

INTEGRATED FUTURE(S)

BRAINWARE

Tech in and around the brain

Welcome to Integrated Future(s), IF.

IF is a weekly newsletter about the future of emerging technology and the impact on science, medicine and society. We'll look at how artificial intelligence, blockchain, quantum and neuromorphic computing, neurotech and more will integrate with each other and with **technoscience**, the technological infrastructure of science in our society.

This week we'll take a wide look at neurotech including but not limited to brain computer interfaces (BCI).

Neurotech is a term that does not have a tight definition but includes a variety of tech for looking at and interacting with and extending function of the brain.

Please remember that the map is not the territory.

- Sean

HOW AI IS ADVANCING NEUROTECH

<https://www.forbes.com/sites/cognitiveworld/2020/02/12/how-ai-is-advancing-neurotech/#4008cafe10ab>

Great overview of companies advancing the field of neurotech. A wonderful place to start the neurotech exploration.

VIDEO: NEUROTECH IMPLANT SHOWS POSITIVE SAFETY PROFILE

<https://www.healio.com/ophthalmology/glaucoma/news/online/%7Ba5a07c98-933c-4be5-a55e-a3c8fd311bac%7D/video-neurotech-implant-shows-positive-safety-profile>

Important to note that in some of the targeted applications, neurotech has already moved into the clinical trial phases.

THOUGHT TO ???

We think of things in tech as jumping from one medium to another (i.e. voice to text), often with an eye towards bypassing some legacy bottleneck (like typing). But at some stage with neurotech even brain to computer will become antiquated. We should keep this in mind (pun intended) as we consider the future of transmission and receiving of information. Certainly, there will still be need for tech augmented gathering of information from the environment and even transmission and storing of internally developed information (thoughts) into tech environments for analysis and storage. At some level, the core concept will become transmission and reception, sometimes augmented, of thoughts themselves. Eventually, brain computer interface to brain computer interface will be indistinguishable from telepathy.

ELON MUSK SAYS AN 'AWESOME' NEURALINK UPDATE IS COMING SOON

<https://www.cnet.com/news/elon-musk-says-an-awesome-neuralink-update-is-coming-soon/>

Besides taking electric cars to Mars, Elon Musk has also been busy in our inner space exploration with Neuralink.

DIY BRAIN COMPUTER INTERFACE KIT, ALLOWS YOU TO CONTROL THINGS WITH YOUR MIND

<https://www.geeky-gadgets.com/brain-computer-interface-kit-07-02-2020/>

You don't need to be a billionaire to get in on the fun of advancing how our brains and devices interact.

HACKING BRAIN-COMPUTER INTERFACES

<https://www.zdnet.com/article/hacking-brain-computer-interfaces/>

As with all things tech, there are dangers both from bad actors, as well as our own potential unintended biases.

ADVANCES IN HYBRID BRAIN-COMPUTER INTERFACES: PRINCIPLES, DESIGN, AND APPLICATIONS

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6800963/>

Identifying challenges in application and working out new hybrid solutions is critical to advancing the field.

ETHICAL ASPECTS OF BRAIN COMPUTER INTERFACES: A SCOPING REVIEW

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5680604/>

This isn't just about cool tech. For someone with paralysis or advanced ALS, these advances can be life changing. As always with tech and people, maybe even more so when they are integrating, ethics matter.

That's all this week. Please share. Questions/comments to seanmanion@sciencedistributed.com. Thanks for reading.

Sean T Manion PhD is a technoscientist with a focus on blockchain and other emerging tech, neuroscientist, former federal researcher/admin and bureauscientist. He is a Chief Editor at Frontiers' Blockchain for Science, a Fellow of the British Blockchain Association and co-author of the book [Blockchain for Medical Research: Accelerating Trust in Healthcare](#) with Yaël Bizouati-Kennedy (CRC Press, April 2020). He is currently performing the duties of self-appointed strategic planner for science.

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