



# When Human-Computer Interaction Meets Neurotechnologies:

What You Should Know about Brain-Computer Interaction

#### The Potioc BCI Team /

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### #2 Practical BCI Design and Use of OpenVibe Software/

H3 Discussion about BCI Capabilities, Pitfalls and Ethical Consideration/





# Introduction to Brain Computer Interfaces

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BCI is a system which enables a person to manipulate a machine



[Wolpaw & Wolpaw (2012)]





4 major components





4 major components





3. Translating data

into commands

### Brain Computer Interface

www. www. you muchum

4 major components

1. Measuring brain

activity

2. Filtering processing data



4 major components

1. Measuring brain

activity

# 3. Translating data into commands

2. Filtering, processing data



wwwwwwwwwwwwwwwwwwwwwwwwwwwwww



### 4. Designing feedback

Brain–computer interfaces for communication and control, J.R. Wolpaw, 2002







FMRI

MagnetoEncephaloGraphy LEFT HAND AFTER STARTING

# Before starting

TIME (ms)



50

### Non-Invasive

MEG





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### Non-Invasive

# ElectroEncephaloGraphy EEG

#### functional Near-Infrared Spectroscopy fNIRS



# JI/III How do we process and translate data?

Filtering

### Classification

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# Why is feedback important?





Not All Created Equal: Individual-Technology Fit of Brain-Computer Interfaces, A. Randolph, 2012

# Why is feedback important?



Predicting Mental Imagery-Based BCI Performance from Personality, Cognitive Profile and Neurophysiological Patterns. Jeunet et al. 2016

# Why is feedback important?





Towards Improved BCI based on Human Learning Principles, Lotte & Jeunet, 2015

Applications







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