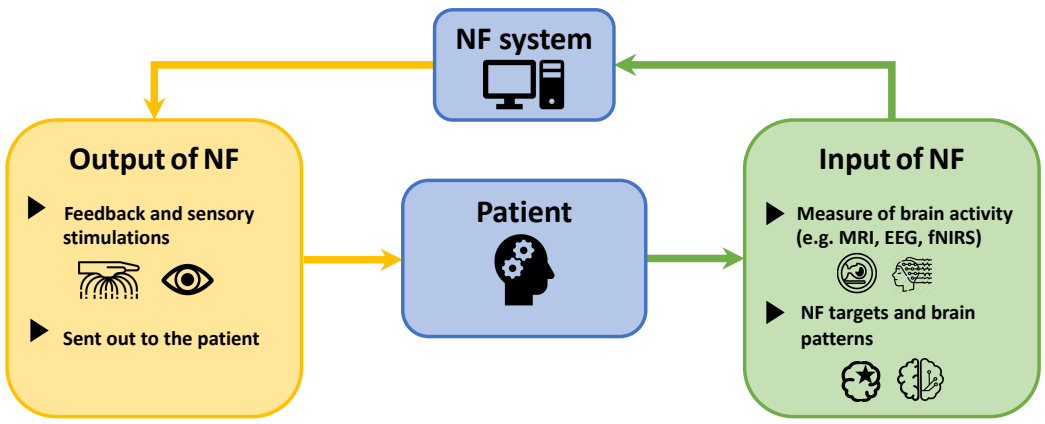
PEPERONI: Portable and Personalized Neurofeedback for Stroke Rehabilitation

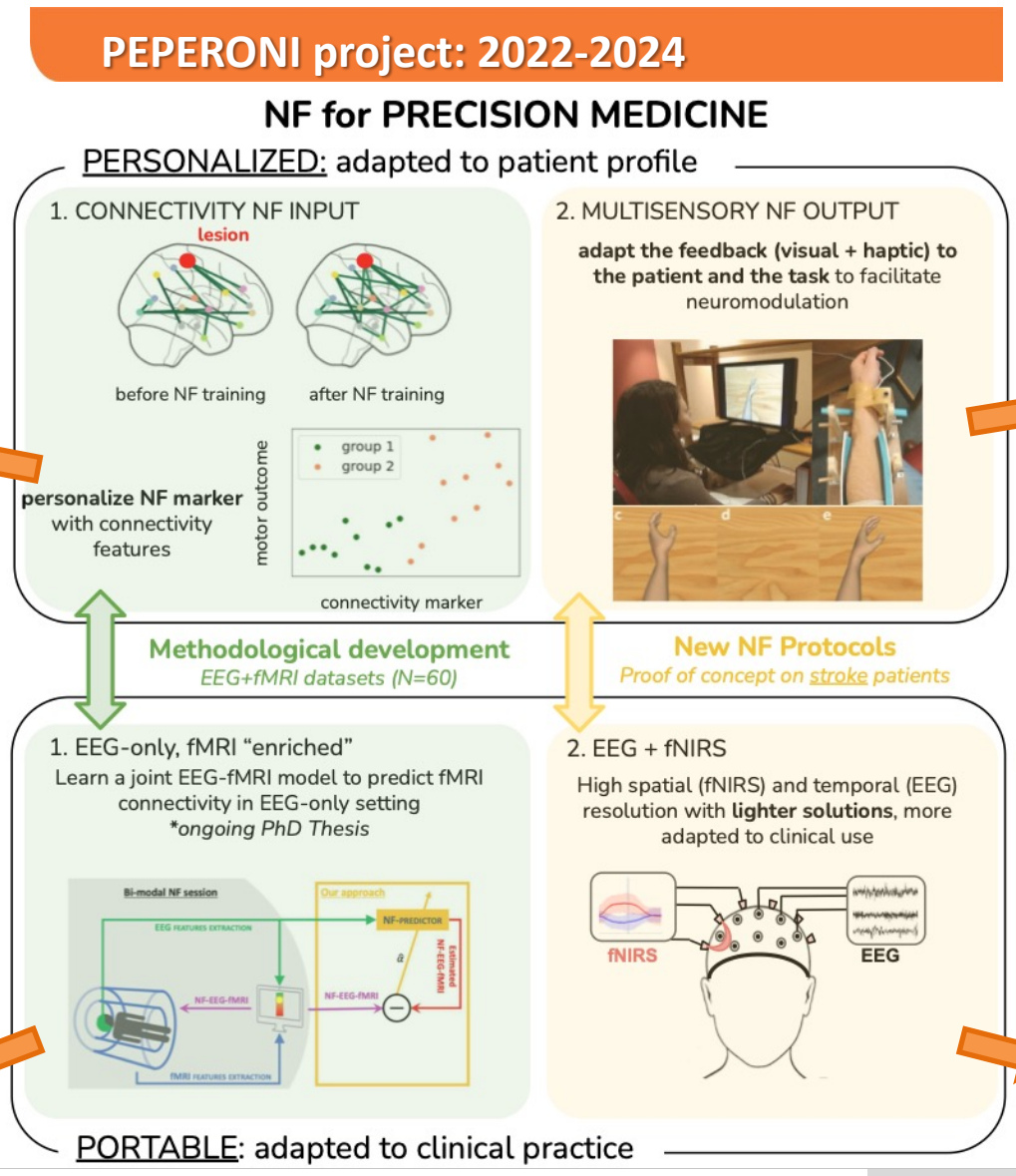
Hybrid

Neurofeedback (NF)

- Consists in presenting a subject with a stimulus directly related to his/her current brain activity
- Can be used to teach subjects to regulate their own brain functions
- Previous studies showed that multimodal (e.g. EEG/fMRI) NF is promising for the treatment of various neuronal pathologies, such as post-stroke rehabilitation



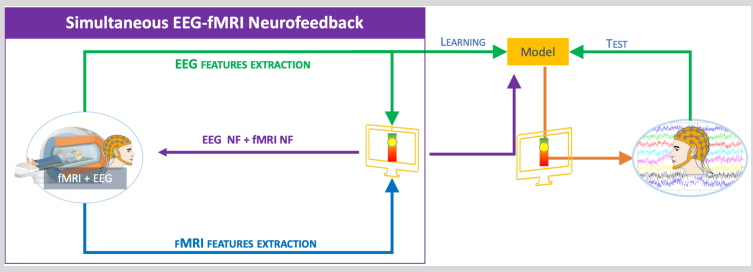
PEPERONI project: 2022-2024



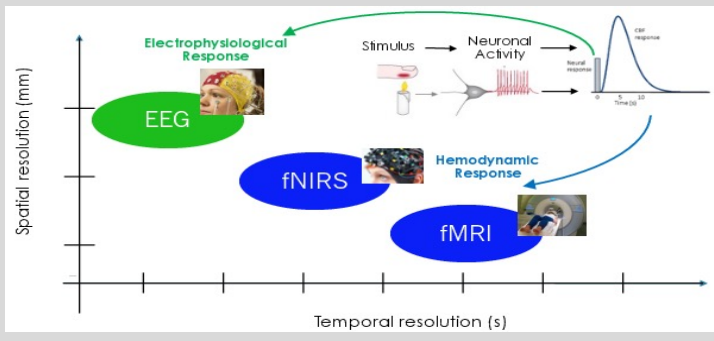
- **A. Lamouroux, PhD student,** from Oct. 2022, funded at 75% by CominLabs
- How to process fMRI data from stroke patients ?
- fMRIStroke : new preprocessing pipeline + evaluation
- On existing data: assessing changes induced by NF training on brain networks organization
- Identify new connectivity-based biomarkers)

- **F. Le Jeune, postdoc,** from March 2023
- Adapted feedback: reduce the time required to learn to control the system and their brain activity
- Adaptation depending on: personal characteristics of users, evolution of their results
- Start of a new clinical trial: haptic EEG neurofeedback in early stages of stroke (44 patients)
- Study on new thermal feedback

- **C. Pinte, PhD student,** from Oct. 2021, not funded by CominLabs
- Preliminary work during former CominLabs project Hemisfer
- Investigating long short-term memory (LSTM) and temporal convolutional neural networks (TCN)



- **C. Muller, postdoc,** from Oct. 2023
- fNIRS and fMRI measure the hemodynamic response
- Study impact of fNIRS for NF
- Propose a new EEG-fNIRS NF acquisition protocol
- Design a proof-of-concept study on stroke patients



Consortium

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