labeled Smart Talks that we've released over the past few weeks. And you can also listen to the first four episodes of Smart Talks, which were released not on our show, but in the feed for the podcast TechStuff. You can find them on the iHeartRadio app or wherever you get your podcasts—just look up TechStuff and click on the episodes labeled Smart Talks. And of course, stay tuned for the one remaining episode in the series, which is going to be published in our feed in a couple of weeks.

ROBERT LAMB: And now, straight on to our conversation with Noam Slonim.

JOE MCCORMICK: Noam, thanks so much for joining us today. Can you start by introducing yourself and talking about your role at IBM?

NOAM SLONIM: Sure. Thank you for hosting me. So, I'm Noam Slonim. I'm a distinguished engineer at IBM Research. I did my PhD at the Hebrew University quite a few years ago, working on machine learning stuff and artificial intelligence. Then I did a postdoc at Princeton University, and I joined IBM Research in 2007. And in 2011, I suggested the project that I guess we are going to talk about today.
JOE MCCORMICK: And of course, that project was Project Debater, right? Do you want to mention a little bit about the origins of that?

NOAM SLONIM: In IBM Research, we have this interesting tradition of grand challenges in artificial intelligence. Back in the nineties, IBM introduced Deep Blue; that was able to defeat Garry Kasparov in chess. And in 2011, IBM introduced Watson; that was able to defeat the all-time winners of the TV trivia game Jeopardy! And just a few days after this event, an email was sent to all the thousands of researchers in IBM across the globe, myself included, asking us what should be the next grand challenge for IBM Research. And I was intrigued by that so, I offered my office mate at the time to brainstorm together. And this is what we did; we sat in the office in Tel Aviv, and we raised many different ideas—that probably I should not share with you today. But at some point, towards the end of the hour, I suggested this notion of developing a machine that will be able to debate humans, and that this is how we will demonstrate the technology for a full live debate between this envisioned system and an expert human debater.

And we submitted that; the only guidance that we got from the management was really to submit the proposals in a single slide so they will not be swamped with too many details. And we will be able to follow these guidelines, and we submitted a single slide. This was February 2011, and this started a fairly long and thorough review process that lasted for a year. And in February 2012, this proposal was selected as the next grand challenge for IBM Research. And we started to work a few months later with a small team that gradually expanded. And we worked on that intensively for, I would say, six and a half years—dedicated solely to this mission of developing a machine that will be able to debate humans. And eventually we demonstrated the system in a full live debate. It was a little bit more than a year ago, and it was a debate with the system now being called Project Debater and one of the legendary debaters in the history of university debate competitions, Harish Natarajan. It was in San Francisco, and it was a full live debate, surprisingly reminiscent of the vision that we had back in the office in Tel Aviv quite a few years earlier in that single site.

ROBERT LAMB: So, the topic of debate brings with it a few different connotations, you know. And therefore, the idea of AI entering the fray might be a bit confusing for some. You know, we might imagine a computer designed to defeat Plato or perhaps a robot that can shout louder in a televised U.S. presidential debate. To that end, can you walk us through what Project Debater is and perhaps what it isn't?

NOAM SLONIM: Yes, absolutely. So, first of all, it is worth explaining what we mean indeed by a debate between an AI system like Project Debater and a human opponent. So, the debate starts with a motion, in the debate jargon, that defines what we are
going to debate. And in the event in San Francisco, the topic was whether or not the government should subsidize preschools. There are many considerations around how this topic is being selected, which we can skip, but the only thing we should really emphasize is that this topic is selected from a list of topics that were never included in the training of the system. So, the system was never able to train on this particular topic. It was trying to debate a new topic from the perspective of the machine. And then we are on the side of the government. So, Project Debater is supporting the motion, and Harish, he is on the opposition. And we have four minutes of opening speeches for each side. And four minutes of rebuttal speeches and two minutes of closing statements. So, all in all, we are talking about a little more than 20 to 25 minutes for discussion that we hope will be a meaningful discussion between Project Debater and a human—Harish in this particular case.

JOE MCCORMICK: So, to clarify for people who might not be familiar with competitive debating—so, competitive debating does not involve what people might be more familiar with, which is like passionately arguing your actual point of view. It involves having a position selected for you that you then must get up and defend in front of the judges, correct?

NOAM SLONIM: Yes, this is correct. And this is indeed important to emphasize because you do not know in advance what is going to be your side. And even if you know in advance that you are going to be on the side of the government, we should bear in mind, the motion could have been phrased, “We should not subsidize.” And then you should actually contest that. So, you do not know in advance what is going to be your stance on the topic. This is true for Project Debater and also for the human opponent. And you have only 10 to 15 minutes to prepare. You don't know the topic in advance. This is again true for Project Debater and for the human opponent. And your goal is really to persuade the audience. And this actually touches on an interesting question of how do you measure who won the debate, because in chess and in other games, this is very clear. And really part of the problem with debate in general, and with developing artificial intelligence that is capable of debating in particular, is that it is very hard to define who actually won the debate.

JOE MCCORMICK: Yeah, I know there are a couple of different metrics. So of course, one would just be like, what is the percentage of the audience that is convinced of either side, but that can be problematic because people come in with their own opinions already formed on an issue. So, one metric I've seen is how much the percentage has changed. They ask people before and afterward what their positions are. And then afterward, they say, okay, which side has won over more people, whatever the starting percentages were, and I assume you all had a metric like that.
NOAM SLONIM: Precisely. So, this is exactly the point, because if you simply ask people who is more convinced, you need somehow to take into account the opinions to begin with, and it is done exactly how you described it. And all this event was in collaboration with—with Intelligence Squared, which is really, I think, the leading platform in the U.S. for organizing such a high-profile, competitive debate. It was hosted—the moderator was the moderator from Intelligence Squared, John Donvan, and the voting was done exactly as you described. And as being done with the show of Intelligence Squared, that is, the audience is voting before the debate starts, and they vote again after the debate ends. And you win if you were able to move more people to your side.

JOE MCCORMICK: Noam, I think a lot of people might be wondering how on earth would you even begin to organize a persuasive argument from an AI point of view? Could you walk us through the technical specifics of how Project Debater would put together an argument?

NOAM SLONIM: Yes. So, we were asking ourselves the same question actually. When we started this project—and I think this is part of the nature of such a grand challenge—that you do not really know how exactly you are going to approach the problem, but we did what computer scientists often do. And this is to take this big and somewhat amorphous problem and break it into more modular and hopefully more tangible tasks. And so, in general, the Debater system had two major sources of information. One of them is the massive collection of around 400 million newspaper articles. And when the debate starts, the system was using various AI, artificial intelligence engines, in order to try and pinpoint short pieces of text within this massive collection—we are talking about 10 billion sentences. So, we were trying to automatically pinpoint these short pieces of text that should satisfy three criteria. They should be relevant to the topic. They should be argumentative in nature—they should argue something about the topic—and they should support our side of the debate. And this is quite a formidable challenge. But assuming that you are capable of finding these short pieces of text, the system is then using other AI capabilities in order to try and glue them together into a meaningful narrative. So, this is one major source of information for the system. The second important source of information for the system was—a unique collection of more principled arguments that were actually written by humans. And we are talking about thousands of more principled arguments. And the role of the system was—when the debate starts—was really to navigate within this collection and find the most relevant principled arguments and use them in the right timing. So, to make this more concrete, what we mean by a “principled argument,” imagine that we are debating whether or not to ban all gun trade or whether or not to ban the sale of alcohol. In both cases, the opposition may argue that
if you ban something, you run the risk of the emergence of a black market. So, a “black market” is a principled argument that can be used almost in the same way in many different contexts. Okay, so one may naively assume that this is kind of a simple keyword matching thing. If we ban something, then the opposition is going to use the black-market argument, and we should be prepared for that, but obviously this is far from true. So, imagine a debate about banning breastfeeding in public.

Obviously, there is little risk for a black market in this context. So, imagine a debate about banning the income of cookies. Or another one could be a black market for tea. If we banned these. So, the system really needs to develop a more subtle understanding of the human language in order to be able to identify the most relevant principled argument. And this is, by the way, just what all this description is before listening to the opponent. This is just what we are going to say on our side. And the most challenging part is really to listen to the opponent and generate some kind of rebuttal to the arguments raised by the opponent. And we do that using an arsenal of techniques that most of them rely on the same principle. We start by listening to the word articulated by the opponent. And for that, we simply use Watson speech recognition capabilities out of the box. But of course, we need to go beyond the word, and we need to understand the rest of the arguments of the opponent. And in order to do that, we try, using various methods, to anticipate, in advance, what kind of arguments the opposition might use, and then listen, determine whether indeed the opposition was making these arguments, and then respond accordingly.

JOE MCCORMICK: Yeah. That calls to mind the question of the difference between, say, what’s a sound argument versus what’s a persuasive argument. I mean, we know from reality that often the most persuasive appeals in debates rely on just straightforwardly false claims and logical fallacies, or even on little emotional cues that have little to do with the matter at hand. I was thinking about how in live debates, if you can get a laugh at your opponent's expense, that's worth, you know, a dozen sound arguments or claims. So, to what degree can AI understand these sorts of persuasive appeals that go beyond just like what kind of evidence you can bring, and the appeals based on style?

NOAM SLONIM: You’re right, in general. In debate, I mean, we know already from the ancient Greeks that we have three pillars. We have logos, and we have ethos, and we have pathos—and humans are using a mixture of these pillars in debating one another.

JOE MCCORMICK: And just as a quick clarification, logos, pathos and ethos are the types of appeals that were identified in the study of classical rhetoric, where logos appeals based on our logical arguments and evidence. Pathos is the appeal to the
emotions, or the passions, and ethos is an appeal based on the credibility or authority of the speaker. I mean, as you know, broadly understood.

ROBERT LAMB: Right.

NOAM SLONIM: And the technology that we developed—and by the way, it should be stated that there is a rapidly emerging community of scientists across the globe that are investigating this kind of topic—it is all under the umbrella of this emerging field referred to as computational argumentation. And when we started in 2012, there was a handful of teams pursuing that. And we’ve seen a fairly dramatic increase in the research in these areas over the last few years. And as I mentioned, the technology that we developed is most focused on logos, and you can see it in the debate between Project Debater and Harish. By the way, this debate is fully available on YouTube. And you can see that indeed a human is better in making—in using pathos, and perhaps in using ethos. And it is harder for the machine. And indeed, most of the research being done by the relevant research communities is around logos, but they are already trying to model and to capture additional aspects of pathos and ethos in order to further enhance this kind of technology.

JOE MCCORMICK: So, another question I have is, Debater has to source claims and facts and arguments from existing written work produced by humans, which of course we know can be full of all sorts of flaws. Is there any way at this point for it to—to have an analytical function, to tell a, say, factually true claim or a logically valid argument from just something that is wrong or dubious but repeated a lot in writing, or are we not there yet?

NOAM SLONIM: This is a very timely, important and difficult problem. And saving one assumption over the [inaudible]. And there are attempts to tackle that. It is certainly not bulletproof, and the problem is quite complex because one may say, “OK, fine. Maybe I should only take my argument from highly credible resources. And by proxy, I can assume that these arguments are valid.” But this is not necessarily the case, right? You can see, you can read an opinion article in a highly respectable newspaper which is actually quoting a false argument that was made elsewhere. And if you're not careful enough, you might be—your system is going to pose this argument without understanding that something is happening there. So, we developed—and we actually, out of Project Debater, included some kind of filtering mechanism in order to filter out these kinds of cases. And the way we did that was really once a specific claim was detected. And by the way, it should be noted that a claim is not a full sentence. A claim is often only a part of a sentence. So even if you were able to detect a sentence that contains a claim—a relevant one that supports your side—out of the millions of sentences in the whole world, you’d still need to find the correct boundaries of the
claim within the sentence. And you have hundreds of options. And only one of them is correct. This is just going back to why this problem is so challenging. But after you do that and find this claim, you ask, what is the stance of this claim? If the stance is supporting your side, you can still ask what is the stance of the claim? And if the stance of the full sentence is in the opposite direction, you may suspect that something is going on and perhaps this claim is quoted in order to contradict and not because it is true—and then perhaps it’s safer to avoid using it, but this is just one safety mechanism. And the problem that you weigh is actually a much more general one. And I think many teams are working on that. We tried to address that as well. And I think it has many interesting dimensions because it is not even just about the validity of the argument. Often when you show people two arguments, they will agree that one of them is better than the other. But what are the underlying mechanisms that guide us to prefer one argument over the other? And how do you train an artificial intelligence system to make this distinction? This is another example of the problems we are considering.

**JOE MCCORMICK:** I have a question about what could come out of AI research like this, because I would say from my personal perspective, I think studying rhetoric and debate is extremely important, but not necessarily because getting into debates is a good way to figure out what's true and establish, you know, the right thing to do. I think one of the most important reasons to study rhetoric and debate is so that you can understand how other people's arguments and persuasive appeals are operating on you or are designed to operate on you. A clear understanding of rhetoric can be a kind of suit of armor for going into, you know, the world and, and seeing how political actors and business actors and advertising and all that is trying to affect you. Do you see Project Debater serving any kind of educational purpose like this in the world today?

**NOAM SLONIM:** There are several levels by which I can answer that. The first one is that this kind of technology is definitely relevant and, we believe, highly valuable in the context of education. You can imagine using the technology in order to build better arguments and moreover to perform more analytical and perhaps more objective analyses of complex and controversial topics. This is one aspect. There is another aspect, often when we debate, is other humans, there are many layers that are involved in this discussion, in this debate. Not all of them are related to the facts and to the arguments that we are raising. Perhaps we have history with that person, perhaps we have history with ourselves, that actually impacts our own thought and decision. Perhaps other people are listening. And this actually provides context that impacts what is happening, and we are curious about this option of debating with a machine in the privacy of your office. Maybe this is a different form of a discussion that to some extent is to perhaps more free of external biases and maybe will enable at least some people to identify situations where they have a blind spot and to better listen to the
other side. So, I think in this case, the role of the technology could be quite influential and positive. There are of course business applications that are also very interesting from the IBM perspective. And this is another dimension, another level by which we can complete other technology that’s valuable.

ROBERT LAMB: Again, big thanks to Noam Slonim for taking time to chat with us. And now we're going to go straight into our second talk on the subject with Madhu Kochar.

JOE MCCORMICK: Madhu, thanks so much for joining us today. Could you start off by introducing yourself and talking about your role at IBM?

MADHU KOCHAR: Yeah, absolutely. And really nice to meet you, Robert and Joe. Madhu Kochar, vice president, offering management in Data and AI at IBM. And the roll of offering management is really all about laying down the strategy and then delivering and executing towards that strategy. And I'm based out of San Jose, in sunny California.

ROBERT LAMB: Excellent. So just to kick things off here, you know, we're going to be talking a lot about AI here, and it makes sense to really get into what we mean when we're talking about AI for business. How does AI serve business compared to the way it serves consumers?

MADHU KOCHAR: Yeah, that's a great question to get started on. So, we developed a thesis a couple of years ago about really how AI for business would be different from consumer AI. Think of consumer AI, which we all know work with our smartphones, smart speakers, social media, photos, everything when it comes, but when it comes to AI for business, it's really very, very different. AI for business is all about automation, optimization and making better predictions. And it requires really a very different set of technical capabilities. Like you would have to understand how to deal with language, how to deal with what does automation need and then be able to have the explainability and trust of AI. So that's sort of the big difference between commercial AI and AI for business.

JOE MCCORMICK: So, we know that one of the big AI projects at IBM is Watson. Could you tell us about Watson and explain how Watson fits into the broader picture of recent advancements in AI?

MADHU KOCHAR: Sure. You might have heard of Watson, and our audience might’ve heard of Watson, which came out in Jeopardy! and people remember Watson from there. But fast forward—lots of work done around Watson; think of Watson as our definition of IBM AI. We have evolved a lot since then. And our strategic intent always has been to have Watson available anywhere, meaning available on any cloud. We have
focused on Watson. We call ‘With Watson’, meaning it's embedded in almost all your applications. So, for example, I use the words a lot “AI for AI.” What does that mean? Like how do we embed AI in our data sciences and in our data platforms and such? The other parts of evolution have been—you know, as I said earlier—from our AI for business; it is all about automation.

How do we evolve into the workflow; AI that matters for our clients and for society? So, some of the workflows’ definition could be in customer care, in IT, asset management, in your regulatory or compliance, in supply chain, or in your planning and budgeting, right? These are how you can really embed AI. And that is where Watson has really evolved into. And we have also been delivering now Watson and AI capability in an integrated, single platform we call Cloud Pak for Data. So, a long way we came from Jeopardy! days. And then you just heard from Noam where we landed with Debater.

ROBERT LAMB: So, speaking of Debater, what capabilities has IBM commercialized from Project Debater into Watson?

MADHU KOCHAR: So that's a great question. A lot of commercialization has happened. We have a pretty good rich set of products, like Watson Assistant, Watson Discovery, Watson Knowledge, language understanding. And I know these are just words, but let me just give a bit of a background on what Watson Assistant is. Watson Assistant is our conversational AI platform; it really helps provide customers a fast, straightforward answer—accurate answers across any application, device or cloud. Right? And our Discovery is all about enterprise search and AI search technology that truly retrieves specific answers to your questions while you're analyzing trends and relationships in the enterprise data. So, we've been looking at Debater and some of the key technologies. Let me give you an example of a few, like sentiment analysis. Let me pose a problem statement. What does that really mean? So, for example, today, Watson does not understand idioms or sentiment shifters, and neither does any other competitor offerings out there also.

So, think of sentiments which include “hardly helpful”, “over the moon,” “cold feet,” “I'm all ears.” How do you make that analysis and figure this out? What is the real context behind this? So, what we have done with that is that now Watson leverages this Debater technology and looks at these idioms and sentiment shifters and does the analysis starting with a better understanding of this. Sentiment analysis is one of the most widely used APIs for us. This already exists today in our product portfolio. What's coming into the future is all around documents. So, let me put a perspective around a problem statement. There are many regulatory documents, such as contracts or security filings, which contain important clauses that have really, really serious business implications. For example, payment terms, obligations made to regulatory
bodies, or warranties, such—humans can spend countless hours reading and extracting the information, so they remain compliant. Although we can provide some of the out-of-the-box models for contracts and invoices and such, but it creates—the client may still need to create their own element classifications of business clauses. So, the solution has been with our Debater’s first-based classification technology into these products so we can learn with a few, 100 samples, to do new classification of elements. Business documents could include contracts, invoices, and procurement contracts. So, at the end of the day, it really, really accelerates the outcomes—what the businesses would be looking for. Other technology is around summarization. So, the problem statement here is, like, when you're looking for information: customer or employee, who may have aggregate research from different sources, clicking through multiple links and pages and—finding exactly what they need can be very, very difficult, right? Can take months, weeks and months—sometimes years.

So, with Watson and Debater technology, we can analyze a variety of these sources and provide a summary or brief of the ideas and the information which is contained within. That's coming up. We are going to be leveraging this technology in our Watson Discovery portfolio in second half. The other interesting issues we see today is in our traditional rule-based systems for contact centers; it categorizes a large fraction of calls in a very generic bucket. Like it says, you know, like not uncommon to see more than maybe 50% of calling a call center for a bank, which says, “Hey, this call was just made for generalized checking”—and it prevents the company from creating any robust self-service. So, with Debater technology, now we can leverage advanced topic clustering, which enables users to cluster this incoming data into meaningful topics of related information, and automatically this can be analyzed. So, think of discovery of a content miner, which will be enhanced with this type of technology to extract better topics from very large data sets, and then make the topic extraction more business user friendly. So, a lot of stuff. I gave a lot of examples, but sort of the—the gist of all this is, look, it's going to impact businesses, real outcomes, right? It's going to save them time; it’s going to automate the process. It's going to remove a lot of human error, which comes with it, and really speaks towards the productivity; it is going to speak towards the client’s NPS, their own promoter scores and such. And so that's really the gist of what we're looking to drive out of the Debater technology.

**JOE MCCORMICK:** If I'm understanding this correctly, this is interesting. It's interesting that this kind of functionality would come out of an AI debate tool, because debate and persuasion—those seem like the kinds of things that would be inherently the most difficult to master with AI, because you've got all these elements of style and subtlety, things that are really difficult to quantify, to make into understandable data. But out of the Debater technology it sounds like you're saying that you're actually getting a lot of derivative technologies that are good at dealing with algorithmic types
of texts, like legal documents. Am I getting this right? Like, that you could have a piece of software that works like a lawyer, and it can explain this contract to you when it's going over your head, and that this kind of thing is possible now because of how formulaic and algorithmic legal documents tend to be. Would that be a correct understanding?

**MADHU KOCHAR:** Yeah, no, totally. And if I may, give you one of the client examples, especially as you started talking about legal. LegalMation's platform actually provides this—in-house legal teams and outside counsel have the ability to respond to their lawsuits and draft their initial round of discovery requests in literally less than two minutes, right? And which shaved off about 10 hours of attorney times on each of these lawsuits. So, real direct outcomes of usage of this technology.

**JOE MCCORMICK:** So, you've been talking about big business applications, but I also wonder about applications directly for the consumer, where, for example, could you have a program that ingests legal documents—say, you feed it some contract you're thinking about signing. And then you say, “I have a question because I'm not a lawyer. I don't understand what I would be bound to do under this agreement.” And then you could feed the contract in and pose questions to your AI legal assistant in natural language. Can you see a future like that?

**MADHU KOCHAR:** We do, and we already have a product like Watson Assistant, which is for customer care. It feeds on a lot of pretrained models, especially now in COVID-19, right? A situation where our government offices and our healthcare are getting inundated by calls, right? So, leveraging this Watson Assistant in front is really helping them deflect a lot of those phone calls and get the accurate answers in the hands of the consumers. So, you know, this is what we are focusing on around customer care, but yeah, in the future...I mean this, the similar technology and leveraging from Debater, we can actually go into any domain, right? We have the right framework, and we have the right technology to go pursue those different domains.

**JOE MCCORMICK:** I guess this sets us up for a bigger question—which is, what is the overall role of natural language processing in the landscape of AI today? And also, which are the elements of natural language processing that we've really gotten a lot better at, and which are the ones that are still a major challenge?

**MADHU KOCHAR:** Yeah, great question. As we all know, right, language has existed, I don't know, a hundred thousand—plus years, you know. It started as speech, probably people started to talk, and the writing came perhaps much later—and we write in ways we don't talk also, right? It's a lot more descriptive and more reflective. And so now with things where we can compute with open data sets and transfer learnings, NLP, natural language processing, really, really is the inflection point. Right? And some of
the examples I shared earlier around the sentiment analysis and summarization and clustering, these are all such critical aspects of taking NLP—not just natural language processing, but natural language understanding, natural language generations is all going to come through all of that. And we really think with the Debater technology it really puts us in a leader quadrant here. A lot more work to be done, but the end goal is, yes, we can continue to research on these things. But how quickly we commercialize it and how quickly we help our clients and users to see the outcomes that are needed here and make them a lot more productive.

ROBERT LAMB: So how many languages does Project Debater and Watson, together, how many do they understand and support today?

MADHU KOCHAR: We started with, obviously, English. We are expanding now to French, Spanish, German in the second half of this year, and then very soon we'll expand to Dutch, French, Arabic, Chinese, both traditional and simplified, and Italian in 2021. And obviously, we are choosing these based on where we are seeing most of our growth and adoption.

ROBERT LAMB: What are some additional examples of how these commercialized capabilities can be used by clients?

MADHU KOCHAR: Great question. I gave you an example earlier on LegalMation. The other one, which is very close to my heart, is RBS. With Watson, RBS built Cora, which is their digital assistant that helps better serve their customers through first-time problem resolutions. Cora is trained with over 1,000 responses to more than 200 customer queries. However, if she doesn't know an answer or she senses that a customer is getting angry or frustrated, she will transfer it to a live agent. Now with improved sentiment analysis from Debater, as I mentioned earlier, we hope that clients like RBS will be able to better serve their customers by having digital assistants that better understand the subtleties of the sentiments of the clients. So, for example, the phrase “over the moon” might be interpreted as literally about the planetary satellite and not as excited or elated, right? So, this is what with Project Debater core AI built into IBM Watson; it can understand these idioms, helping clients like RBS to better serve their customers.

The other example, switching into financial, like Crédit Mutuel, they had over 5,000 branches and they received more than 350,000 online inquiries a day. And the volume is growing at least 23% a year. So now with Watson-infused email analyzer, they can help deflect and address 50% of their 350,000 daily emails received by banks’ client advisors. So, with the implementation of the topic clustering from Debater, we believe now clients with similar needs, that's Crédit Mutuel, will enable more self-service by identifying clusters of commonly asked topics and can be converted into self-service
content. Right? So, to me, the examples like this are just amazing, because I can totally then connect the dots between technology, the usage and the outcome. A win-win situation. We got multiple other examples as well, Robert, and we're going to continue to be focusing on how do we really not just commercialize it, but I believe AI is really meant to improve our society as well. Right? Make us more productive and do better things. And especially the world we are living in with COVID, and other things which are happening around us. Right? The goodness of AI—it needs to be there. So very critical.

**JOE MCCORMICK:** Overall, what do you see as the best possible role for AI? Not just as a tool for business; but as a society, what could it do for us in the best-case scenario?

**MADHU KOCHAR:** Yeah, I mean, that's a great question, right? To me fundamentally—I mean, there are many examples, but one most critical which comes to my mind is how AI can really help us detect bias. Right? A lot of our data sets have been built by humans with bias and bias goes into that data, right? AI can really start separating that, help us detect bias and make our products better, makes our society better. So that to me is the, would be sort of the holy grail if AI can achieve that.

**ROBERT LAMB:** All right. So, there you have it. Thanks once again to Noam Slonim and Madhu Kochar for taking time out of their busy days to chat with us about this topic. For more information on *Smart Talks*, visit ibm.com/smarttalks. And if you'd like to learn more about NLP, you can go to ibm.com/watson/natural-language-processing. And if you would like to learn more about our show, where you can find us wherever you get your podcasts and wherever that happens to be. Just make sure you rate, review, and subscribe.

**JOE MCCORMICK:** Huge thanks, as always, to our excellent audio producer, Seth Nicholas Johnson. If you would like to get in touch with us with feedback on this episode or any other, to suggest a topic for the future, or just to say hello, you can email us at contact@stufftoblowyourmind.com

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