

# **SDS PODCAST EPISODE 714: USING A.I. TO OVERCOME BLINDNESS AND THRIVE AS A DATA SCIENTIST**



Jon Krohn:	00:02	This is episode number 714 with Bournemouth University PhD student, Tim Albiges.
	00:19	Welcome back to the Super Data Science Podcast. Today, I'm joined by the remarkable Tim Albiges. Tim was working as a restaurant manager eight years ago when he tragically lost his sight. In the face of countless alarming and discriminatory acts against him on account of his blindness, Tim taught himself Braille and auditory learning techniques and to raise math equations and diagrams using a special thermoform machine so that he can feel them.
	00:43	And he did all this in order to be able to return to college and study computing and data science. Not only did he succeed in obtaining a Bachelor's degree in computing with First-Class Honors, he is now pursuing a PhD at Bournemouth University full-time, in which he's applying machine learning to solve medical problems. His first paper was published in the peer-reviewed journal, Sensors, earlier this year.
	01:04	Today's inspiring episode is accessible to technical and non-technical listeners alike. In the episode, Tim details why a career in data science can be ideal for a blind person, how he's using machine learning to automate the diagnosis of chronic respiratory diseases. He talks about the techniques that he employs to live a full and independent life with a particular focus on the AI tools that assist him both at work and at leisure. And a keen athlete, Tim fills us in on how he's adapted his approach to fitness in order to run the London Marathon and enjoy a fascinating team sport called goalball. All right, let's jump right into our conversation.
	01:38	Tim, welcome to the Super Data Science Podcast. It's awesome to have you on. Thanks for-



Tim Albiges: 01:42 Yeah, thank you for inviting me.

Jon Krohn: 01:44 Yeah, my pleasure. Where are you calling in from today?

Tim Albiges: 01:47 From Bournemouth in England.

Jon Krohn: 01:49 Ah, yeah. I've never been to Bournemouth, but I'm well aware of the Cherries, the football club there. Yeah.

Tim Albiges: 01:55 Oh, yes. We have a football club. Very popular with the locals.

Jon Krohn: 02:00 They've been tremendous in recent years, I guess. And yeah, it's actually, it's quite a shame that I haven't been down to Bournemouth because I lived in the UK for five years, but... It's right on the water and it's relatively warm for England, right?

Tim Albiges: 02:13 Seven miles of coast beach.

Jon Krohn: 02:17 Sounds nice. Yeah. We got to know each other through you being a student on... So there's this... A lot of people are aware of the Open Data Science Conference, so they run, as far as I'm aware, the biggest conferences in North America in this post-pandemic world, for data science. So there's ODSC West in San Francisco. There's ODSC East in Boston. There's also, there's ODSC Europe in London.

Tim Albiges: 02:41 In Europe. Yeah.

Jon Krohn: 02:42 Yeah. Have you gone to the London one?

Tim Albiges: 02:44 No, I haven't. I've watched some of the episodes online, but I haven't actually been up there.

Jon Krohn: 02:49 Yeah, yeah. And they have an Asia one that's in India as well. So they're all over the shop with these in-person conferences, but they also have a digital platform called AI+, and I've done a number of trainings in AI+ and had

the trainings recorded in there so that people can view them later. So my whole Math for Machine Learning curriculum. So there may be some listeners out there who are aware of how, I started posting a couple years ago, linear algebra videos and then calculus videos, and then I started the probability videos, and then it just kind of abruptly stopped. So on YouTube and Udemy, I have this Math for Machine Learning course where it's very, very tightly edited, but then I also have just this live training that I did for AI+ on Math for Machine Learning, but it actually covers the whole curriculum. So on YouTube and Udemy, I need to get back to this really tightly edited curriculum.

03:49      So there's kind of this, if people want to have access to all of the content that isn't yet on YouTube and Udemy, and that I haven't published in over a year, it is all in the AI+ platform. It's just that, I just did it in one shot in a live class. So yeah, maybe a little bit rougher around the edges, but in addition to that math-

Tim Albiges:      04:10      I would definitely recommend it though.

Jon Krohn:      04:12      Nice, yeah. And in addition to that Math for Machine Learning course, I also have a Deep Learning course, which is, I don't know, there's probably 15, 20 hours of deep learning content. It was kind of six three and a half hour-ish lectures that maybe, they get edited down a bit because there's breaks and stuff. So you did that whole deep learning curriculum as well?

Tim Albiges:      04:35      Yes.

Jon Krohn:      04:36      And I think after you finished that course, you reached out to me on LinkedIn, kind of added me on LinkedIn. Then we were connected for a couple of years and we hadn't chatted until a week ago. At the time of recording, you wrote a post on LinkedIn that really moved me. It

really... I thought it was a really special thing to read. And so now, we're going to focus on that, kind of, for this episode. So tell us about what happened eight years ago, Tim.

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| Tim Albiges: | 05:02 | So eight years ago, I had a big bleed in my eyes, which took most of my vision. At the time, I was working in a bar restaurant and when it actually happened, I was actually at work when I had the bleed. And I was just about to use a till and I started moving towards a till to try and read what was on the screen, and I ended up banging my head against it because I just couldn't see. |
| Jon Krohn:   | 05:33 | Oh, my goodness.   |
| Tim Albiges: | 05:33 | It just faded out. So that's left me on a journey of learning and redirection and everything, where I am now.  |
| Jon Krohn:   | 05:44 | Yeah. And you've managed to do really impressive things since, so things like running the London Marathon. You ran the London Marathon in four hours and 45 minutes, which is faster than most people, I imagine. So these kinds of things... Obviously, to run a marathon, you're dependent on a running guide.   |
| Tim Albiges: | 06:07 | Yes.   |
| Jon Krohn:   | 06:08 | So things are a bit different and how does that... So I mean, let us know how that works. When you train to run, is it sometimes on a treadmill or do you often have a running guide for training as well?   |
| Tim Albiges: | 06:22 | No, I have the same running guide for training as well.  |
| Jon Krohn:   | 06:25 | You keep each other fit?   |
| Tim Albiges: | 06:27 | Yeah. Well, he was used to running marathons. He's done all the ten top marathons in the world and so he loved   |

running, and we just trained to do the mileage. We trained to get into sync as well. There's a lot of-

- Jon Krohn: 06:45 Right.
- Tim Albiges: 06:47 He needs to be slightly ahead of me, but not too far ahead so that I can understand what the ground is because I can't see the ground.
- Jon Krohn: 06:54 Oh, my goodness. Oh, so you can tell by how he moves in front of you, whether it's going up or down.
- Tim Albiges: 07:02 Yeah. We have a little cable between us holding on. Yeah, we feel so much of each other running. Yeah, it really kept me going at the time when I needed to.
- Jon Krohn: 07:14 Yeah and so fitness and IT were two different kinds of career options as you started to... So what were you doing before the blindness started?
- Tim Albiges: 07:26 So I was a duty manager of a bar restaurant.
- Jon Krohn: 07:31 So that explains the till that you were describing?
- Tim Albiges: 07:36 Yes.
- Jon Krohn: 07:37 Yeah, yeah. So then with the blindness coming on, you looked at fitness and IT as two different kinds of potential career paths, things that you were interested in, and how did those discussions go?
- Tim Albiges: 07:50 So what I tried to do, I tried to find other visually impaired blind people in those industries. I spoke to people in fitness, mainly because I love being outside running and enjoying the outdoor activities and everything. And they were explaining how... Yeah, they're all qualified, they're all good, they have the regular customers, but trying to find new customers or get employed in gyms, very challenging. And their work

wasn't always continuous. But when I spoke to people in IT, most of those were self-employed, similar like fitness people. However, a lot of their clients didn't know they were blind and they didn't inform them, or tell them, or anything. They said, "We just get the jobs, we know what to do, we know how to do it, and we get it done." And they were always so busy that they always had more work than what they needed to, really. So I thought that would be an good option to go into.

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| Jon Krohn:   | 08:59 | Yeah. It sounds like it was the right choice, but in the beginning, it wasn't easy. So you actually, you wrote in the LinkedIn post that battling to keep your job was a struggle that seemed never ending. You faced countless setbacks, laughter, hung up calls, and interviews canceled when you turned up.  |
| Tim Albiges: | 09:14 | Yes.  |
| Jon Krohn:   | 09:14 | One company wanted to see evidence of what you could do without your sight, but you wrote triumphantly in this post, that you left those companies in your wake as you keep growing and move on. So yeah. I don't know if you have a little more color that you want to add to those kinds of circumstances. I mean, it's crazy to me that in these modern times, that there'd be that kind of blatant discrimination, that this was kind of... I mean, it sounds like from this post, that that was kind of the norm as you were going to interviews and that kind of thing. |
| Tim Albiges: | 09:42 | Yeah. It really did feel like the norm. I would go to... I went to a different job interviews, someone over the phone, but when I turned up, even if I let them know I was visually impaired, I didn't tell them how much, but they would turn around and say, "Oh, the position's been fulfilled." Or if it's on the phone, they would say, "Oh, you're blind." It's like, "Yeah, and I'll need certain adaptations." They're like, "Oh, don't worry." Then they'd   |

hung up and some would laugh. Then at other interviews, they would be more interested in me being blind rather than actually interviewing me for the role. I had all these barriers and challenges. So that's when I really thought about, why not retrain, and move on, and go for bigger and better because a lot of these jobs were secretaries [inaudible 00:10:43] roles and just sales on phones and everything. So I thought, "Why not push and go further?" So yeah. I went back to college and facing that type of challenge of learning via audio instead of visual.

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| Jon Krohn:   | 11:01 | Yeah. So you returned to college to study computing and you had to shift from visual to audio learning, which would've been super taxing, I imagine. And then you also, you mentioned to me before we started recording, that you also learned Braille, which comes in super handy for people like data scientists because...                                    |
| Tim Albiges: | 11:24 | Oh, yep. For helping me to debug. Doing it via audio, I didn't find it as accurate, and I was also advised it wasn't as accurate. And so I learnt Braille and yeah, it really helped me to debug, if I had accidentally hit a space in between certain variables, you pick it up a lot easier on the Braille display than on the audio. So that really did help. |
| Jon Krohn:   | 11:56 | And so you actually, you have a special keyboard with Braille on it for typing or...?  |
| Tim Albiges: | 12:03 | No, no. Luckily, when I was 18, I used to stay up all night in a dark room, just touch typing. So yeah, [inaudible 00:12:14] all the old IRC chat rooms. [inaudible 00:12:18].   |
| Jon Krohn:   | 12:19 | So then the device that you showed me, it's not a keyboard, it's for reading Braille.  |



Tim Albiges:	12:27	I use it mainly for reading. You can type on it. That's still a skill I need to really develop a bit further. I can very slowly type on it, but [inaudible 00:12:40] a lot quicker for me.
Jon Krohn:	12:44	Most of our listeners are in an audio-only format, and so they wouldn't have seen the device that you just showed up on the screen, but it kind of looks like a keyboard. But then it also has five big blue buttons for each of your fingers.
Tim Albiges:	13:05	It has eight large, big, blue buttons.
Jon Krohn:	13:08	Oh, yeah.
Tim Albiges:	13:08	And that's the typing in Braille. Then you've got the space bar under the cursors for your Braille display. The Braille display, they're cells of eight dots.
Jon Krohn:	13:22	Oh, I see, I see. So the eight buttons correspond to the eight dots. So you type in Braille. It doesn't try to emulate a keyboard, a traditional keyboard, the one that you've been typing on for years and years, but you actually print... Yeah. So it's almost like [inaudible 00:13:41]. It's like piano chords, where you're like... So it's not one key at a time. You're like, "Oh, okay. This kind of chord represents the letter A and this chord is the letter B."
Tim Albiges:	13:50	Yes.
Jon Krohn:	13:51	Oh, cool. And then so for reading, so then the display on it, I guess, it changes the touch. It has the eight things go up and down.
Tim Albiges:	14:08	Yeah, each cell has eight little dots and they go up and down, depending on which letter it is.
Jon Krohn:	14:16	Cool.

Tim Albiges:	14:16	It's all symbol.
Jon Krohn:	14:18	Yeah. So basically, between these two things, between audio... And there's actually, there's something that... It became obvious to me, just as you and I were setting up to do this recording, when you're switching microphones, trying to figure that kind of thing, as you hover over the screen, I could hear this voice quickly reading to you, kind of everything that you were hovering over.
Tim Albiges:	14:40	Yes.
Jon Krohn:	14:40	So this is another way that you... Yeah, another kind of accessibility trick.
Tim Albiges:	14:45	Yes, it is. Yeah, it tells you what part of a screen you are on and everything. So it gives you a lot of information, where you are, what you need to do, what you're typing as well when you type. It tells you each key, and then the whole word when you finish typing a word. In Word, it does beep if you make a mistake. But if it's in a IDE, it doesn't tell you if you've made a mistake. So you'll get on the screen with squiggly lines underneath. I don't get that details with a screen reader.
Jon Krohn:	15:25	Right. Yeah, that would definitely make it trickier. You need to be more precise about what you're doing.
Tim Albiges:	15:31	Yes, definitely.
Jon Krohn:	15:34	But yeah, between these kinds of accessibility techniques, between learning to read by audio, between learning Braille, you've been able to not only just get by studying computing, but you got a distinction and then you started a Master's of Research and then got transferred into a PhD. You just published your first research paper this year. You're currently writing a second paper. So clearly, it is, no doubt, taxing to switch these modalities and go

from the way that you were learning eight years ago to the way that you're learning now. But yeah, achieving at the highest level. I mean, doing a PhD, this is like... Only 1% of people or something are able to achieve that in any circumstances. So yeah, you're obviously flourishing. And it goes beyond just the academic stuff. You've also taken on... Your love of fitness hasn't gone away at all. So you're playing a sport called goalball.

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| Tim Albiges: | 16:41 | Yeah, I haven't played it for a few years now-  |
| Jon Krohn:   | 16:46 | Oh.   |
| Tim Albiges: | 16:46 | But yeah, no, it's a really great sport. Very physically demanding. But you're actually, everyone's blindfolded on a pitch and it's nine by eighteen meter pitch. The goal behind you is nine meters long and there's three people on each team. The court's tactile and the ball has a little bell in it so you can hear it. So there's three of you defending the goal and trying to stop anyone trying to score, but you've only got 10 seconds to shoot back, once you've got the [inaudible 00:17:24]. |
| Jon Krohn:   | 17:24 | Oh.   |
| Tim Albiges: | 17:24 | So up and down doing like... It feels like doing burpees throughout, each half, 24 minutes long. So yeah. You're shooting back and forth so much and you're diving left, right, and center to capture a ball.   |
| Jon Krohn:   | 17:43 | Oh, wow.  |
| Tim Albiges: | 17:45 | And it really teaches you orienteering and learn to pay attention to everything around, where the ball is, where your teammates are, wherever your position [inaudible 00:17:56], positioning themselves as well. And yeah, brilliant game.   |

Jon Krohn:	18:00	Oh, yeah. So you can tell where the ball is because it makes noise, but how do you... You tell where your opponents and your teammates are, based on just listening? And you can kind of tell-
Tim Albiges:	18:12	You often know the court layout as well, but you need to pay attention to where they are.
Jon Krohn:	18:15	Oh, my goodness.
Tim Albiges:	18:15	[inaudible 00:18:19] Covering the goal and not hitting them.
Jon Krohn:	18:15	Oh, dear. Right.
Tim Albiges:	18:15	Yeah, no [inaudible 00:18:29].
Jon Krohn:	18:29	So you'd say, "I didn't see you there, mate." Hit your [inaudible 00:18:35] in the back of the head with a ball. Wow. So yeah, so incredible. Yeah, so... With all of these kinds of adaptations that we've already talked about, it's clear that blind people are able to flourish in these kinds of IT roles, computer programming roles, data science roles-
Tim Albiges:	19:01	It's one of the big things you've got to remember. You don't see the code running. It's all a mental model and you don't need your eyes to have a mental model.
Jon Krohn:	19:12	Right, right, right. That's a really good analogy. Tim, so what's your research about? What's your PhD research about and the paper that you published recently, what are you focused on?
Tim Albiges:	19:22	So my focus is on AI for healthcare, with a focus on respiratory conditions, mainly COPD. That's a chronic obstruction pulmonary disease. So my first paper is based on audio auscultations of pulmonary system and whether we can detect or diagnose COPD out of healthy,

or another respiratory condition, which was, in this case, pneumonia. And yes, I was getting good scores on [inaudible 00:19:55]. My research at the moment, or the paper I'm writing about at the moment, is detecting COPD severities because there's four different state levels of COPD severity, depending on obstruction. So yeah. And there's... Is a bit of lack of data out there in the public domain, but in my research, I've managed to use two different datasets. The one I was previously used in my first paper, I brought into the second one to make sure I've got enough data and I've learned some key features of breathing. In my first dataset, I used bringing it into a COPD severity dataset, to get better features for better classification of severities.

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| Jon Krohn:   | 20:52 | Got you. So these COPD patients, the datasets consist of recordings of them breathing, I guess?   |
| Tim Albiges: | 21:01 | Yes. [inaudible 00:21:02]. Of stethoscopes-   |
| Jon Krohn:   | 21:04 | Stethoscopes.   |
| Tim Albiges: | 21:05 | Recordings of [inaudible 00:21:06]. Yes. And back.  |
| Jon Krohn:   | 21:13 | Through these recordings, you can then apply some machine learning algorithms to be able to detect, so you have... Your label is kind of severity of COPD.                      |
| Tim Albiges: | 21:22 | Yes.  |
| Jon Krohn:   | 21:23 | So you have this quantitative variable that you can regress on and use some machine learning techniques to automatically extract features, I guess, from these audio waveforms. |
| Tim Albiges: | 21:39 | So I try and create for features.   |
| Jon Krohn:   | 21:43 | Oh, yeah.   |

Tim Albiges:	21:44	So I transform the features from what they are, into a subspace of a wide range of lung sounds. That helps maximize some of the dominant features I need to look for or reduce some of the other features that I can just use standard machine learning techniques to then classify.
Jon Krohn:	22:08	Nice. Yeah. Like a random forest or that kind of thing.
Tim Albiges:	22:12	Yeah, SVMs-
Jon Krohn:	22:14	Support vector machines.
Tim Albiges:	22:14	[inaudible 00:22:15].
Jon Krohn:	22:16	Yeah.
Tim Albiges:	22:16	So you get out some other feature or understanding from the process.
Jon Krohn:	22:26	Very cool. Sounds like a brilliant project. You could make a big impact with that. Is it by design or by coincidence that it's audio data, which you happen to be... Obviously, you've honed your audio abilities through things like goalball and obviously, learning auditorily.
Tim Albiges:	22:44	Yes. So it's just a bit of a coincidence. My next part will be using vision as well. So yeah, I'll be doing the computer vision next, to bring in and sense of fusion techniques to help try and get better results.
Jon Krohn:	23:02	So yeah. So speaking of machine learning and computer vision and that kind of thing, what kinds of ways does machine learning assist you today and how could it in the future? So for example, has the ChatGPT revolution of the past year, has that been useful to you or are there computer vision things or... What are the ways that machine learning is helping you out today and how could it maybe in the future even more?

Tim Albiges:	23:32	So ChatGPT hasn't really helped me as much, but what has really helped me is object recognition and OCR technologies.
Jon Krohn:	23:42	Right.
Tim Albiges:	23:43	I use that a lot. Object recognition to help me find things in shops, OCR for scanning books and everything. Yeah, it's been a real big help.
Jon Krohn:	24:00	So with object recognition, I guess, you have an app on your phone that allows you and maybe just headphones plugged in, and then so you can be scanning shelves and it's just kind of telling you, that's an orange, not a grapefruit kind of thing.
Tim Albiges:	24:16	Yes.
Jon Krohn:	24:20	And then the OCR, optical character recognition, that allows you to, I guess, in probably any circumstance, maybe similar kind of thing just on your phone, being able to take public transport or whatever. You can be reading signs and reading books, any of that kind of thing.
Tim Albiges:	24:37	Yeah, I use it a lot for reading books. I've got quite a few different types of scanners, book scanners, document scanners. There's even just my phone, scan texts so easy nowadays. You used to get it to read it out, to read it aloud. It's brilliant nowadays.
Jon Krohn:	24:57	Yeah. I mean, that's probably even relative to eight years ago. I can't remember exactly where my iPhone, kind of capabilities were, eight years ago, but I suspect that as these devices in our pockets become exponentially more powerful-

Tim Albiges:	25:11	Yes, definitely. You've seen big changes, especially in the last five years, where previously, it could only read printed text, OCR, and recognition nowadays is brilliant. It's picking up a lot more, so it doesn't have to be just printed text and scanning. It can be handwritten notes-
Jon Krohn:	25:30	Right.
Tim Albiges:	25:31	[inaudible 00:25:31] with AI nowadays.
Jon Krohn:	25:34	And what about, even stuff like... We touched on this a little bit before we started recording. I found it interesting that you found my deep learning courses in AI+ to be so valuable because I was like, it's interesting because I actually... In those trainings, I leverage illustrations a lot because the trainings are based on my book, Deep Learning Illustrated, which yeah, I would've expected that maybe, that my kind of way of teaching or the way that I made my book, was actually maybe going in the wrong direction for you. But it seems like somehow the, I don't know, the descriptions of the illustrations of the visuals actually... If those descriptions are good enough, then that's actually, makes it easier for you. Yeah.
Tim Albiges:	26:18	Yes, it definitely does. A lot of people tend to forget the alt tags and everything, or if they do use alt tags to give descriptions of images, it's a description of what it is. When it's a good description of what it contains in that image, that's very empowering. Some people could put an alt tag, a description of an image like, "This is a photo of my brother," when they could say, "It's a brown haired person, brown haired, rugged, handsome looking brother," or something like that.
Jon Krohn:	26:59	Right, right.
Tim Albiges:	27:01	[inaudible 00:27:01] details in descriptions.



Jon Krohn:	27:02	Right.
Tim Albiges:	27:05	But then again, there are some semantics we naturally learn in language. Take like banana. When you say banana, what do you think about? Its color, for instance.
Jon Krohn:	27:17	Yeah. Yellow.
Tim Albiges:	27:19	Yellow.
Jon Krohn:	27:19	Yeah.
Tim Albiges:	27:22	So when you go into shops and take a photo, you don't always get that description. It could be screened where it's ripe, fresh, or spotted. Some of that information, some people miss in image description labels.
Jon Krohn:	27:38	Right. So yeah, that actually, that brings me on to my next question, which is, how can people... So this kind of having these alt tags be descriptive in a way where it's not just a description of the color of things, but a description of what that means. That it's ripe, is more important than the hue of yellow. And so, that's a good example of the kinds of things that people could be doing to be helping blind people out. What other kinds of tips do you have for our listeners who could work with a blind person? Maybe before hearing this episode they thought, "Oh, that wouldn't work." But now that they've heard this episode, they think, "Oh. Actually, okay, someone like Tim could work with us and be just as effective in some ways, maybe more effective, because of attention to detail and these additional ways of learning."
	28:41	Actually, one thing that was interesting that you described to me from your studies is that because sometimes in lectures, the lecturer isn't changing the way that they describe something, which can make it in real time, more difficult for you to understand. Then you go off

on your own and you learn a lot more about this phenomenon, this concept, from lots of different resources. So you could understand that concept a lot better than other students in the class who just heard the one description one time.

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| Tim Albiges: | 29:10 | Yes. I would not just... It wasn't just books. I signed up to other talks. The British Computer in Society, they put on a lot of talks. So I attended to loads of those and it's just a wide range and it's interacting with other people as well at times, just talking through everything, develop such a wide breadth of knowledge. And you get to these points where you have this real clarity of, "Oh yes, I've got that. I've understood that now." They're nice feelings to reach when someone in the class might have just picked up in one lot of the lectures, but I've had to go a lot further. Even just learning SQL, I think I found every single error message you could possibly think of, just to [inaudible 00:30:05] data understanding of what or how I needed to use the language. |
| Jon Krohn:   | 30:15 | Yeah. I think it's crystal clear that people should not, obviously, I mean, it seems insane that I have to say this out loud, but you shouldn't discriminate against blind people. There's lots of jobs out there where blind people can perform just as well or better than people with full sight. So yeah. So what kinds of ways can myself, can our listeners, support blind people, not just at work, but in general?   |
| Tim Albiges: | 30:43 | So I'd probably recommend, if you see someone with sight loss, they still got a vision of mind and yes, it's a disability, but nothing which stops them. It's just, we do things in a slightly different way.  |
| Jon Krohn:   | 31:04 | Nice. Yeah. Crystal clear. So basically, I mean, the kind of... I guess, the underlying point is, we don't actually need to do that much differently at all.   |

Tim Albiges:	31:15	No.
Jon Krohn:	31:17	Yeah, so... And yeah, it's interesting for me just as kind of like a final pointer, you mentioned that ChatGPT hadn't made that much of a difference yet, but a couple of weeks ago, I had a podcast episode, episode number 708 on the ChatGPT Code Interpreter, which allows you to paste in code or have it work on code right there in the browser. And it seems to me like tools like that, maybe as they get even better or maybe are adapted slightly to be more accessible, I imagine they'll be brilliant for you because it detects bugs automatically and fixes them. So you don't... That missing space or whatever that you have to detect with your Braille, it's just something that ChatGPT can pick up and fix automatically, like you could...
Tim Albiges:	32:13	Yeah.
Jon Krohn:	32:13	Yeah.
Tim Albiges:	32:13	The only problem with, I could see with that is, it's a bit like autocomplete. Autocomplete completes everything, but my screen reader doesn't always announce it. So it's making changes to my code that I don't know about.
Jon Krohn:	32:28	Right. Oh, yeah.
Tim Albiges:	32:29	So I quite often turn off autocomplete. [inaudible 00:32:38]. But then again, some IDEs are getting better. You can go down and select what options you want and everything now. So that's good. But some of the autocompletes, yeah, I turn it off. I like to know what I'm typing and what I'm [inaudible 00:32:52].
Jon Krohn:	32:52	Yes, of course. Yeah, that makes perfect sense because I guess... Yeah, something like that, I'm thinking, "Oh, yeah. This code interpreter or ChatGPT's going to be perfect because it'll take whatever you wrote and then

clean it up for you." But that actually could be a huge pain because then you need to painstakingly have the entire thing read through, character by character, or Braille character by Braille character where you just... And you're having to kind of remember the delta between what you'd put in and so then... Yeah, it can actually end up being just way more work than kind of getting it right yourself the first time around. Fascinating. All right. Thanks very much, Tim. This has been a really interesting episode, a really special episode.

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| Tim Albiges: | 33:33 | Yes. Thanks for having me.   |
| Jon Krohn:   | 33:34 | Hey, so before I let my guests go, Tim, I always ask for a book recommendation. Do you have one for us?  |
| Tim Albiges: | 33:40 | Yeah. It's an audiobook. Machine Learning Mathematics by Samuel Hack. Very detailed, loads of equations, and all in Audible and really accessible.   |
| Jon Krohn:   | 33:54 | Nice. And yeah, that actually, that brings up something you talked about before pressing the record button, which is, how do you handle mathematical equations, Tim?   |
| Tim Albiges: | 34:03 | That can be a challenging thing. OCR can be quite good nowadays, but there are some inaccuracies in it and when you're scanning a research paper with a mathematical equation, if it does get out the equation perfectly, it might not get out with descriptions. And so you're there. You know what values you've got like $\tau$ , $\alpha$ , $\beta$ , but you don't have any descriptions for what they mean in that context. So there's a bit of more processing with some of those. Sometimes [inaudible 00:34:40] into tactile format, tactile text format. I use some swell paper and a thermal printer. |
| Jon Krohn:   | 34:51 | Oh.  |

Tim Albiges:	34:51	Print it in black water-based ink on the special paper and then put it through the thermal printer and it raises any black ink up.
Jon Krohn:	34:59	Oh, really?
Tim Albiges:	35:01	Yeah.
Jon Krohn:	35:01	Wow. I was not aware of that. So you actually then, you feel the whole equation. So it's not like Braille where it's the eight bumps per character, it's just the shape of the whole equation and like, "Okay, I'm in the numerator-"
Tim Albiges:	35:16	Yeah, but I have to make it a bit bigger so I can fill the outer outline and everything.
Jon Krohn:	35:22	Wow.
Tim Albiges:	35:23	Because I also use it for putting diagrams into tactile as well.
Jon Krohn:	35:23	Very cool. All right. So if people want to connect with you or follow you after this episode, what's the best way for them to do that?
Tim Albiges:	35:32	Yeah, via LinkedIn. I'm quite active on there.
Jon Krohn:	35:36	Nice. All right. Well, thanks so much for taking the time with us today, Tim. This has been an awesome episode and yeah, looking forward to hearing how the PhD journey comes along and how your career develops after that. Awesome to be doing this AI and machine learning in healthcare research and make a big impact with that. Very cool, Tim.
Tim Albiges:	36:00	Yeah, thank you.
Jon Krohn:	36:02	What an inspiring story. In today's episode, Tim covered how he generally uses auditory learning, but Braille is



essential for debugging code, while raised print is helpful for understanding math and diagrams. He talked about how he's applying machine learning to automatically detect the severity of chronic obstructive pulmonary disease, COPD, from stethoscope recordings. And he filled us in on how tools, how AI tools like object recognition algorithms and optical character recognition enable blind people to live a full and independent life.

36:30 All right, that's it for today's episode. Support this show by sharing, reviewing, or subscribing, but most importantly, just keep listening. Until next time, keep on rocking it out there my friend. I'm looking forward to enjoying another round of the Super Data Science Podcast with you very soon.