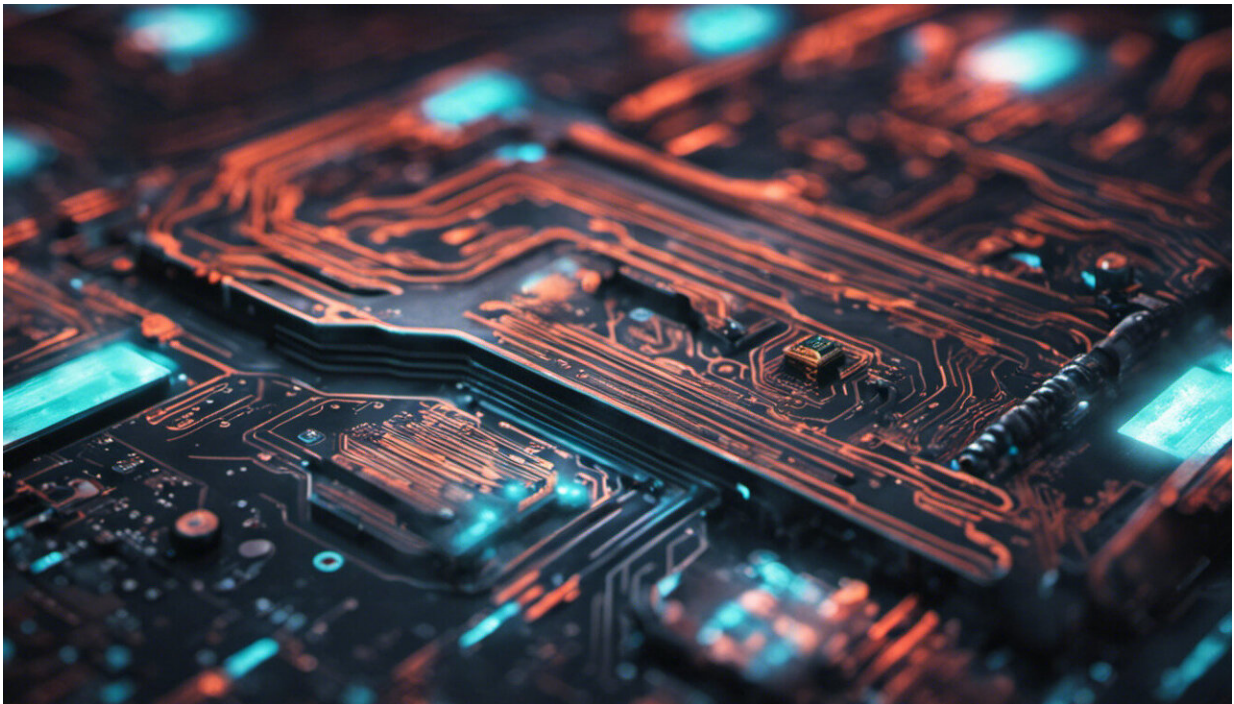


How uploading our minds to a computer might become possible

June 27 2023, by Angela Thornton



Credit: AI-generated image ([disclaimer](#))

The idea that our mind could live on in another form after our physical body dies has been a recurring theme in science fiction [since the 1950s](#). Recent television series such as "Black Mirror" and "Upload," as well as some games, demonstrate our continued fascination with this idea. The concept is known as mind uploading.

Recent developments in science and technology are taking us closer to a time when [mind](#) uploading could graduate from [science fiction](#) to reality.

In 2016, BBC Horizon screened a program called "[The Immortalist](#)," in which a Russian millionaire unveiled his plans to work with neuroscientists, robot builders and other experts to create technology that would allow us to upload our minds to a computer in order to live forever.

At the time, he confidently predicted that this would be achieved by 2045. This seems unlikely, but we are making small but significant steps towards a better understanding of the human brain—and potentially the ability to emulate, or reproduce, it.

Whole-brain emulation is one potential route to mind uploading. Detailed scans of the brain and its activity would allow us to reproduce a person's biological brain, and potentially mind, in a computer.

Several approaches

The most promising technique is "scan and copy", where the structure of a preserved brain would be scanned in detail, using, for example, the technique of electron microscopy. This would gather the [data needed to produce](#) a working [copy of a brain](#).

So, how likely is it that whole brain emulation, and potentially mind uploading, will be achieved? In a report published in 2008, researchers at the University of Oxford described whole brain emulation as a "[formidable engineering and research problem](#), yet one that appears to have a well-defined goal and could, it would seem, be achieved by extrapolations of current technology".

However, others are skeptical of the underlying assumptions and two key

tenets in particular. Central to the proposition of whole brain emulation is the separation of the mind from the body.

However, this is contentious, as many [believe](#) that the [brain is "embodied"](#) and functions as it does because of its [relationship to other parts of the body](#) and the environment [that we sense](#) and [interact with](#).

Mind uploading also assumes that the mind is an outcome of what the brain does. Our minds, and particularly consciousness, are often considered something greater and more ephemeral than a function of the biological brain.

This controversy means that the philosophical and scientific challenges of whole brain emulation and mind uploading are actively debated by academics, yet there is hardly any awareness among the public that this discussion is happening and is unresolved.

For my Ph.D. thesis, I have been exploring how aware the public are of mind uploading and what they think of the idea when they learn about it, such as whether they would like their minds uploaded into a computer or into another body and what the benefits and risks might be.

In the course of my study, I have used several [research methods](#) including longitudinal interviews—interviews with same subjects over several years—and a storytelling website that depicts two characters being uploaded.

Modifying the brain

Neurotechnology, or "[methods to directly record](#) or modify human brain activity", is rapidly advancing. Examples of neurotechnology such as brain-to-computer interfaces and an implantable device, Stentrode, made headlines earlier this year because they allowed severely paralyzed

patients to [control a computer by thinking](#) and to conduct online activities like shopping and sending emails.

Such developments, along with advances in artificial intelligence (AI), are allowing us to better decipher brain waves. In the future, they may well allow us to "write to" or modify the brain.

Consequently, we need to put guidelines and legislation in place to ensure that our human and neural rights are protected. This area, known as "neurorights", is a hot topic in academia at the moment.

No one knows for certain how long it might take to emulate the human brain. It could take 100 years, with mind uploading being another big leap. While this may seem a lifetime away, we need to remember how fast technology has advanced in the last decade.

For example, we first used [magnetic resonance](#) imaging (MRI) fifty years ago. However, earlier this year, a team of researchers led by Duke University [scanned a whole mouse brain](#) at the highest resolution ever — it was 64 million times sharper than before. At the moment, whole [brain](#) emulation and the possibility of mind uploading sits mainly in the scientific domain.

However, as we are already starting to see, such developments have the potential to transform what it means to be human and, as such, those outside the world of science should have a voice.

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