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# Brain Machine Interface

Neuralink

Yohannis Telila - Mar 14



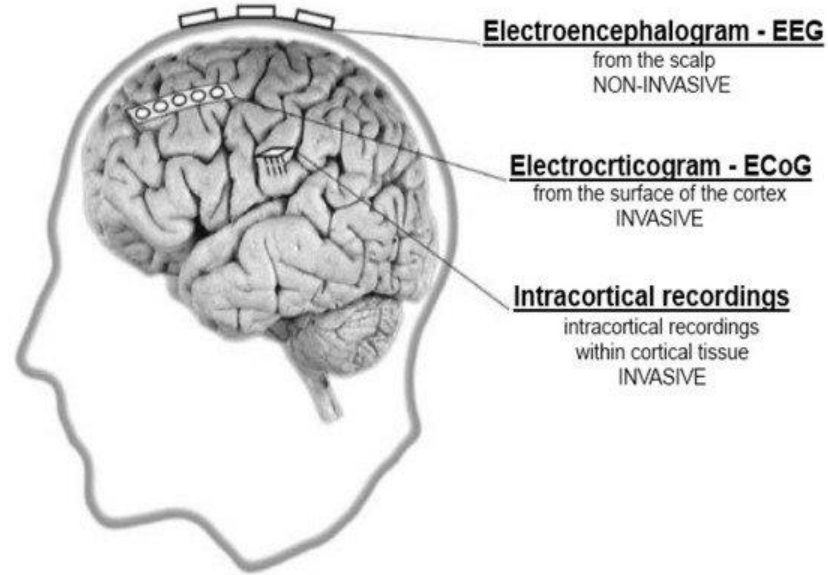


# Outline

- How the technology works?
- Benefits of the technology.
- Media.
- Ethical Issues.
- Opinion.

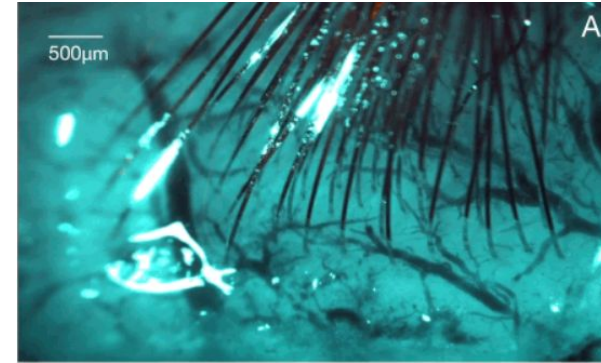
# BMI, how do they work?

- BMI are devices that acquires electrical brain waves using sensors from the brain and are connected to a computer that analysis and extract features from these data and translate them to useful commands.
- There are many BMI technologies.
  - ◆ Invasive and non-invasive



# Neuralink

- Is a company co-founded by Elon Musk and others in 2016.
- Developing flexible, scalable high bandwidth BMI system.
- They have built 3,072 electrodes per array distributed across 96 threads.
- Neurosurgical robot capable of inserting 6 threads (192 electrodes) per minute
- USB-C for full bandwidth data streaming



# Media Examples

- Science fiction is often a good or at least useful predictor of future technology.



ARKANGLE (BLACKMIRROR)



The Matrix

# Neuralink . . .



**maddog0516** 10 months ago

This is simply the most amazing thing I have ever seen in my life. I hope this technology is used only for good, but I am worried.

👍 163 🗨️ REPLY

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**Jeff Hall** 10 months ago

As a disabled person this fascinates me. The implications in prosthetics is amazing. As an anime fan and an avid gamer (though now limited a bit) I am excited. Just wondering how long until I can walk again in a venmo or use my mind to type when the nerves in my had won't work.

👍 3 🗨️ REPLY

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**Merlin Möller** 10 months ago

I nearly cried. I know this is just a first step, and there are still many steps to take, ... BUT I might be able to experience a world where we can fix almost any problem with the human body. I suffered a form of brain damage when I was born, due to lack of oxygen. Luckily it mainly affected the part of my brain that cares about motoric/ balance. I can barely walk stairs and only when I hold thight to the railing. I really hope to experience a day where I can get myself an "upgrade", like a chip that will fix my balance.

👍 1 🗨️ REPLY



# The benefits?

- Neuroprosthetics
  - Robotic arms, improve learning ..
- Cognitive enhancement.
  - The ability to improve or “upgrade” the brain.
- Enhanced memory
  - What if you could remember everything and google anything with a single thought.
- Brain-computer interfaces might also improve rehabilitation for people with strokes, head trauma, and other disorders.





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## Ethical Issues?

- Hacking.
- Who owns your thoughts?
- Who owns your brain?
- Similarly, who owns your Identity?
- Social Equity





# Opinion

- This is a technology that is potentially so transformative.
  - A future full of wonder and promise.
  - Could echo our worst nightmares if we're not careful.
- Even though advanced brain machine interfaces are still some way over the horizon, it's not too early to start thinking about what sort of future we want, and how we're going to get there.





# References

[Neuralink White paper](#)

[Wikipedia](#)

[Monkey Mindpong](#)



**Thank you!**