

Human consciousness is the great unsolved puzzle in biology. How can we make artificial intelligence?

The year is 2019, but the unanswered question lingering in the fog that lies between science and fiction is not 'when?' but 'where?'. Where are we now? Where do we intend to go? Where do we find answers? The so-called robot revolution has taken the world by storm, with recent advances in AI technology now being responsible for monitoring crops to illustrate changes in agricultural land, allowing the sequencing of DNA to occur in a day (a process which took over a decade when it was first done) and delivering the prospect of personalized medicine to a future generation of medics. However, the inevitable truth of scientific discovery has always been and will always be that more questions are asked than answered.

I've been teaching myself to code through various resources such as online courses and YouTube videos. When starting out, my first goal was to get an output of 'Hello World' on my computer screen. As well as being the traditional first step in learning a coding language, it is also a simple way of making sure that your development environment - a collection of procedures and tools for developing a program (Techopedia, n.d.) - is working as it should. For reasons beyond my understanding at the time, mine wasn't. I'd type in all the colons, commas and make sure to use the right brackets but somehow, the output wouldn't be representative of the input. Eventually, I'd realise my mistake. Usually a tab I'd forgotten to insert, or a closed bracket that had been missed. The point is, upon realising my mistake, it was always very clear why the outcome I had been hoping for wasn't reached - because, as I have since been told by various teachers and internet experts, the computer always does what you tell it to do. However, matters of the mind tend to be a lot more complex than a missing colon or an extra tab. Despite centuries of effort to further understand the human brain and an array of scanners and medical devices that should have lessened said effort, there is still an unimaginable amount that we don't know.

But why? Why is human consciousness the great unsolved puzzle in biology? Surely if the mind is a 'neural computer' as described in 'How the Mind Works' (Pinker, 1997), then it can be decoded... Philosophers use the term 'qualia' to refer to the introspectively accessible aspects of our mental lives (Stanford Encyclopaedia of Philosophy, 1997) or a description of a subjective experience e.g. the experience of tasting a certain food (The Chopra Well, 2012), however many modern analytic philosophers of mind choose either to deny that qualia exist, or argue that they can never be meaningfully studied by science. In his article for Scientific American (2018), Christoff Koch described how

'Francis Crick and I [he] decided to set aside philosophical discussions on consciousness (which have engaged scholars since at least the time of Aristotle) and instead search for its physical footprints'.

In an attempt to locate these 'physical footprints', cerebellar patients have been observed after surgery in order to determine whether loss of parts of the cerebellum is likely to have any effect on consciousness. While these patients may experience hearing loss, numbness, or problems with memory, it has been concluded that the cerebellum has no link to the conscious experience of the individual. This revelation forced scientists to continue their search elsewhere, turning to other parts of the brain for an answer to the question of where consciousness can be found - Scientists from the University of Wisconsin-Madison have identified a "hot zone" of electrical activity in the brain that indicates dreaming. Stimulating the posterior hot zone can trigger a number of distinct sensations and feelings - flashes of

light, geometric shapes, hallucinations, a feeling of familiarity or unreality (Scientific American, 2018). It is these peculiar effects that have given researchers reason to believe that almost all conscious experiences have their origin within the posterior cortex.

After centuries of research and enquiry, we now have some idea of where consciousness is located in the brain and what it might be, but we still don't know how it works. Even if we did, how would we even begin to apply such knowledge to the development of artificial intelligence mechanisms and how would we go about combatting some of the ethical issues surrounding them?

The English mathematician, computer scientist and philosopher Alan Turing devised the Turing Test as a way of measuring a computer's ability to exhibit intelligent behaviour equivalent to or indistinguishable from that of a human. Though there have been debates over whether or not passing the Turing test would represent a meaningful breakthrough, it can't be denied that what has been achieved with Google Duplex is worth celebrating, or at the very least deserves a figurative pat on the back. At I/O 2018, Google presented a new digital assistant capability designed to improve your life by making simple boring phone calls on your behalf. Audio clips from the event show the AI being demonstrated, by having Google Duplex make a hairdressing appointment, and book a table at a restaurant. Arguably, based on these audio clips, Google passed the Turing Test, as the employees on the other end of the phone were completely unaware that it was not a person they were speaking to.

While many of the comments on that clip (Mashable Deals, 2018) were in praise of Google's ground-breaking achievement, one comment in particular caught my attention. That comment read 'There goes every phone support ever' and the 1,000 likes that the comment received suggested to me that there are many others who agree. The comment sparked a debate that addressed an infamous issue – fear of AI taking all of our jobs. Articles such as 'Robot automation will 'take 800 million jobs by 2030' (BBC, 2017) haven't exactly helped to put people at ease. The study of 46 countries and 800 occupations by the McKinsey Global Institute found that up to one-fifth of the global work force will be affected. It also said one-third of the workforce in richer nations like Germany and the US may need to retrain for other jobs. It is undeniable that a number of automated jobs will be lost to AI. But maybe that isn't such a bad thing.

We can only hope that this will enable people to find meaning in non-labour activities, exploring different ways of contributing to society and making a living – giving millions of people across hundreds of different professions the chance to collaborate to find better answers to the questions 'Where do we go from here? How do we improve AI?'. AI is still very limited in its capability- it is more technically feasible to automate predictable physical activities such as welding on an assembly line and packaging objects, than unpredictable physical activities like construction and forestry. Perhaps this shift would force people to seek potentially more fulfilling jobs that AI is in no hurry to replace. Perhaps the prospect of an AI driven society isn't anywhere near as ominous or threatening as movies tend to make it seem.

I would like to return to the question of why human consciousness is the great unsolved puzzle in biology. Yes, the human mind is very complex. Yes, the human brain is very difficult to study- a prod or a poke in the wrong place could permanently impair a patient's speech, vision or memory. But I believe there is an underlying factor that is making this quest for knowledge even more difficult than it needs to be. As displayed in the quote I included from Koch's article for Scientific American, there is a significant lack in our ability to look at things from a multidisciplinary point of view. Koch talked of how to 'set aside philosophical discussions' in order to come to an answer, but it appears that he failed to

consider that collaboration could be the key. Rather than dealing with issues in isolation, combining philosophical, social, economic and scientific research could reveal answers we already have, but failed to recognise before.

In creating AI, we would not be creating consciousness. As with Google Duplex, developing and fine-tuning Artificial Intelligence is about putting research into natural language understanding, deep-learning, text-to-speech. It's about mimicking human behaviour. In the same way that a baby can absorb a new language by copying sounds, then learning words, without knowing what it means to conjugate a verb or understanding the concept of phonetics, it is more than possible to develop AI without fully understanding the nature of human consciousness. Computers only ever do what they are told to do, so if we're going to try and make computers appear to act "more human", we'll need to act more like computers; be concise, be versatile, be resourceful. It's about time we left the automation to the professionals and started allowing ourselves room to be a bit more creative in a field where most people may not expect it.

Reference List

Techopedia, (n.d.). Retrieved from <https://www.techopedia.com/definition/16376/development-environment> [Accessed 17th January 2019]

The Chopra Well. (2012) What are Qualia? Ask Deepak Chopra! [Video] Available from: <https://www.youtube.com/watch?v=sCglvcsC9Ss> [Accessed 17th January 2019]

Scientific American. (2018) *What is Consciousness?* Available from: <https://www.scientificamerican.com/article/what-is-consciousness/> [Accessed 13th January 2019]

BMA. (2018) *Autonomy or self determination*. Available from: <https://www.bma.org.uk/advice/employment/ethics/medical-students-ethics-toolkit/2-autonomy-or-self-determination> [Accessed 25th January 2019]

Business and Human Rights Resource Centre. (2019) *Commentary: Can we make artificial intelligence ethical?* <https://www.business-humanrights.org/en/commentary-can-we-make-artificial-intelligence-ethical> [Accessed 27th January 2019]

Mashable Deals. (2018) *Google's AI Assistant Can Now Make Real Phone Calls*. [Video] Available from: https://www.youtube.com/watch?v=JvbHu_bVa_g [Accessed 27th January 2019]

Extreme Tech. (2018) *Did Google's Duplex AI Demo Just Pass the Turing Test?* Available from: <https://www.extremetech.com/computing/269030-did-google-duplexs-ai-demonstration-just-pass-the-turing-test> [Accessed 27th January 2019]