Me, Myself, and AI Podcast

Making 600 Billion Decisions with AI: Expedia Group's Rathi Murthy

SAM RANSBOTHAM: When consumers plan travel, they consider many factors. They don't make 600 billion decisions, but one travel company's AI tools do. Find out how this company is modernizing the travel industry on today's episode.

RATHI MURTHY: I'm Rathi Murthy from Expedia Group, and you're listening to *Me, Myself, and AI*.

SAM: Welcome to *Me, Myself, and AI*, a podcast on artificial intelligence in business. Each episode, we introduce you to someone innovating with AI. I'm Sam Ransbotham, professor of analytics at Boston College. I'm also the AI and business strategy guest editor at *MIT Sloan Management Review.*

SHERVIN KHODABANDEH: And I'm Shervin Khodabandeh, senior partner with BCG and one of the leaders of our AI business. Together, *MIT SMR* and BCG have been researching and publishing on AI since 2017, interviewing hundreds of practitioners and surveying thousands of companies on what it takes to build and to deploy and scale AI capabilities and really transform the way organizations operate.

SAM: Welcome. Today our guest is Rathi Murthy, CTO and president of Expedia Product & Technology. Rathi, thanks for taking the time to talk with us.

RATHI: Very excited to be here. Thank you for inviting me.

SAM: There are so many places that we could start, but maybe we start with Expedia. We've got listeners throughout the world who may not be familiar with Expedia, or they may know Expedia but not the Expedia Group, so maybe let's start there. Can you describe Expedia for us? What are the things your group does?

RATHI: Sure. At Expedia, I am the CTO, and I manage Product & Technology for Expedia Group. If you think about Expedia, we started as a family of 21 different brands, and today we are bringing all of these brands together and building a platform for travel. And some of the brands [are] well-known brands across everything:

Expedia, Hotels.com, Vrbo, Travelocity. And what we're trying to do is unify these experiences and bring common building blocks that can help us transform not just Expedia but transform the travel ecosystem altogether.

SHERVIN: So Rathi, put this in perspective for our listeners. There must be a huge scale and traffic of travel, globally, each day. Can you give us some quantification of the scale that we're talking about here? Flights, hotels, reservations, the complex network of travel options — how big is that scale?

RATHI: Yeah, totally. So if you think about our business, today we connect over 168 million loyalty [program] members across all of these brands, and 50,000 B2B partners with over 3 million properties, and over 500 airlines, car rentals, [and] cruise lines. And when you think about the data that we have across all these of brands and on our platform, today we process over 600 billion AI predictions a year. It's powered by over 70 petabytes of data, so just think about the gamut of data and the volume of business we run on our platform to service travel across all these different lines of business, whether it's lodging, air, car, or cruise.

SHERVIN: And what are some of these AI decisions? Give our listeners some examples.

RATHI: Sure. Fundamentally, I believe, as a technology, AI can be leveraged across almost all aspects of running our business. There are some core platform capabilities that we excel at leveraging complex AI and ML [machine learning], one being fraud prevention. Now, everybody has fraud prevention in many, many sectors, like finance; you have things where you see a stolen card or account takeover, and that's a very common use case of being able to detect fraud as you see attacks. But in travel, it gets even more complex. We're looking at preventing abuse of trust, which impacts the safety of all our travelers, especially when you think about vacation rentals.

Now, abuse can be anything from fake reviews, bad listings, inappropriate content, wrong images, false descriptions, or even improper use of a property; whether there's illegal activity [or simply] too much noise, we have to protect against all these scenarios. And what makes it super difficult is there's very little time between a booking and the time that a person takes a vacation, and our algorithms have to be able to find these variants that differ from the normal track and alert us of any of these signals so we can go address this and protect our travelers.

That is one aspect, and we have excelled at this. We're really good at being able to alert. The complexity is also that we don't own the end service — that is the hotel or the vacation rental or the flight — so we must apply a higher level of sophistication to our technology and data science capabilities to protect our travelers, our supply partners, and on our platform. That's one aspect, if you think about it at the platform level.

On our products for our travelers also, we have done lot of innovation to help us provide great experiences for our travelers and partners. One example is price tracking for flights. Today, it's very complex for travelers to know what's the right time to book a flight. We have built a sophisticated algorithm, which uses our flight shopping data and a lot of machine learning to map past trends on pricing for a chosen flight path so travelers can understand what it used to cost and provide them with predictions for the future, so you know when is the right time to book your flight — something that no one else offers right now. Another example is smart shopping for hotels. Today, if you really try to compare a hotel, it's super complex. We often joke you need to open 100 different tabs because every hotel has millions of rate descriptors, whether it's an ocean-facing room …

SHERVIN: That's how we do it in our household.

RATHI: Yeah. City view, double bed, single bed, king-sized bed, queen-sized bed — there's so many … free breakfast, free cancellations. There are so many descriptors, so it's very difficult to compare apples to apples, and we've taken all these millions of rate descriptors and pulled them in and [are] able to show you certain key attributes, like room features and upgrades, that help you make a quick decision.

And you know, I think memories are precious, and it's not just a commodity, right? I bought the wrong pencil; I can go change it tomorrow. Sometimes it is the memory that you have; you're going to go there only once, and you want it to be perfect, and travel has to be perfect. We create those memories for life for our travelers and our partners, and you need it to be as close to perfect [as possible]. So it is really a very critical part of our game.

SAM: Underlying those 600 billion decisions every year, every one of those is important to one person.

RATHI: And of course, AI/ML [can] drive a whole ton of personalized experiences through the booking cycle and as well as post-booking. So these are just some quick examples. We also started leveraging AI on our customer service applications through COVID. We — as you can imagine — we hit an all-time high of customer service volumes on our platform, about 5X. We were handling over 500,000 calls per day when COVID hit, and we took that time to actually accelerate our conversations platform capabilities and build a lot of AI/ML there to build out our virtual agent capabilities. That has paid out in spades, actually, over the last three years. We have had many peaks and valleys.

Even most recently, through Hurricane Ian, our call volume spiked because we had so many cancellations of flights. Today, we take over 29 million conversations through our virtual agents, saving more than 8 million hours of call time with our agents. So we were able to very quickly scale our capabilities and keep our call time to less than 30 seconds.

SHERVIN: You know, when I'm hearing you, I'm impressed by two things. One is the sophistication of the decisions and the intelligence, given all the sort of nuanced factors and that you don't control the overall closed loop and all that. And the other part is the sheer scale of it. And so it feels like the data science that you're describing is already quite complex, and you have to go above and beyond what a typical fraud prediction or typical personalization or feature-comparison engine would do. But I'm also impressed by the sheer scale of it, because I remember when online travel began to be popular, there were all these brands, like Travelocity and Hotels.com and Expedia, and they were pretty comparable back then. And I think you guys own a lot of that right now.

So the question for me is, how did you standardize? Because the data models must be different across all these entities. The sheer scale of engineering work that must have gone to just create common components, common data models … am I right that this is even more complicated than data science?

RATHI: Yes, absolutely! As we are going through this, it's a giant transformation at the platform level. It's both, right? At the back end, we had six different checkouts. We had many pricing algorithms. We had many different stacks that served

each of our different brands. So really collapsing all of this and converging our back end is one big journey.
And we have been on this path over the last couple of years, and we have really done a lot of work to bring this path together, as well as on the front end. We've done a lot of work over the last year to converge our lodging paths — whether it is Hotels.com or Expedia or Vrbo — and bring those front-end and lodging paths together so that we can innovate once, which will help all of our brands and all of the experiences, whether it is conventional lodging or vacation rentals, that will all get impacted at the same time. So, yes, absolutely.

In addition, we have been converging a lot of our machine learning models, a lot of the data models, so that we can innovate much faster.

SAM: Yeah, that seems really big. I mean, you started off by saying a very simple statement: "Oh, yes. We combine all these into a single platform." And then, as Shervin points out, that one sentence is a nightmare, to pull all of these things together.

SHERVIN: And then somehow, magically, it all happens, you know?

RATHI: Yeah, absolutely. And if you think about it, when you look at the gamut of all of this work that's happening, in addition we are continuing to grow our business; we're continuing to innovate while we're transforming a lot at the back end. And it's all coming together and really helping innovate and simplify our experiences for our travelers and partners.

We're seeing this live. For example, I talked about the fraud prevention as a service. And just over the last year, we saved over $2 billion in fraud attempts, so building and scaling that has helped us. Now, we are taking our platform and our platform capabilities and also offering it to our partners.

So one of our strategies is to be the platform for travel — so taking all these platform capabilities that we have, whether it is fraud as a service, or payments as a service, or conversation as a service, any of this — and make these core building blocks so we can actually support many in the travel industry, and we can power them with our technology to help accelerate and digitize their business. And that's the huge opportunity we see ahead of us.

SAM: Organizationally, how did you and the Expedia Group get started on these processes, knowing that it would be a while before you, let's say, had the next Hurricane Ian that causes a disruption that you're ready for, but you don't experience it at the time you're experiencing the pain? How do you get that organizationally to happen?
RATHI: I think we started, first of all, with dogfooding our own technology, and as you're bringing 21 different brands together, it's important to build out a platform [and] build out capabilities and all of the features in a manner that's extensible, configurable, and externalizable so you can bring those experiences together. We started with ourselves and building capabilities as small building blocks that can then be shared across [other organizations].

And then, what we also realized was the travel industry has a lot of antiquated systems and antiquated processes, and we have an opportunity not just to modernize ourselves but to help modernize the entire travel industry. And especially through COVID, a lot of players in the travel industry have had to slim down and focus on their core expertise. So we are here to say, "Do what you do best, and let us help you with what we do best, which is building a platform and technology." So that was the genesis of our saying, "We have a huge opportunity to not just help us, but by doing what we do best, we can also help the entire travel industry come together."

SHERVIN: As I'm thinking about the scale of what you're talking about, a lot of the companies I work with have the vision of building the analogous scale and quality of decisions and replacing a lot of manual and difficult decisions with advanced AI. But a question in many people's minds is how to start and the path they take to go from their starting point and to this platform-at-scale play.

And there's a dimension of it that is around getting to business value now and picking up those use cases that you know you could put some advanced algorithms and get better-quality decisions, better-quality optimization, personalization, etc. And then there is another aspect of it that is around data platform and the tech: common tech components and APIs and standardizing all the data. And I almost see a tale of two cities, where there's one that's like, "We've got to get all of our data first, and we've got to build all the platforms, and once we have everything, then we can build these use cases on top." And there are others, sort of the complete opposite, like, "Let's take one sort of vertical slice through one silo and do one thing really well, and then we extend it to other sort of parts of the business or other partners, etc."

What is your advice on how to navigate this? Because it's sort of a huge engineering and data challenge on one side, and

then there's another sort of business value and data science and AI application and product challenge on the other.

RATHI: When I look at this, we started both horizontally and vertically. We started, of course, with, when COVID hit, how can we solve the problem for our virtual agents and help our travelers get their answers fast without having to wait in long queues to get the response from a call center? So it started with the statement of "Let's solve for this particular problem and build out AI and ML there so we can help our travelers very rapidly."

So we started with the vertical and then we broadened that to say, "We are now going to build a platform for travel. We're going to consolidate a lot of our capabilities and leverage this conversation as a platform and build out these capabilities as a service that can be leveraged across the board." That's when we came up with "Let's solve for things as building blocks of our travel platform. Let's build out each of these as a building block that can then be externalized to serve different capabilities across [them]." So we did a bunch that we solved for horizontally. And I've also always optimized for vertical, so it's not really one or the other. It's actually trying to …

SHERVIN: It's like a weaving of it, right?

RATHI: It's like you're trying to change the tires while the car is running, you know? And so you are making constant trade-offs to see what is best to serve our travelers and partners at the same time. There are some horizontal elements that are core [to the] platform that have to be solved holistically that bring the capabilities together. And then we have the other platform start leveraging those capabilities and undo the stack. So if you think about where we started, we started with over 21 different stacks and everything from the front end to back end.

I personally am constantly challenging myself [around] whether there are nine different paths that are better than the path I've taken, so the best advice is to constantly look at better opportunities to go get better — there's always a better path — and to seek that.

SHERVIN: It's not one right answer.

RATHI: And the answer keeps varying and at every step. Your maturity curve evolves to offer different sets of capabilities that can distinguish us as travel partners.

SHERVIN: Very well said. Thank you.

SAM: One of the things that I thought was interesting about the last comment, if you connect it to something you said earlier, is how much of the industry is inherently, honestly, ancient infrastructure. We're talking in the context of, Shervin and I very recently almost met in person for the first time but failed. And we failed largely because of difficulties in failing older systems within the travel sector.

The point here is that what you're doing is that you've got so much of the world that is difficult to change, and you're providing this insulating layer between some of the older, difficult parts that you have experience in working with, and keeping a lot of the world from having to retrofit toward those. And that seems like a very valuable insulating layer that you're offering.

RATHI: Absolutely, yes. As you said, the travel [industry] is a very complex industry, and as a company, we touch all aspects. Not every company touches all aspects of the traveling ecosystem, but we do. And so we feel we're really well positioned to understand the issues holding the industry back. And technology is really key, so that's why we think about ourselves as a technology company versus just a travel company.

SAM: If I look at your background, you've got ... how did you end up in this position, in this role? If we look at your history, I see AmEx, and Gap, and Verizon, and eBay, and Yahoo, and WebMD — even Informix, I saw back in there. I hadn't thought about Informix in quite a while.

RATHI: Me neither!

SAM: Can you tell us a little about you, personally? How did you end up interested in these components, and how did you end up with Expedia?

RATHI: I have always ... yes, I have dabbled at many different verticals in my career, but everything really has hinged upon my passion to lead and drive transformation. I've always had a passion for looking at technology as a vehicle to help accelerate a business. And I started at many different verticals. I worked in media, worked in fintech organizations, in e-commerce, and retail sectors, and I found that there's a lot of commonality across many of these sectors.

We deal with a lot of legacy [technologies], and we deal with a lot of innovation. But at the core of it, it really has to deal with being able to bring together consumers and the product in a manner that is friction-free. I've had a passion to really look at how do you use technology as a competitive

advantage to power any and all of these businesses. At the end of the day, you're really looking at it as a technology stack, and there's always either … a bunch of tech that you're dealing with, that you're looking at modernizing, building a stack for the future, taking the old, migrating it to the new — with customer centricity at its core. And I have a passion for travel, so this was really bringing my passion for leading/driving technology transformation, my passion for travel, and customer centricity at its core all together, and that's what led me to Expedia.

SAM: If you look at this breadth, I'm curious: What's hard about these transformations? What's getting harder, and what's getting easier? I think you have a unique overview of so many industries and so much experience across them.

RATHI: It's funny; I'll share with you: I feel technology is helping us, and technology is making it harder at the same time. There's always something evolving, and it's almost hard to keep up with what's coming next. Like today, we're all talking about ChatGPT and how that's taking over some of the ecosystem and heuristics. But there's also so much false data, and you don't know what to read out, and you don't know what to keep. So there are constant challenges that we face in terms of evolution of technology [and] being at the front end of being able to adapt new technologies to serve our business purpose.

For us, it is about making the lives of our travelers and partners much easier and leveraging technology as that advantage. So I think technology makes it easier. Now we can solve so many problems that were really harder in the past.

SHERVIN: It's the forbidden fruit.

RATHI: Absolutely.

SHERVIN: The tree of the knowledge of good and evil. And it's good and then you ... then there are problems. Yeah.

RATHI: With good comes the challenge, exactly. And so it keeps you on your front foot, being alert of what's coming out. I'd say the other thing is, as technologists, you can never settle down, so we always have a challenge of getting everything done. So especially in the worlds [where] we are, there's a lot of legacy, there's a lot of migration, there's a lot of antiquated systems, and you want to get rid of those or consolidate those. But then technology at the front end is also constantly changing, and you feel like you're chasing a North Star that's constantly moving. Being able to make the right set of trade-offs is often most challenging for all leaders.

SHERVIN: I just have a question, because I, too, have gone from a highly manual, personal process of figuring out where I'm going to go and how I'm going to do it, to "Everything is online and everything is fast," etc. There's an element of it, though, for very, very special travel or, let's say, a three-day visit to Cambodia or a particular island somewhere [about] the knowledge that a person who's been there still has.

What is your thinking on that? I know it's probably in the margins, but it's not always about oceanfront and number of bedrooms, etc. It's also about something that maybe is a little bit more unstructured, subjective. Are you guys thinking about that and tapping into that sort of more generative type of AI experiences?

RATHI: Yes, we are constantly looking at some of the unstructured data and trying to leverage that. We do a lot around reviews and feedback from our travelers across the board that we can then collate and provide [to] you, knowing your travel behaviors and patterns and what matters to you. So, yes, we're constantly innovating and bringing that unstructured data together in a manner that helps serve you. And there's a lot.

Listen, today we are looking at places where I can just look at an image, [and] I don't know where that image is, but I want to go there, and I want [the] feedback of anyone who's been there. And being able to recognize from pictures, to traveler feedback … and input and collate all of that information so I can serve you with not just feedback on how that is and what to do there, but also where to stay, what activities you can do over there … so there's a gamut of innovation that all of us are working on to bring this together.

SAM: We have a segment where we ask you a series of rapid-fire questions. We just want you to answer with the first thing that comes to your mind.

You've got so much going on with artificial intelligence at Expedia. What's the one thing that you're most proud of? What's your proudest moment?

RATHI: I'm really excited about our customer service. We've been able to scale flawlessly by leveraging AI.

SAM: So every time there's a disaster and you're able to handle it, that's definitely something to be proud of.

RATHI: I will say, recently, we have had hurricanes, we've had a lot happening in the East Coast, and we've still had our agents be able to respond within 30 seconds.

SAM: That's huge. I think everyone is worried about AI and bias and ethical issues here. But is there anything else that worries you about AI? What worries you about artificial intelligence?

RATHI: What worries me is what I don't know. It's changing constantly. There's a lot of evolution; there's a lot of discovery happening at the same time. And what worries me is, am I going to be able to keep up with this discovery?

SAM: I feel you there. Certainly, walking into class every time. What's your favorite activity that involves no technology?

RATHI: Meditation.

SAM: OK. What was the first career that you wanted? Like in your childhood, what did you want to be when you grew up?

RATHI: It's really funny, but I wanted to be a dentist. But I can tell you, I feel like I'm pulling teeth sometimes, so it's OK.

SAM: And so some analogies to what you do and what you wanted to do — that's great. What are you hoping for from artificial intelligence? What's your greatest wish?

RATHI: I really wish it will help us eliminate a lot of the human intelligence that's using up our manual work right now and help predict some of the paths that the human mind can never predict. For us, [it's] being able to correlate information in a way the human mind cannot, so that we can leverage our time doing much more interesting work.

SAM: So people can have more time to travel, I guess.

RATHI: Yes.

SAM: All right, Rathi. Thank you so much for taking the time. It's great meeting you. I think there's a lot that people can learn from something that I think you have portrayed, perhaps, a little ... you made it sound a little bit easy, but the idea of coordinating all these pieces over time and being prepared to have serviced that technical debt so that when these next events come out, you're ready for [them]. And building that platform and ecosystem that people can use as components. I think a lot of people can learn from that. We really enjoyed talking with you. Thank you.

RATHI: Thank you so much. It was my pleasure.

SAM: Thanks for listening. Next time, Shervin and I will speak with David Thau, data and technology global lead scientist at the World Wildlife Fund. Please join us.

ALLISON RYDER: Thanks for listening to *Me, Myself, and AI.* We believe, like you, that the conversation about AI implementation doesn't start and stop with this podcast. That's why we've created a group on LinkedIn specifically for listeners like you. It's called AI for Leaders, and if you join us, you can chat with show creators and hosts, ask your own questions, share your insights, and gain access to valuable resources about AI implementation from *MIT SMR* and BCG. You can access it by visiting mitsmr.com/AIforLeaders. We'll put that link in the show notes, and we hope to see you there.