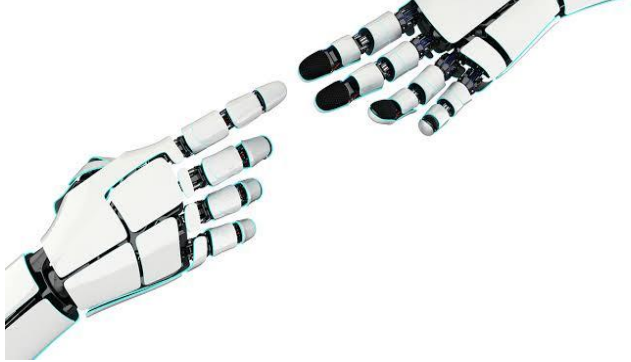
NEURALINK

"Linking Brain to computer"

Guided By
Aparna Ratheesh
AP, HCET

Presented by
Nandana J S
HCE17EC018

ABSTRACT



- Latest inventions of AI ease the usage of the devices.
- Emergence of AI increases insecurities among humans.
- This made people to think about how to make our future secure among Robots and AI.
- Solution - Mix both technologies and achieve symbiosis.
- Neuralink, vision is to cure the insecurities among us.

OVERVIEW

INTRODUCTION

- In 1943, McCarthy and Pills modelled a neural network with electrical signals.
- In 1957, Neumann suggested neuron functions by using relays and vaccum tubes
- Recently neural network is used to heal brainly disorders
- Neuralink- not just cure the patients but also connect them to digital devices.

NEURALINK

- Device surgically implant into our brain.
- Brain- machine interface (BMI) technology is used.
- Communicate with machines or even control.
- With Neuralink, N1 chipset is installed in skull.
- Chipset is 8mm diameter and has multiple wires having electrodes.
- Wire is as thick as neurons and thinner than strand of hair.

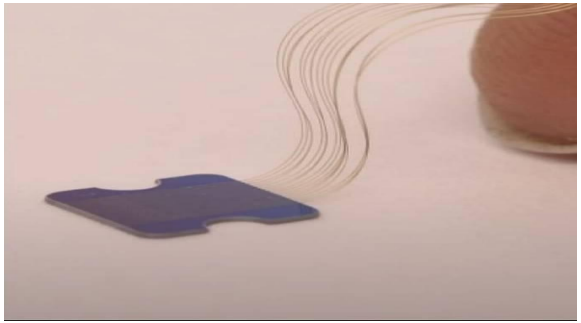


Fig1: The size of a Neurolink Chip compared to little finger of the hand

BMI- BLOCK DIAGRAM

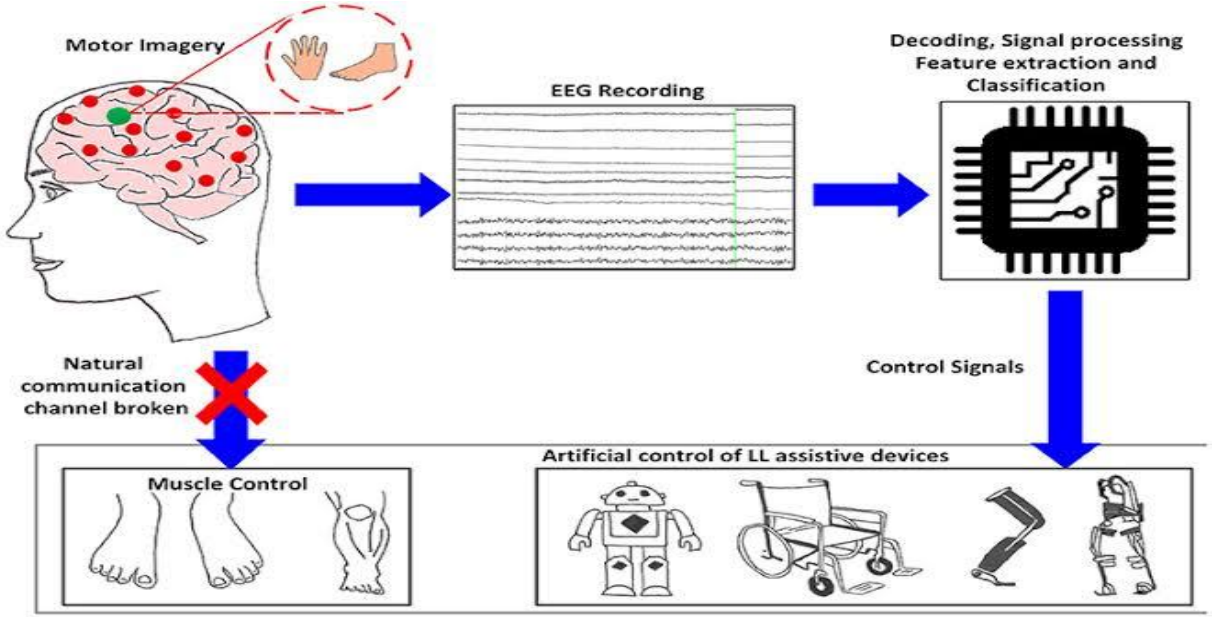


Fig2: Block Diagram of brain machine interface(BMI)

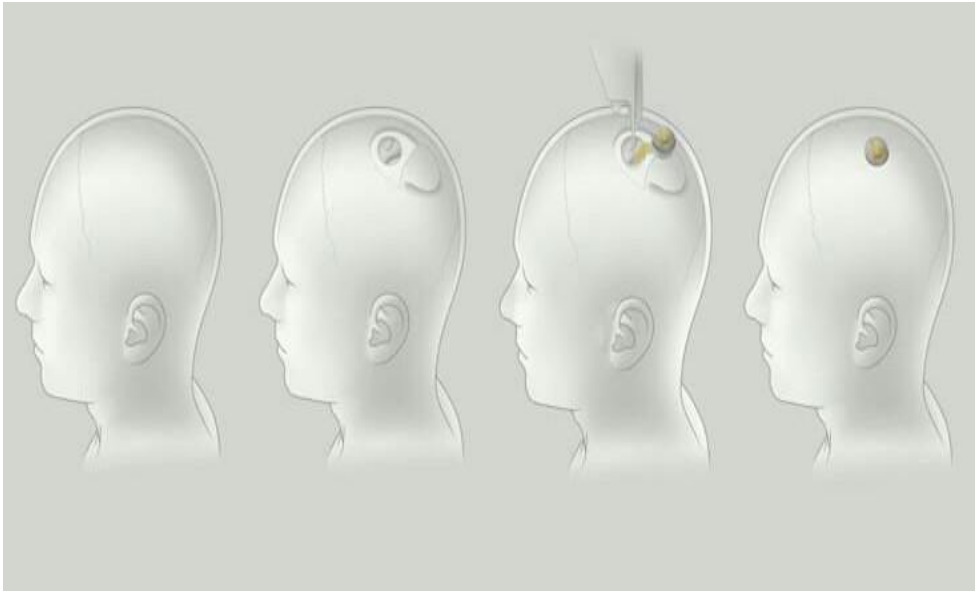
BLOCK-DIAGRAM EXPLANATION

- BMI provide communication between brain and objects.
- Brain constantly produce signals.
- When we think, cortex gets activated and can record signals using EEG.
- Feature of recorded signal vary according to intended movement.
- That is we can figure out which feature correspond to which action.
- This can be done by Machine Learning.
- So from the given EEG signal, we can figure out what movement represents.

HOW NEURALINK WORKS

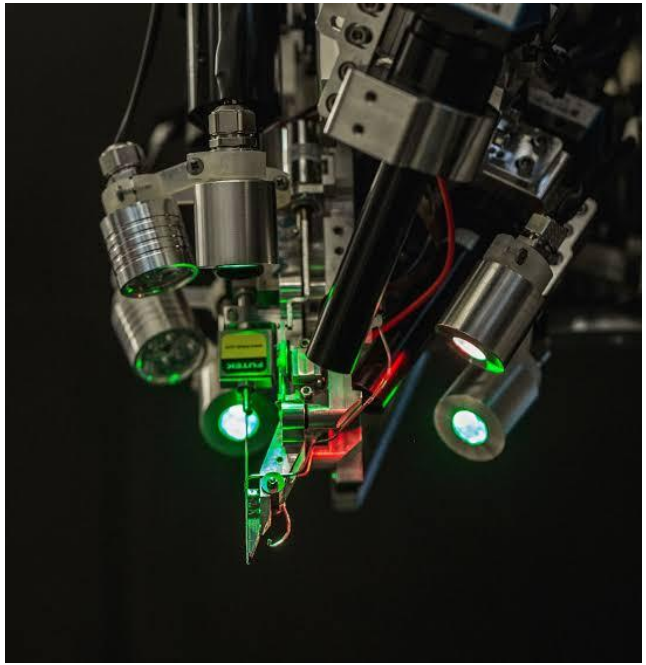
- Brain sent information to different parts using Neurons.
- It connects with each other and communicate using neurotransmitter.
- Generate electric field and record these reactions by placing electrode.
- Electrodes can read electric signal and translate into algorithm that machine can read.
- This way Neuralink can read what you are thinking.

HOW NEURALINK BE INSERTED



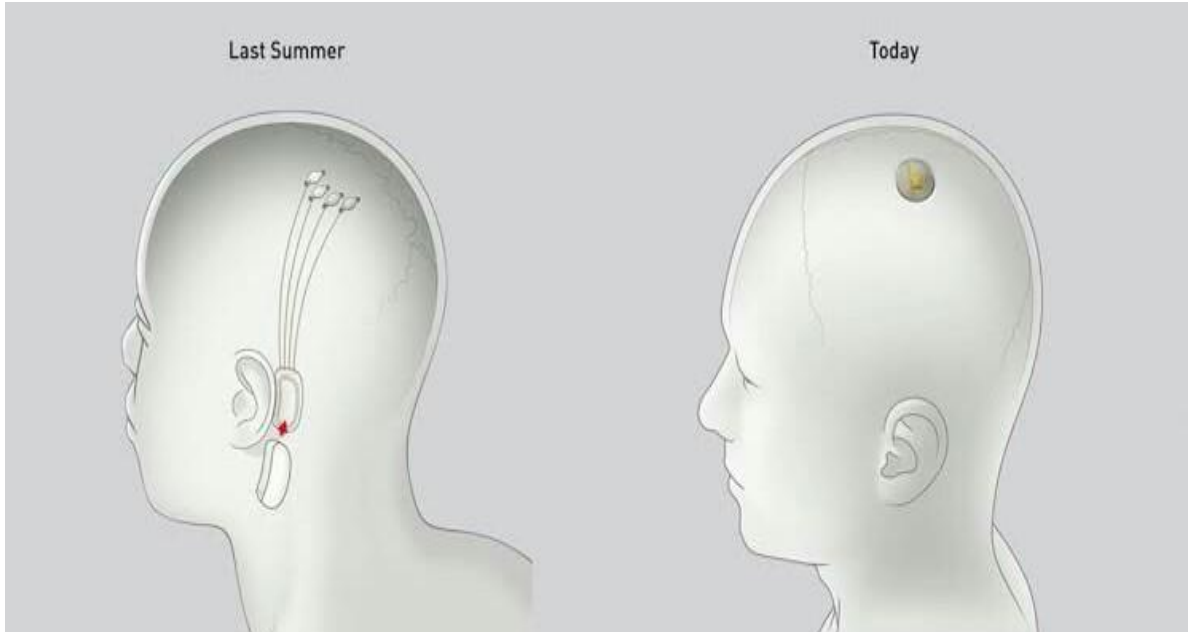
- A small incision is made in the skull and neuralink is inserted.
- Surgery is carried out by company designed robots.

SURGICAL ROBOTS

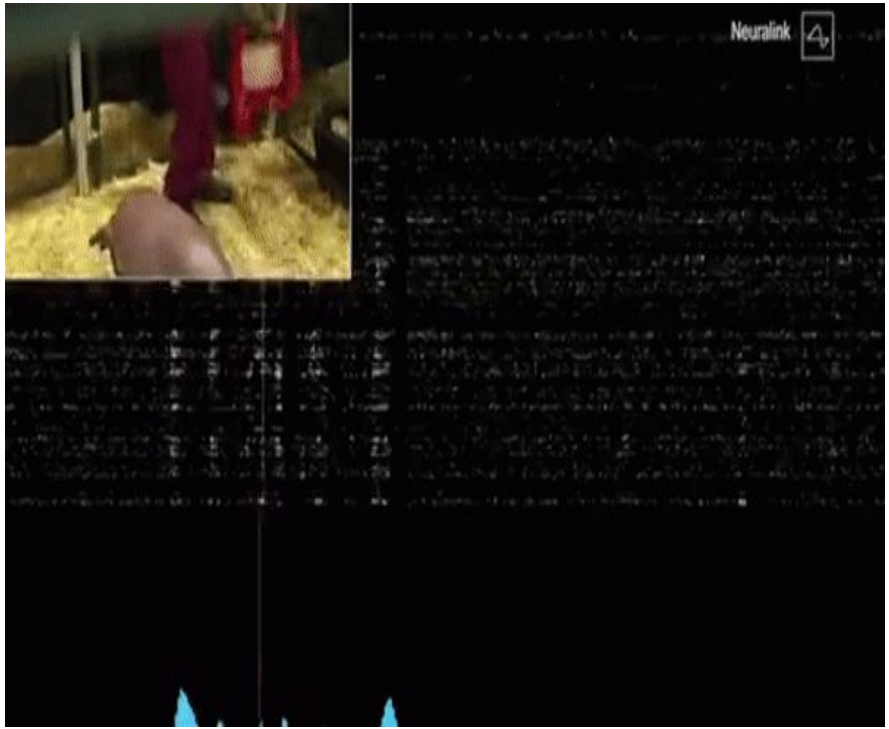


- Robots will insert module into your brain using microscope with needles of size 24 microns.
- Allow fast and reliable insertion of the wires.
- Needle can't be spoted with human eye.
- Robot has 4 stereoscopic cameras which are focused on the needle.
- Installation process will be carried out within an hour.

NEURALINK ARCHITECTURE



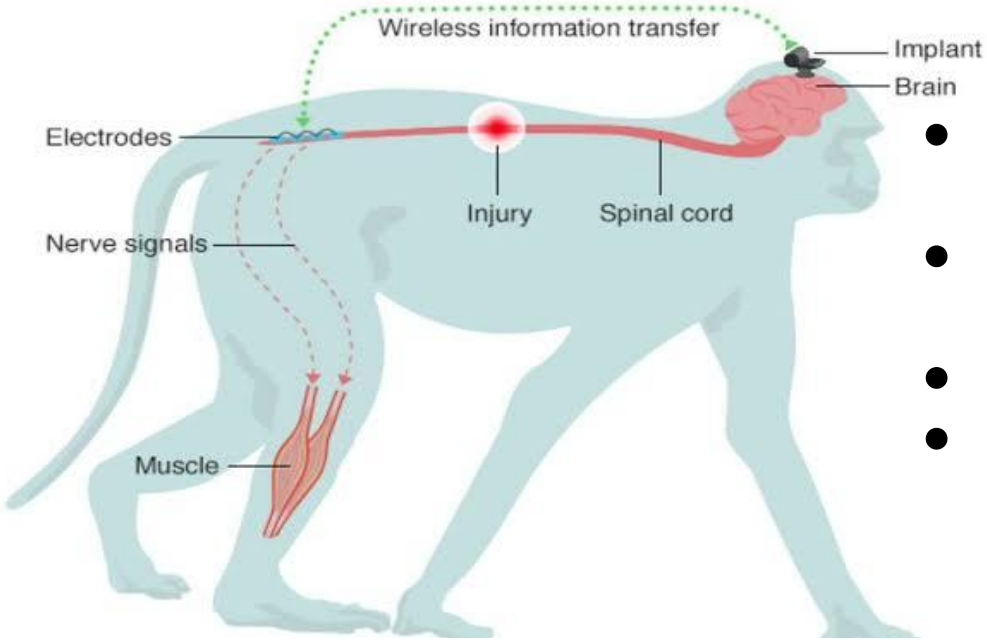
PIG DEMONSTRATION



Live demonstration :-

- Case 1- Neural link on a pig showing nerve activities as signals.
- Case 2- shows a pig still function normally after removal of neural link before two months.

REAL-LIFE EXAMPLES



- Here is a monkey paralyzed due to spinal cord injury(damage)
- Injury blocks the electric signals from brain to other body parts
- After chip implantation.
- Reads spikes of signal activity and coordinates nerve stimulations.

REAL-LIFE EXAMPLES

- 2009, Evotic released a headset, EPOC.
- Allows user to play video game using brainwave.

- 2012, g-tec introduced 1st commercial available BCI system.
- To control apps and games.

ADVANTAGES

- Cure paralysis.
- Control robots with your thoughts.
- Threat mental illness.
- Extend the range of hearing.
- Provide a visual prosthesis for people who have retinal injury or blindness.

DISADVANTAGES

With every innovation there has always been downstreams

- Need regular upgrades
- Can hack brain

CONCLUSION

- Neuralink is a device that enable the human brain to keep the pace with AI.
- Technology is young at this stage.
- To implant a wireless Brain to machine interface.
- Neuralink have to cross lot of bureaucratic, ethical huddles.
- Accomplish what they claim, significant technology in human history.

FUTURE ENHANCEMENT

- Telepathic communication could become a reality.
- Future scope of brain activity monitoring.
- Unlock hidden creativity.
- New level of communication and networking.

WOULD YOU HESITATE TO GET A NEURALINK IMPLANT!

REFERENCES

[1] Abhinav Kulshreshtha; Abhineet Anand, "*Elon-Musk startup achieve symbiosis with AI*", *2019* International Conference on Computing, Communication, and Intelligent Systems (ICCCIS)

[2]Tal Dadia & Dov Greenbaum; *"Neuralink: The Ethical 'Rithmatic of Reading and Writing to the Brain"* Vol 10, issue 4(2019)

[3] Elon-Musk, Neuralink; "*An integrated Brain inference platform- Elon-Musk with thousands of channels", Vol 21, No 10(2019 oct).*

[4] Neuralink (2019, july,16); *Neuralink launch Event,* US, Presentation.

REFERENCES

[5]Tim Urban(2017,04,20). “*Neuralink and the Brain Magical Future”,* edition(1)

[6] Malcolm Gay(2015). “*The Brain Electric: The Dramatic High-Tech Race to Merge Minds and Machines”,* edition(9)

Thanks!

Does **anyone** have any questions?

iamnandanajs@gmail.com