S11E1 - Katie Blake - Amazon's Alexa AI

00:00:00 Katie Blake
Alexa has many components in the background that make her work, but the one I work on is the one that decides which part of Alexa should respond to a particular reflex. So let's say you ask Alexa, "What's the weather today?", and, on the routing team, which is the team that I work on, we help get that question to the weather domain so that you can get the right answer.

00:00:26 Automated Voice
You're listening to "Speaking of Language," a podcast recorded at the Language Resource Center at Cornell University. Each week, we explore a topic related to Language Pedagogy and Second Language Acquisition. This week on Speaking of Language:

00:00:42 Sam Lupowitz
Katie Blake tells us how her PhD in linguistics at Cornell led to her work on Amazon Alexa's AI and takes us under the hood of the popular digital assistant.

00:00:56 Angelika Kraemer
Hello, hello Speaking of Language listeners.

00:01:00 Sam Lupowitz
Welcome to a brand new season of our podcast.

00:01:03 Angelika Kraemer
I'm Angelika Kraemer, the director of the Language Resource Center at Cornell University,

00:01:07 Sam Lupowitz
And I'm Sam Lupowitz, the LRC's media manager. We're excited to speak with Dr. Katie Blake today. Katie is a language data scientist at Amazon Alexa AI.

00:01:19 Angelika Kraemer
Welcome to Speaking of Language, Katie.

00:01:22 Katie Blake
Hi, great to be here. I'm excited to get to talk to you guys today.

00:01:26 Angelika Kraemer
And I wonder how many Alexas just went off in the background as we introduced Alexa AI. I had that happen to me the other day over dinner, ahh.

00:01:35 Sam Lupowitz
Make sure you do it six or seven more times over the next…

00:01:38 Angelika Kraemer
Oh we will, yes, absolutely.

00:01:43 Katie Blake
Yeah that happens a lot in meetings… People often have to mute their mics and say, you know, shut up.

00:01:53 Katie Blake
Not you right now.

00:01:55 Angelika Kraemer
Haha, that's funny. Katie, you recently completed your PhD here at Cornell in linguistics, researching phonological markedness effects on noun-adjective ordering. Congratulations, and do give us the elevator pitch of your dissertation.

00:02:11 Katie Blake
Yeah, thank you so much. Um, so I first want to just talk about adjective ordering, so for people, um, you know there are people with all different language backgrounds featured on this podcast, um, and it might be the case that in your language, the adjective can come before or after the noun, or it can only come in one of those positions. So like, in English, adjectives almost always receive the noun, like "red car"; we don't say "car red". But there are some languages where the order has flexibility, and the same adjective can occur before or after the noun. So like, in French, you can have *maison magnifique*, or *magnifique maison*, um so there is some flexibility here. And my dissertation, which is now available on ProQuest, uses large tech programs to see if this flexible ordering is at all conditioned by trying to avoid dispreferred sequences of sounds together. So, there are a lot of languages that don't like the same sound next to each other. Let's say with this English example, "car red" we have 'r' 'r' and something like that, y'know, would be avoided, we have flexibility in english. I looked at vowel hiatus which is when two vowels occur next to each other, stress clash, and some other phonological constraints, and I looked at a lot of languages: French, Italian, Polish, Arabic, and Hindi.

00:03:49 Sam Lupowitz
Awesome. And prior to your PhD, what was your background and path with languages?

00:03:57 Katie Blake
Oh my God I was such a language nerd; I loved language learning, it was like my favorite subject in school and I was always, haha, I was always pretty good at it, if I can say that. So, I definitely got into linguistics through language learning, a lot of linguists do, not all of them. And yeah, so I, as an American schoolchild, learned Spanish in elementary school, as many do, and then in middle school I got to pick a language to learn and I wanted to do something different so I picked French, which I continued through high school and then got a bachelor's degree in in college. While I was at Indiana University, which is where I did my undergrad, I took some more

Spanish classes to see how that was going and took Italian for the first time because that was something I always wanted to learn. And then, I actually took a couple of Italian classes during grad school at Cornell with Michela Baraldi who was awesome. So yeah, I love language learning and hope to continue it throughout my life.

00:05:13 Angelika Kraemer
Wonderful. You are now working as a language data scientist at Amazon Alexa AI. What does your work entail? What do you do?

00:05:24 Katie Blake
Yeah, this is like you know such an exciting question, especially from people from an academic background who maybe don't know too much like what goes on out there in the corporate world. But yeah, my work entails helping us at Alexa figure out how well the device is satisfying the customer and where we can do better. So I contribute to this by analyzing data on interactions with Alexa, and like doing deep dives to help better understand customer pain points, like you know what might be going wrong where there's friction, so Alexa has many components in the background that make her work. But the one I work on is the one that decides which part of Alexa should respond to a particular request. So, say you ask Alexa, what's the weather today and on the routing team, which is one of the teams I work on, we help get that question to the weather domain so that we can get the right answer.

00:06:30 Angelika Kraemer
Fascinating.

00:06:31 Sam Lupowitz
So how does Alexa learn to respond to those commands and all the other things that it does? What does that look like?

00:06:41 Katie Blake
This is a great question. There are a couple of ways that Alexa learned, so just like in life learning can be implicit or explicit, so Alexa also learns in kind of these two ways. So, I'll start with explicit, which is more straightforward, so you can tell Alexa your preferences so they can be included in your routines, like “Alexa, my favorite football team is the Colts.” And so then you know when you ask for your daily update or something, she can give you the score for your favorite team and that sort of thing. And then sometimes also Alexa asks *you* for feedback after responding to your inquiry, like “how did I do,” or “did I do a good job,” “did I get it right,” that kind of thing. So we also like elicit feedback in that way. And then implicit learning happens through the machine learning that powers Alexa. So machine learning looks at lots of interactions with Alexa and some information about them, like the context, and did Alexa succeed or fail at answering so that on future requests that maybe haven't been seen yet models can make a pretty good prediction at what would be a success or a failure from the customer's perspective. And then another new way Alexa is learning is what we call “self learning,” which is like we are

not giving explicit feedback to Alexa or giving it all the answers where the interaction went well or not. There's some self supervised learning, creating data where probably the interaction was a failure by just mixing up answers from successful ones, that sort of thing. This is the newer way of learning that is complicated.

00:8:51 Angelika Kraemer
That's fascinating. Can Alexa teach languages?

00:08:56 Katie Blake
Yes, so we are always looking for new ways to have Alexa to support a variety of language needs from customers all over the world. Alexa has a feature called Vibe Translation, which can translate between English and French and Spanish and Portuguese, German and Italian. In addition to this Vibe Translation thing, you can say "Alexa, what's the word for 'apple' in Spanish?" and she can also do this and give you the word in a foreign language and go back and forth between different languages.

00:9:41 Angelika Kraemer
Can I teach Alexa to pronounce my name correctly?

00:09:48 Katie Blake
Uh yes, I believe that you can. You can tell Alexa what your name is and this is part of her getting explicit feedback from you. You should try it and let me know how it goes.

00:10:00 Angelika Kraemer
I need to because usually any interface is always calling me "Angelica" and I've tried sometimes my name is not "Angelica," I'm "Angelika." I have not tried this with Alexa so I need to do that when I get home.

00:10:24 Katie Blake
You should. You guys should record the interaction and put it as a tag for the podcast or something.

00:10:32 Angelika Kraemer
There we go.

00:10:32 Sam Lupowitz
I will absolutely edit that in the end. I love how this episode is turning into everyone listening while we ask for a personal tutorial on how to use Alexa better. Welcome back to the show everyone. Does Alexa also recognize when people switch between languages in context?

00:10:32 Katie Blake

Yeah definitely. This is something I think is so cool like, as a linguist, I know that many people that exist—there are so many people in the world that exist in multilingual environments with each other and also just as multilingual people and sometimes use more than one language in the same sentence, and so Alexa has this feature called the “Multilingual Model” and with this feature, Alexa customers can switch between supple supported languages like German, Spanish, French, Italian, and Japanese. So like if you’re at home for the holidays or something with you know your Nonna, your grandma’s over and speaking Italian, she can switch between English and Italian and yeah, it’s really cool.

00:11:47 Angelika Kraemer
So this may be a silly question, but does Alexa sound different in different languages? Say, you know, your setting is set to Italian, versus English, versus German, versus whatever.

00:11:58 Katie Blake
Yeah this is a really good question, but she does sound pretty consistent between the languages and that’s kind of on purpose. We want to offer like, you know, like the same customer experience to all users, so yeah, no matter what language you choose the default voice kind of sounds similar to maintain this consistency. But there are ways you can personalize the voice, so you can make Alexa speak English with a British or Australian accent. Yeah and we offer a male sounding voice, with a lower F-zero, and there are also a couple of celebrity voices, so there’s like Shaquille O’Neal…

00:12:50 Sam Lupowitz
No, you’re kidding.

00:12:52 Katie Blake
No, for real. And Samuel L. Jackson, who has just an awesome voice. So, yeah. You guys can have a lot of fun playing with the different things after this podcast I think.

00:13:10 Sam Lupowitz
Yeah, clearly. I want to have Samuel Jackson actually; Shaq, that’s cool too. It’s like the novelty of it, I feel kind of silly but it’s like back in the pre-smartphone days when people used Garmin—the GPS—they got one with Snoop Dogg, and I was like “Yes! I want Snoop Dogg to tell me to make a left turn.”

00:13:33 Katie Blake
Oh my God, right? I loved—that was like the first kind of my experience with Voice AI was the Garmin and that was so cool and making it be in a posh British voice—I was like ”Oh God, so fancy!”

00:13:50 Sam Lupowitz

Yeah, now it's so ubiquitous now, you know, with everyone's phones and devices but at the time, yeah that was really new and fun.

What is the origin of Alexa's name, by the way? Why isn't it… Katie?

00:14:11 Katie Blake
I'm so glad it's not. Yeah, so before Amazon launched Alexa as the original wake word, the team that was working on it of course considered a lot of wake words, and evaluated them for different characteristics. So one of the great characteristics of "Alexa" is the combination of "uh" names—that makes it a good wake word from a speech recognition perspective. So like it has a "cuh" and a "suh", and these are big changes in the speech signal that make it easy to pick up from like a ASR perspective. And then, there were also, you know, internal Beta testing that kind of revealed that people definitely preferred you saying a person's name instead of something like "Computer", which is a wake word, but Alexa feels more personal and natural when you're talking to your assistant. Yeah, another cool fact is that Alexa was chosen to pay homage to the Library of Alexandria, and Alexa is kind of like Star Trek brought to life, so there's kind of that history as well which is part of why computer was also an available wake word. So yeah/\.

00:15:42 Angelika Kraemer
I love it, that's awesome.

00:15:55 Katie Blake
There's also, I learned recently, another wake word that I don't think many know about, is "Ziggy". So "Ziggy" is another wake word. "Amazon", "Computer", "Alexa", and "Ziggy".

00:16:11 Angelika Kraemer
Okay, look at that.

00:16:14 Sam Lupowitz
But "Ziggy" is fun and cute, but the next time I want to be Starship Captain Jean-Luc Picard, I will address "Alexa" as "computer."

00:16:23 Angelika Kraemer
I was about to say, exactly, yes. It's very formal.

00:16:28 Sam Lupowitz
Engage.

00:16:29 Angelika Kraemer
Yes, and then you have to make sure that she responds in a British accent though.

00:16:33 Sam Lupowitz

Yeah I think that's only fair. Yeah. The computer on Star Trek was voiced by Gene Roddenberry's wife, which is again, going way off.

00:16:45 Angelika Kraemer
So, Katie, a frequent question that has come up on our podcast recently in Season 9, and again in Season 10, is the issue with which we hear, at Speaking of Language, are most concerned. And that issue is the following: "Should our listeners be preparing themselves for the robot uprising?"

00:17:12 Katie Blake
Oh my gosh, I don't think so. My short answer to this is no, not at all. It's just math. So, like, I think it's totally natural and healthy to be skeptical of new technology—this is just being human. But, machines are not sentient, they cannot think for themselves. It may look like they can think and are like very smart from the outside, and they will definitely continue to get better at the tasks that we point them at, but under the hood they're really just getting better at statistics. So it's not, you know, having feelings and a brain, it's just having math down there. Really really good math, but no.

00:18:02 Angelika Kraemer
This is good to hear. I think this will put all of our listeners at ease hearing that from you, Katie.

00:18:08 Katie Blake
I hope it's reassuring.

00:18:13 Sam Lupowitz
Well, so Katie, this has been really fun to talk about with you. Where can our listeners find out more about your research and work?

00:18:22 Katie Blake
Yes, they can go to my website, which is still hosted at Cornell, so I think it's conf.ling.cornell.edu/katherineblake, you can put that in the show now. I am also on LinkedIn, so yeah.

00:18:44 Angelika Kraemer
Wonderful. Katie, before we sign off, we'd like you to share a word in a language that you speak you love, you are learning, you want to learn, that makes you laugh. What is that word?

00:18:58 Katie Blake
So, I learned this word just in the last couple of years from some very dear great friends of mine who are Korean speakers. They're L1, and Korean, it's such a cool language, and I know some stuff, but not too much. But this word is "noonchi", and I love this word so much because it's like this concept of: if a person has good "noonchi", they really can like read the room and they know

what to say when, and they kind of have this really good empathy and they don't put their foot in their mouth and they know when to shut up, that kind of thing. So this is not something that I, like this isn't really a word that I have in another language, but I think now that I know it, it comes up a lot and I definitely use it a lot with friends. So yeah, "noonchi".

00:20:08 Angelika Kraemer
Awesome.

00:20:10 Sam Lupowitz
Fantastic. Well, thanks so much for Speaking of Language with us, Katie.

00:20:15 Katie Blake
Thank you, it was awesome to be here.

00:20:17 Angelika Kraemer
Next week, we will speak with Alan van den Arend about Cornell's Active Learning Initiative, and how active learning principles can be integrated into language classes.

00:20:27 Sam Lupowitz
Until then,

00:20:28 Angelika Kraemer
Auf Wiederhören.