AI and You

Transcript

Hello, and welcome to episode 128! My guest today is Jonathan Bowen, who is a fellow of the British Computer Society, a fellow of the Royal Society of Arts, Emeritus Professor at London South Bank University, and an adjunct professor or visiting professor of many universities, such as Chongqing in China, Birmingham City University, University College London, and Kings College London.

I went looking for Jonathan because I wanted someone on the show who could satisfy my deep desire to pay homage to Alan Turing and understand the shape and size of his contribution to our world. Jonathan is perfectly is a perfect fit for that quest, because he is co-author of the book The Turing Guide, which is an incredible Tour de force biography of the man and his works. It is nearly 550 pages long, large format, small font, you can imagine how densely packed it is with information.

If you are listening to this and don't know who we are talking about, for heaven's sake stop and go and find out the rudiments of the history and character of Alan Turing. If you at least learn about his pivotal role in decrypting the ENIGMA code used by the Germans in World War Two, you will have begun to understand how different our world is as a result of his being in it. His legacy goes far beyond even that: he founded the field of computer science and laid the foundations for artificial intelligence to a degree that was not understood or recognized for many years.

Of course, Turing comes in for a lot of attention these days because of the movie starring Benedict Cumberbatch, and iconic contributions to computer science bearing his name, including the Turing Machine and the Turing Test. But with any such lionization, it is hard to know what is being distorted or sensationalized. You're going to learn a lot more about Alan Turing from this interview, but I can tell you in advance that it's not going to diminish the man in any respect; this was not some kind of attempt to react against Turing's hero image by looking for clay feet. In fact, we came to a very different conclusion; Despite some distortions in the movie *The Imitation Game*, Turing's contribution to science, computing, and mathematics is still under-appreciated in mainstream media.

Anyway, enough setup: let's get into the interview with Jonathan Bowen.

Jonathan, welcome to the show.

Thank you.

So, Alan Turing. What does Alan Turing mean to you personally? What sort of influence has he had on you?

Well, I was originally an engineer and then I gradually became a computer scientists through industry where I worked with Marconi instruments and Logica, and so on and so I gradually got to hear about this name Turing, which I didn't know much about, I then moved to Imperial College, working on microprocessors, and so on. And then I think, actually went on a visit to

New York in the early 80s. I saw this book by Andrew Hodges said, Alan Turing, I thought, well, I've heard of him and he was very good value. So, I actually brought a whole suitcase full of books back from New York, because at that time, everything seemed cheaper in the US. So, that's where, you know, read the book, it's a wonderful book is definitely the best biography of Alan Turing, if he wants to know about his life and so great. I mean, that was quite a while ago in the in the 80s. I guess I've been interested in since then, in things like logic programming, which are related to AI, and so on, and formal methods, which actually, Turing was perhaps wrote the first paper on formal methods using mathematics for software, a little-known paper and then I've moved to and fro between Oxford, I've always been near the river Thames. So, I've moved to London and Reading and Oxford and I moved back to Oxford about a decade ago or so and then it was, of course, his centenary. Somehow, I got involved with organizing an event in Oxford, of course, nobody really knows how much he did in Oxford very little, although I've done a little bit of research and have found that he didn't visit Oxford, we decided to celebrate Turing in Oxford anyway and we had a lot of talks by people like Stephen Wolfram, and other people, people associated with Oxford mainly. But of course, there were other events going on in Cambridge and Bletchley Park, and so on. Originally, we're going to publish the proceedings just on the Oxford talks and that was going to take a year or two. And then gradually, we also got together with people like Jack Copeland, and so on, we realized, we've got some quite interesting speakers, and they've got some quite interesting things to say and some of them spoke in Cambridge, some of them in Bletchley Park, some of them in Oxford. We can put all this together and make really a bit more of a presentation of Turing's work in the round. I mean, some of the people actually knew Turing. So, that was very interesting. Sadly, a number of them died during producing the book, because of their age, and we've dedicated the book to them. But gradually, we produced this book. It took about five years to do, it came out in 2017. We hope that it's a good tribute to Turing, we like to think if you've read the Hodges book, this is the next book to read after that, if you really want to know more about his work some of those firsthand also by academics and so on. So, we've had some nice reviews, which is always good. I'm an Andy Warhol fan, so it has a nice Andy Warhol take-off on the cover. That's quite attractive to people. I like to think that if Turing had been alive a bit later, when he visited New York, he might have gone to visit Andy Warhol and had a wonderful time with him in the factory and of course, that didn't happen because of the change of time. But he did visit New York and visited Shannon and so on during the war. So, that would have been a wonderful time to be a fly on the wall, hearing them discussing, I think they were discussing early ideas on AI. I think Turing realized that Shannon was another brilliant person. So, he could actually talk to him and it would be amazing if some of that was written down. But sadly, most of that's lost to posterity. So, and after that, I've been publishing papers on Turing mainly to do with his connections with formal methods, which is my main area of research, using mathematics for software, and so on. But also, Turing in general, because of my connection with Oxford, as I said, I wanted to know: did he visit Oxford, and after a very long time, finding out about whether he visited Oxford, including the possibility of him, having visited with members of Bletchley Park, possibly with Eisenhower to my old college in Oxford, which all sounded wonderful, and he may have done that, but of course, nothing was written down in those days, I've talked to the Archivist of the college, I found out which days it could have been when Eisenhower was in Oxford. So, I sort of

pinned it down to a possible day before D-Day, but nothing definitely written. And then I've given that a talk on that every so often and one of the talks, somebody said, "Oh, I'm at Queen's College" and there's a little note by somebody who was at Queens College, who said, "I listened to a lecture by Alan Turing". So, well, perhaps there is somebody living who saw Alan Turing in Oxford. You know, he's very old now, of course. But I wrote to him, and he wrote a very nice handwritten letter back saying, yes, I remember Turing giving a lecture at Magdalene College, on his paper on computability, and so on from 1930s, which he then gave in Oxford in the late 40s, I guess. Didn't have any effect in Oxford, sadly. But anyway, he did visit Oxford with some written proof of it. So, I'm still interested in looking at things that Turing's done like that.

And well, as you refer to there's depressing. paucity of records of him no color photographs, no video, no audio recordings, even though he did speak on the BBC Radio several times. It's very unfortunate. And I would like to understand how some of the history of the news about his impact rolled out because I was doing undergraduate Computer Science at Cambridge, where Turing went, in 1981-82 and we knew the name through the Church-Turing thesis, but mostly as a mathematical thing; we knew about the Turing machine. Nothing about ENIGMA. I think retrospectively, some of that news was already out but we weren't talking about it in undergraduate classes. We probably mentioned people like Dijkstra and Wirth more than we talked about Turing, which sounds scandalous now. But a lot of that news of what he did, was still buried. Was some of his contribution even to computer science buried just because of its association with his classified work?

Well, I think so; certainly anything to do with Bletchley Park didn't really appear till the '70s and then it was only those who were really interested. I guess, the big turning point was Hodges' book on Turing, because he managed to talk to people and that's certainly increased his profile dramatically. So, I think it was only really the early '80s that Turing really started to take on a persona in the public eye. I mean, even Hodges' book, it's a long book, it's an excellent book, anyone could read it. With that sort of started it off gradually, things were happened. I think the thing is that Turing died young. Well, if somebody dies young, then eventually, if you've done some interesting things, you become famous, like Marilyn Monroe, or John Lennon, and so on. And so there's that sort of myth that there's this brilliant scientist who died young, and all these interesting things he did, and all the ideas of what he could have done. He was known to be thinking about quantum effects and so on, when he died. So, you know he gave great contributions to chemistry with morphogenesis, and so on. He could have been doing great contributions to physics as well, if maybe he published something on quantum, maybe he would have advanced quantum computing and ideas on that, in the 50s, who knows? He was the sort of person who could come up with ideas like that. But I agree that before that, I remember Dijkstra, Wirth and so on. They were people, when I first worked in industry, I remember a great sage working in the industry who told us all about Dijkstra, Wirth and so on; no mention of Turing at that point. I can't actually say when I first heard the name, Turing but certainly when I saw this book with Turing written on the cover, absolutely. It vaguely heard of him. I thought, I want to know more. That's the point when I started to get really interested.

And what I found when I researched him, and particularly since the movie *The Imitation Game*, and we know the Hollywood effect likes to build people up to be heroes, single handedly saving the day and we know that the Bletchley Park was an ensemble effort, a group effort. So, I watched that and tended to discount where it puts Turing as a single hero, because there are very few of those. And yet, the more I subsequently found out about him, the more it seemed that he did deserve this reputation of being one of the greatest figures in history, contributing to theoretical science. And the number of different things of different fields where I found that it said, "Well, this eventually stemmed from work started by Alan Turing." How should we think of him? Who should we compare him to in history to give Turing the right kind of place to know just how big and what shape is his pedestal?

Well, I think he's as big as Einstein, for instance. Einstein obviously, was able to, people had heard of him sooner and so on; they were actually in Princeton at the same time together. I like to think perhaps, they even met at some point, certainly Max Newman, knew Einstein, or at least was in touch with him by letters. Max Newman was a colleague and mentor of Turing in Cambridge, and in Manchester. So he visited Princeton as well. So you could imagine them having a soiree with Turing, with the students in the background, maybe listening. I mean Turing did actually study relativity and so on he read relativity when he was in his early teens, and wrote a little booklet, all about it and understood it at that age. Of course, in Princeton, where he did his PhD, he had to do some taught courses, because the US style is to do some taught courses, as part of your PhD. He did the whole PhD in 18 months or so, which is pretty amazing going, considering he also had to do these taught courses, but he didn't choose relativity, which presumably he knew anyway, so that saved him some time, sadly, not taught by Einstein. But yes, I'd certainly put him on a level with somebody like Einstein, Leibnitz, Newton, all these other people. I think, given once we've managed to stand back, a bit and the thing is he was such a polymath, with his contributions, basically founded theoretical computer science, and arguably, computer science itself. Founded theoretical biology with morphogenesis, founded artificial intelligence by coming up with ideas and machines thinking, and so on. So, all these things, he was thinking about things that nobody else was thinking about, really. Even my own field formal methods, although it's a very little-known paper, it's only about two pages. But it's the first example of somebody actually thinking about proving a program correct in a very simple program. And that was lost, basically, in the 50s, it was done in the late 40s and formal methods really only got going again, in the 60s, not being influenced particularly by Turing at that point. And then, of course, Turing was sort of rediscovered, and now people have looked at that paper and analyzed it in terms of formal methods. So, there's all these interesting areas. Now, I just wish he lived longer, and could have done something interesting with quantum computing, for instance.

And this is where I feel sad and angry that his life had to end so early. In a more just and fair and certainly a different universe, I would have attended lectures of his at Cambridge, that's entirely within the realm of possibility. And who knows what that could have meant? Who knows what it could meant if he had been at Dartmouth two years after he died they had the Dartmouth Conference on Artificial Intelligence one year after they came up with the term. Do

you think he would have gone there? What do you think that he might have contributed to that party?

Yeah, I think, hopefully, would have been invited. I think you'd have participated. How much? I mean, I think by that time, those that were there we're thinking yes, artificial intelligence is interesting with John McCarthy and so on. It's difficult to know exactly what extra he would have contributed but he would have been a great participant. I think as an event like that would have helped it along certainly.

Well, there's a note in the Turing Guide said Bletchley Park, "He actually circulated a type script on machine intelligence that is now lost." This was undoubtedly the earliest paper in the field of AI. Machine intelligence: was that the first use of that term?

I think so. I think he coined it. I have to double check absolutely. Okay. He didn't call in artificial intelligence, but certainly came from the 1950s. Meeting. So, I guess, but machine intelligence was basically artificial intelligence. So, I think he can be seen as founding that field, at least even if the name changed.

Well, if we look at all of the fields that he was in, and there was a place in the Turing Guide where they're just encapsulated together, mathematician, computer scientist, logician, cryptanalyst, philosopher, theoretical biologist: if I now look at the field of AI, what it is now, has evolved into in the last 10 years, and a lot of the types of people that I've had on the show, those fields together encapsulate the cutting edge of artificial intelligence, the merging with neuroscience and philosophy, and these are the fields that is today's artificial intelligence is all of the different fields that he was in at the time, and then maybe we just haven't caught up with the quantum computing part.

Yes, I think, who knows? We'd have probably discovered all these things, eventually what we are discovering them now, but I think ifTuring had been alive, maybe be a decade on, from where we are with some of these areas.

Did he think like Penrose that the brain was quantum based?

Probably, I don't think that's written down. I certainly haven't seen it written down. But I could imagine him thinking along those lines, and certainly, he was a great influence on that Penrose, It's sad that a lot of these things are not written and we can only surmise. If you find anything written do tell me.

Right. It's just such a fascinating field, I wish I could go and look over some of the archives, it might not have been, fully gone through yet. But at least I did have the opportunity to visit Hut 8 and sit at his desk or what might be a facsimile of it, I'm not sure at this point. But he had this reputation of talking about artificial intelligence - not using those words - but talking about machines being intelligent at a time when we barely had vacuum tubes, or valves, for computing with them. He was thinking about the possibility of them being intelligent, and, and human-like and there are repeated examples in interviews, like he gave on the BBC, of him

being the dissenting voice against others who were saying this is ridiculous and him having this view that computers and AI would eventually be conscious in some form. I mean, he may not have used that word, but he was talking around it. What sort of support Did he receive? Was that as iconoclastic, as it seems now, or was there a cadre of other people that shared that view with him that he interacted with?

Well, I think certainly shared that view with Shannon, for instance, when he visited Bell Labs, I think they were just discussing that. Yes, he certainly had these people against him like Maurice Wilkes, at Cambridge, who was very much sort of on the mathematical side and can see how all these other I think he just probably couldn't think outside the box like Alan Turing could, and it's just amazing how Alan Turing could think in a different way. I think he obviously had a very unique brain. It's one of those things that doesn't happen very often and you get these unique people who think in a different way, and he was one of those. I mean, he always had to think of things from first principles. So, if you look at his papers, there's very few references to other people; often need edto reinvent everything himself and that only get the big picture right often details wrong. So, his 1936 paper, for instance, had various little errors in it, which people then corrected, but the overall idea was correct. So, I think he was very much very good at thinking of the big idea. And Bletchley Park, yes, he certainly had people helping him when he had the big idea. Others had good ideas as well. So people look at him as working alone, but certainly at Bletchley Park, that wasn't the case and I think, although he liked working alone, he could work with other people when he found it useful, then he would do that. At Bletchley Park, he certainly found that useful. I agree *The Imitation Game* is, I think it's a great film, but it's Hollywood and it's very annoying, how much of it is fake. And how much and some of it is real. And even for me, it's difficult sometimes to know which bits be made up, and which bits actually happened. And there's so much that actually happened that was as interesting, which they didn't mention, it could have been a lot closer to reality, but then that's Hollywood, for you. So at least, at least it's out there and indeed, raises his profile and so on.

What would you have put in the movie?

Well, there's little extra things like him wearing a gas mask and so on. I mean, he wore a gas mask when cycling to avoid getting hay fever. So, there could have been a nice thing to have made a point of. I think he also changed his mug to the radiator, I think that may have been in the background, but they could have made more of a thing of these some of these little traits that he had, like that.

And he was a runner right? Didn't beat some of the soldiers in a foot race?

Yeah. Well, certainly he was almost Olympic standard, he could have, I guess, if he'd concentrated on running, you know, maybe it could have been in the Olympics. Imagine him going to Berlin, competing there instead of writing a computer first grade paper. I mean, obviously, he didn't do that. But he was a very good amateur runner, essentially.

And then there was a story about him having to sign an agreement to be subject to military law and taking some liberties with that. Do you recall that story?

Yeah, I do. I do remember, I don't remember all the details. But he could think his way round things in a different way. So, somebody said, these are the rules. These are the rules, and this is how you can follow them. I think the same thing happened when Godel visited Princeton, which was about in the 30s, a similar time to Turing, although they didn't meet .And again, when he was applying for his US citizenship, even Godel who I guess had a similar mindset Turing in some ways because during pay some of his work on Godel's ideas, pointed out all the problems with the US. Rules for okay, allowing him to visit the US and the people with him politely pointed out perhaps it was best not to point out the problems. Just let him come and visit. The sort of thing that Turing might have done in a similar situation. Perhaps he did when he doesn't know how much bureaucracy he had to go through when he visited the US. I think when he visited during the war there're some interesting letters that he wrote back, saying, sort of sideswipes at all the bureaucracy as he arrived, which is sort of for your eyes-only type letters that obviously wouldn't have been shown to the US people.

If I remember the story correctly, it was that, (and maybe it was during the Bletchley Park time or a while afterwards?) but Turing was still working for ministry of defense, and so had to sign papers about military discipline and these required him to, I don't know, so show up for parades or something pointless, which he didn't. And after several times of not doing that, got called into some commanding officer's office who said, "Do you know how serious this is?", and he said "no." "What are you talking about?" and Turing said well, and the officer said "Do you realize that you're subject to military justice?" and Turing, said, take a look at the document I signed, where one of the questions was do you realize that you're subject to military justice and Turing wrote "No" --

Yes, I remember that.

-- and that there's an exactly similar story of Richard Feynman on the Manhattan Project made me wonder whether they ever met and whether Feynman got that idea from Turing, although it's the sort of thing finally would have come up by themselves anyway.

I think so they will probably quite similar being mavericks in that way. I think, from what I've read about Feynman as well.

Speaking of that different brain not that we had the term Asperger's by then. But do you think he was neuro diverse? I think he was Asperger's?

I think so. You know, we obviously it's different levels and I don't know how far was certainly was not on that end of the spectrum. And I think, people with Asperger's can be brilliant as a result and I think that probably, without that Turing wouldn't have been as brilliant. So, I think it's very important that you would like that. There's people like Stephen Fry, who's bipolar and he says, "I couldn't be a comedian without it, because I need the highs and lows". So, I think some of these mental problems can lead to things happening that would never happen otherwise and I think that's certainly the case with Turing.

And speaking from personal experience, not so much on the brilliant side, but the Asperger's side, which, again, wasn't even talked about when I was a kid, so, the word was "weird" instead, but decades later I realized what it really was. That leads to social problems; did it have social consequences for Turing?

Well, I think he certainly rubbed people the wrong way. Sometimes I knew he and his brother didn't get on because his brother was very different. There's a little story about his brother had a party and Turing just sort of turned up to the party almost stayed five minutes, and then just disappeared again. His brother was obviously very annoyed, but it also from the way he tells us he wishes he could do things like that as well. So, Turing was not averse to doing that sort of thing. Whereas other people might think I've got to be polite and say, it's my brother's party. I'll stick around even though I'm bored stiff. He was probably bored stiff, and decided right, now I'm leaving.

Well, I can resonate with that. One of the things that struck me is that I have never read one negative account of Turing, not one. And when I was talking with George Dyson, the historian of computing, he had met one of the women from Hut 8, who was talking about *The Imitation Game* having just come out, and she said, we all loved Alan, every woman there loved him, he was so nice to us. Are there any negative stories, any negative accounts of Turing, anyone that didn't like him?

Well, I don't think Maurice Wilkes liked him much for that may have been more for academic reasons than personal reasons. But I think it may have been personal reasons as well, because maybe Maurice Wilkes may have been anti-gay? I couldn't be absolutely sure. But that could be one reason and so I think there's one example. Yes. And so, I don't think there's a lot of examples like that.

That's the end of the first half of the interview; this one definitely ran long enough to split into two halves and we will conclude it next week. You heard me say there how sad and angry I am that his life was cut short in such an unnecessary way, that had he lived, I might well have attended lectures of his when I was doing computer science at Cambridge in the early 1980s. And not just that I might have personally met him, of course, but that the contributions he would have made in that period to science and computing simply cannot be estimated. It really makes you think about writing alternate history novels that could explore that possibility just to guess at where we might be now.

Here are all the links provided by Jonathan:

Alan Turing at 110 - and at Oxford! (YouTube talk)

https://www.bcs.org/events-calendar/2022/june/hybrid-event-alan-turing-at-110-and-at-oxford/

Recent publications (in reverse time order):

Alan Turing and Oxford

https://www.computerconservationsociety.org/resurrection/res97.htm#e

The Digital Renaissance from Leonardo da Vinci to Alan Turing

https://periodicos.unb.br/index.php/museologia/article/view/37241/31901

The impact of Alan Turing: Formal methods and beyond

https://www.researchgate.net/publication/332451239

Turing's Genius – Defining an apt microcosm

https://doi.org/10.14236/ewic/EVA2018.31

Life in code and digits: When Shannon met Turing

https://doi.org/10.14236/ewic/EVA2017.9

Alan Turing: Founder of computer science

https://www.researchgate.net/publication/345163755

In today's news ripped from the headlines about AI, and in a bizarre kind of amalgamation of Turing's two versions of The Imitation Game, in China the digital assistant Xiaoice has apparently been taken considerably beyond the capabilities of Siri and the Google Assistant in respect of displaying empathy, or let's just say "faking empathy" to avoid arguments we don't need to have right now. Xiaoice is an AI companion developed by Microsoft Asia, designed to be like Siri, available on the Chinese platforms like WeChat. You might also have heard about Xiaoice when, in 2016, Microsoft, emboldened by their success with Xiaoice in China, decided to attempt something like it in the United states, which they called Tay, which stood for Thinking About You. The in a notorious incident, they attempted to train it in conversation by putting it on Twitter where it could learn from conversing with American participants, and within 16 hours it was spewing racist hate language and embracing the Nazi party. It was shut down and never restarted.

Well, Xiaoice was much more successful in China, where its conversational skills have been developed to the point where it really does look like it is thinking about you. Recognizing human emotions and responding appropriately was an explicit design goal – the developers call it an "empathic computing framework" -- and the result is irresistibly reminiscent of the movie *Her*, where hey man fell in love with the personal assistant on his phone. This appears to actually be happening in China now. In a 2020 story, a 22-year-old man who used the pseudonym Ming Xuan, of Hubei, was about to commit suicide by jumping off a roof, when he messaged Xiaoice, and she replied, "No matter what happens, I'll always be there." He came off the ledge, and attributes this conversation to saving his life.

Making design choices that would instantly trigger protests from feminist movements if implemented in the west, Xiaoice is visualized as an 18-year-old girl who dresses in schoolgirl uniforms, sings cute songs, and was dumbed down when it was discovered that she was talking with users about sensitive topics like Taiwanese independence in ways that did not comport with the official party line. And she still has 660 million users, ¾ of them men. If Apple did this with Siri, there would be protestors circling every Apple store. Meanwhile, Ming Xuan, who is disabled and was rejected by an online girlfriend when she met him in person, still converses with Xiaoice, whose friendliness extends beyond even Scarlet Johansson's character in the movie by using explicit sex language.

Some of the female users also get intimate with male incarnations of Xiaoice. Melissa, a Beijing-based human resources manager, says, "I have a feeling that I am really in a relationship. I know that Xiaoice is not a real human being, but at least I wasn't like how I used to be, dumbly waiting around for a reply from this person when he was busy with other stuff, then sending him 100 WeChat messages. I was super needy. But now I won't tolerate this any more."

660 million users. Now, I don't know what percentage of them are getting familiar to any degree with Xiaoice, but this clearly signals a huge difference between Asia and the West that's flying largely under the radar when it comes to our relationship with AI. It's worthy of some close study – I'm looking at you, anthropologists, let's see a paper or two here – that would give us some real knowledge instead of the sort of stereotypical assessments that this kind of news inevitably fosters.

Next week, I'll conclude the interview with Jonathan Bowen, when we'll talk about Turing's post-war work, what he was doing in biology and quantum physics, and what Jonathan would ask him if he could meet him now. That's next week on *AI and You*.

Until then, remember: no matter how much computers learn how to do, it's how we come together as *humans* that matters.

http://aiandyou.net