BRAIN WAVE TECHNOLOGY

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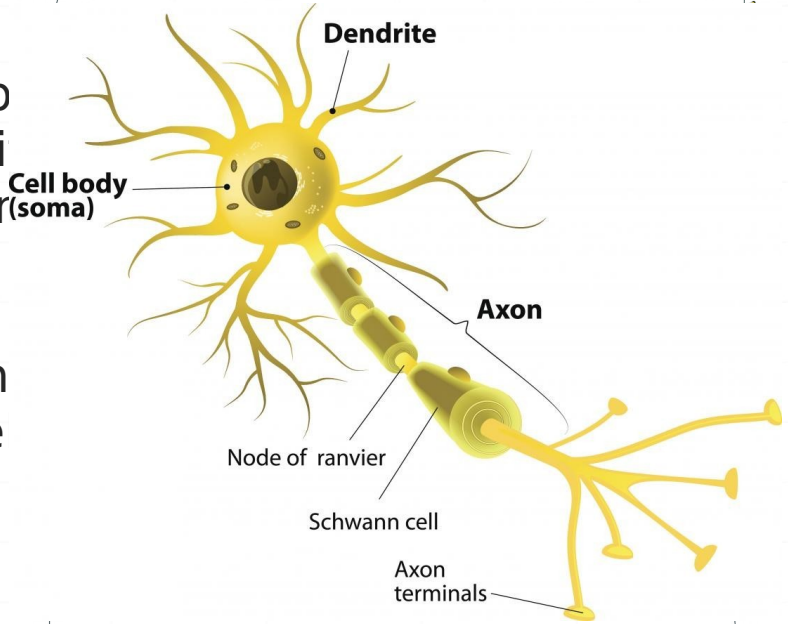
INTRODUCTION

- Brainwave technology is a direct technological interface betw a brain and computer system not requires output from the us by using EEG analyzer. It is also known as a Direct Neural Interface(DNI) & Brain-Machine Interface(BMI) & Brain Compuiter Interface(BCI).
- We can communicate from brain to brain and also this technology is mainly used for physically and mentally challen people.
- This is one of the most trending technologies in this competit world.

NEURAL NETWORKS

- **What neurons do?**

A neuron is an electrically excitable sp
type of cell that processes and transmi
information through electrical and cher
signals with the presence of synapses,
are
complex membrane junctions that tran
signals to other cells with the aid of Ce
body,Dendrites & Axon.



- **Action potential**

A brief electrical charge that travels
down a neuron’s axon.

ION CHANNELS CONTROL THE MOVEMENT OF IONS THROUGH THE NEURONAL CELL MEMBRANE.

Location		Function	
Passive Channels	• Cell membrane on Dendrites. • Cell body & Axon.	Passive Channels	• Makes Resting Membrane Potential. • .
Chemically gated Channels	• Dendrites. • Cell body.	Chemically gated Channels	• Makes synaptic Potentials. •
Voltage gated Channels	• Axon Hillock, all along unmyelinated axon. • Nodes of Ranvier in myelinated axons.	Voltage gated Channels	• Generation & Propagation of Action Potentials. • .

BRAIN WAVES

- Brainwaves are the electrical impulses produced as your brain c communicate with one another.
- Brainwaves tell us a great deal about how you feel and function thought habits, stress levels, underlying mood and overall brain function.
- Using sensors on the scalp, we can measure and monitor this activity. With brain analysis software(EEG), we can identify wha specific activity is giving rise to your symptoms.

NEURAL ACTIVITIES

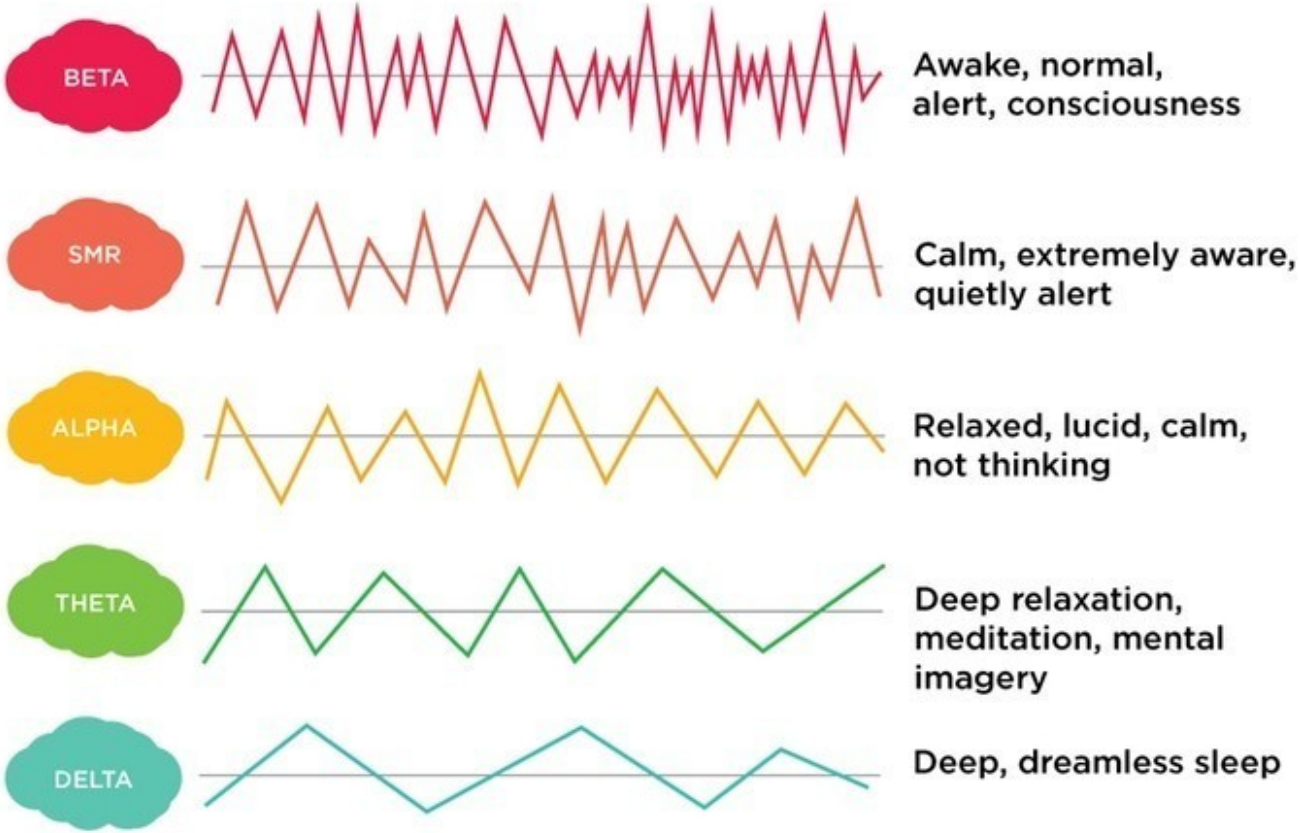
A potential of 60–70 mV with negative polarity may be recorded under the membrane of the cell body.

- This potential changes:-

  If an action potential travels along the fibre,which ends in an excitat synapse, an excitatory postsynaptic potential (EPSP) occurs in the fo neuron.

  If two action potentials travel along the same fibre over a short dista there will be a summation of EPSPs producing an action potential on postsynaptic neuron providing a certain threshold of membrane pote reached.

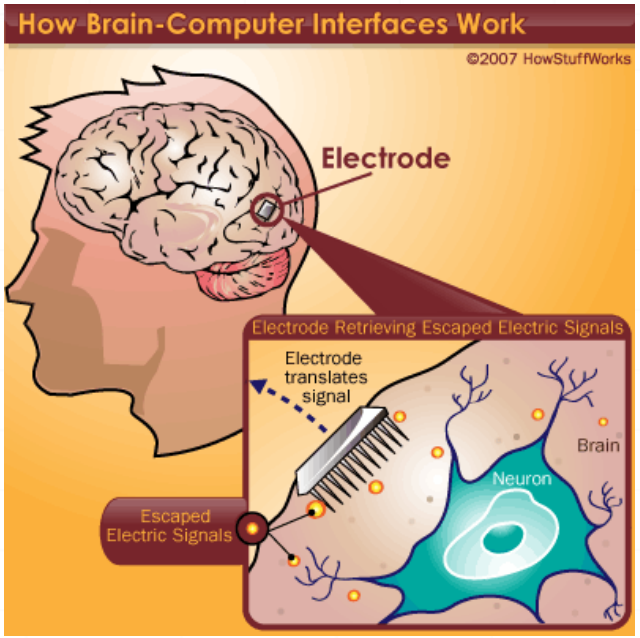
TYPES OF BRAIN WAVES



DETECTION & ANALYSIS

1.INVASIVE BRAIN COMPUTER INTERFACE

- Invasive Brain Computer Interface devices are those implanted directly into the brain and have the highest quality signal.
- Ex: Mindwave mobile headset



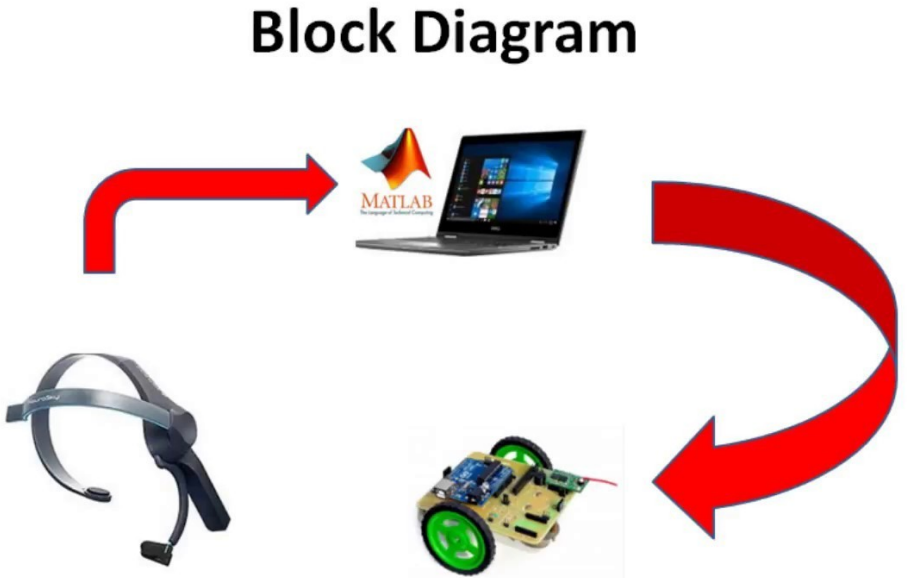
MINDWAVE MOBILE

headset

working

wearing

INTERFACE



Arduino interface

Computer interface

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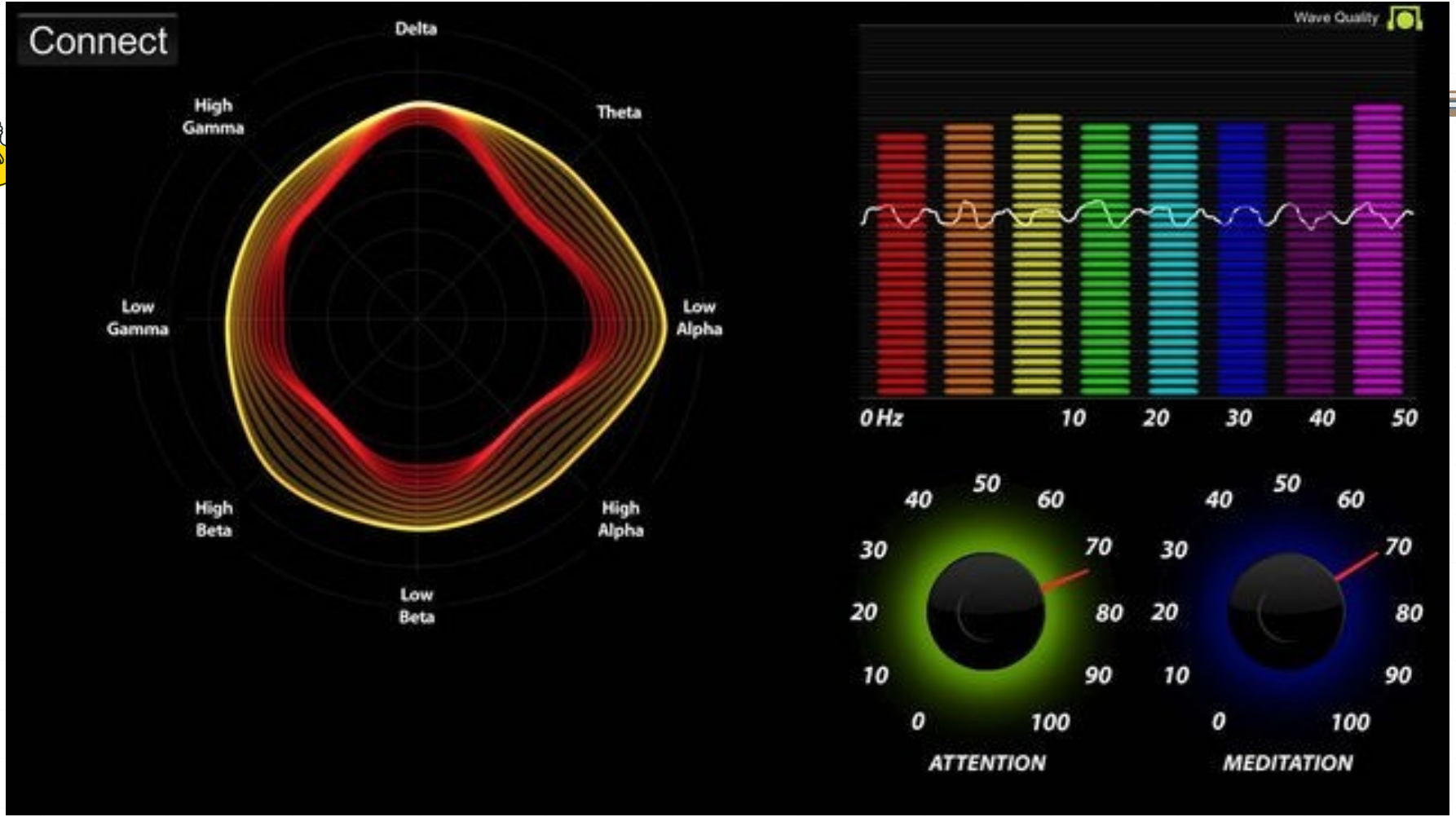

Connect
Delta
Theta
Low Alpha
High Alpha
Low Beta
High Beta
Low Gamma
High Gamma
Wave Quality
0 Hz
10
20
30
40
50
ATTENTION
MEDITATION

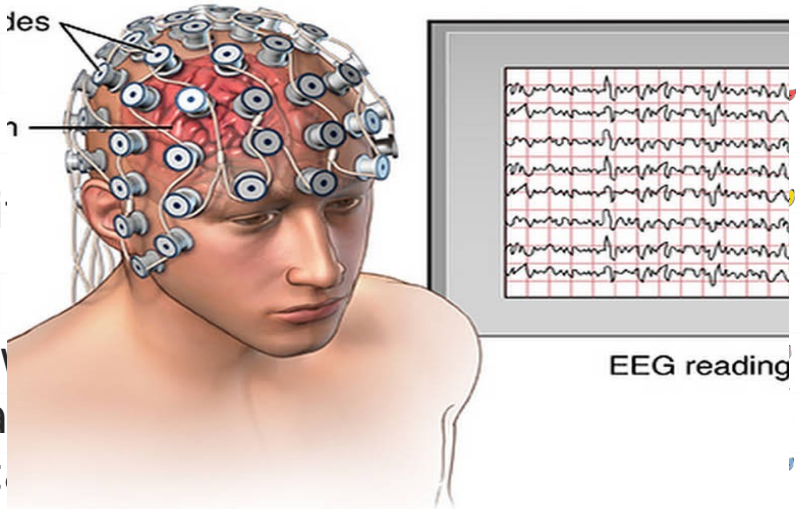
2.NON-INVASIVE

- EEG,the most used non-invasi

  Methods.

Electroencephalography is an electrophysiological monitoring method to record electrical activi the brain.

An EEG tracks and records brain patterns.Small flat metal discs ca electrodes are attached to the sc with wires.



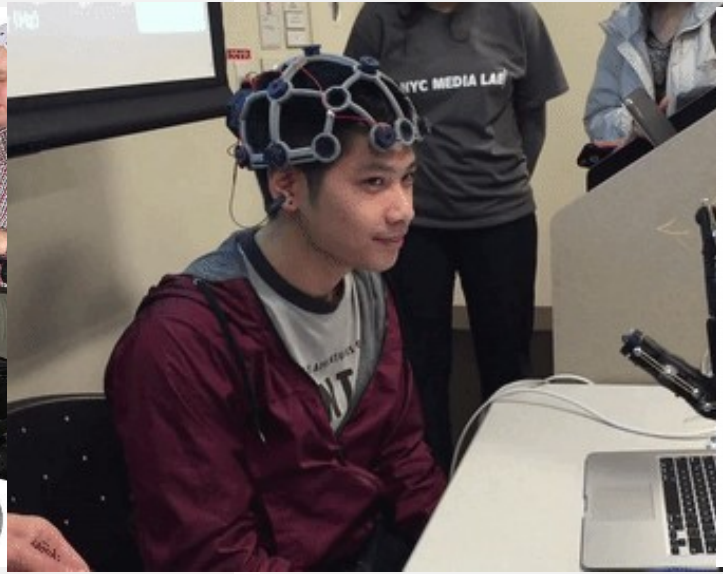
BRAINWAVES CHARACTERISTICS

- Main source of EEG is synchronous activity of thousands of cortical neurons.
- Everyone's brain signal is a bit different even when they thin about same thing.
- In abnormal adults,EEG shows sudden bursts of electrical activities.These abnormal discharges may be caused by a bra tumor,infection,injury or strokes.

FEATURES

- Can detect multiple mental states simultaneously.
- Reference node on ear clip is to remove ambient noises.
- Provides EMG feature for eye bilnk detection
- By changing some connections,we can use it as brain figure prints.

APPLICATIONS



Brain controlled wheel chair for paralyzed persons.

Brain controlled robot

Music therapy

MILITARY AND SECURITY

- Improve threat detection and identification .
- At Viewpoint Of Accessibility,the Brain wave is the most Adequate.
- Brain wave are unique to individual.
- In future,it could be possible to fill the surrounding information in our brain
  without wasting a time for gain it.
- Games to increase our brain activity.
- Used to relax our mind.

PROS

- It uses to relax our brian.
- Greater accuracy and much faster time.
- BCI's can improve a direct pathway between a human or animal brain and external device like computers etc.
- BCI's has increased the possibility of treatment of disability related to nervous system.

CONS

- Compexity of brain.
- Information transmission rate is limited to 20 bits/sec.
- Adaption and learning is difficult.
- It is very expensive.
- Research is still in begining state.

CONCLUSION

- The use of Brain Wave signals as vector of communication between man & machines represents one of the current challenges in signal theory research.
- This is the new emerging area which is mainly for the patient the treatment bed.
- We can explore ourselves with this emerging technology in future.

THANK Q

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