



HAL
open science

HappyFeat, an interactive and efficient BCI Framework for clinical applications

Arthur Desbois, Tristan Venot, Marie-Constance Corsi, Fabrizio de Vico
Fallani

► **To cite this version:**

Arthur Desbois, Tristan Venot, Marie-Constance Corsi, Fabrizio de Vico Fallani. HappyFeat, an interactive and efficient BCI Framework for clinical applications. MetroXRINE 2022 - IEEE International conference on metrology for extended reality, artificial intelligence and neural engineering, Oct 2022, Rome, Italy. hal-03842568

HAL Id: hal-03842568

<https://inria.hal.science/hal-03842568v1>

Submitted on 7 Nov 2022

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

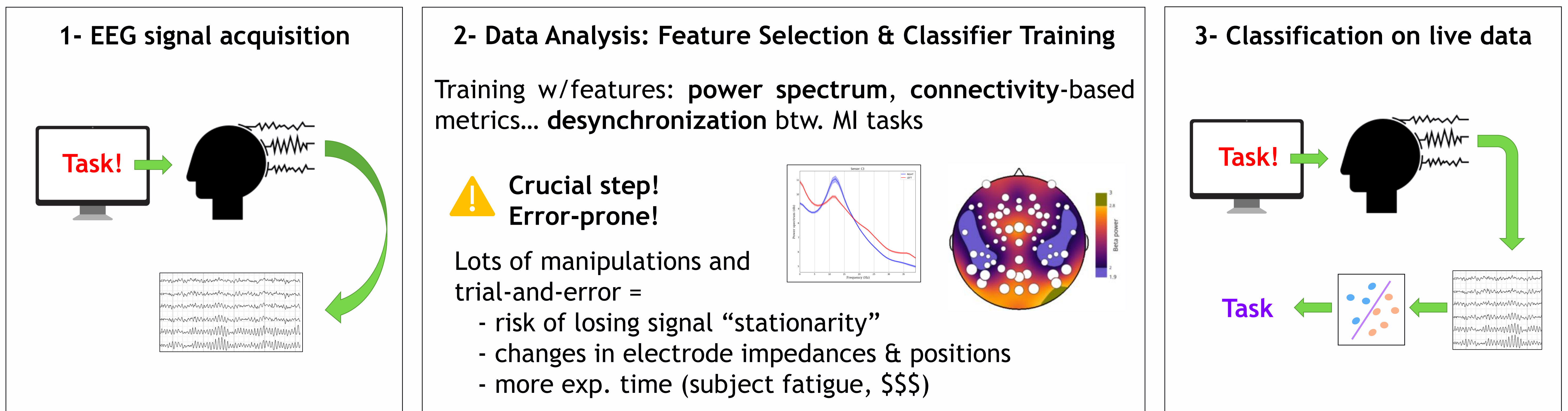
L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

HappyFeat, an interactive and efficient BCI Framework for clinical applications

IEEE MetroXRaine Conference 2022 - Rome, Oct. 26th-28th

A. Desbois, T. Venot, M.-C. Corsi, F. De Vico Fallani

Typical Motor Imagery (MI) experimental pipeline



HappyFeat is a Python-based framework for MI pipelines.



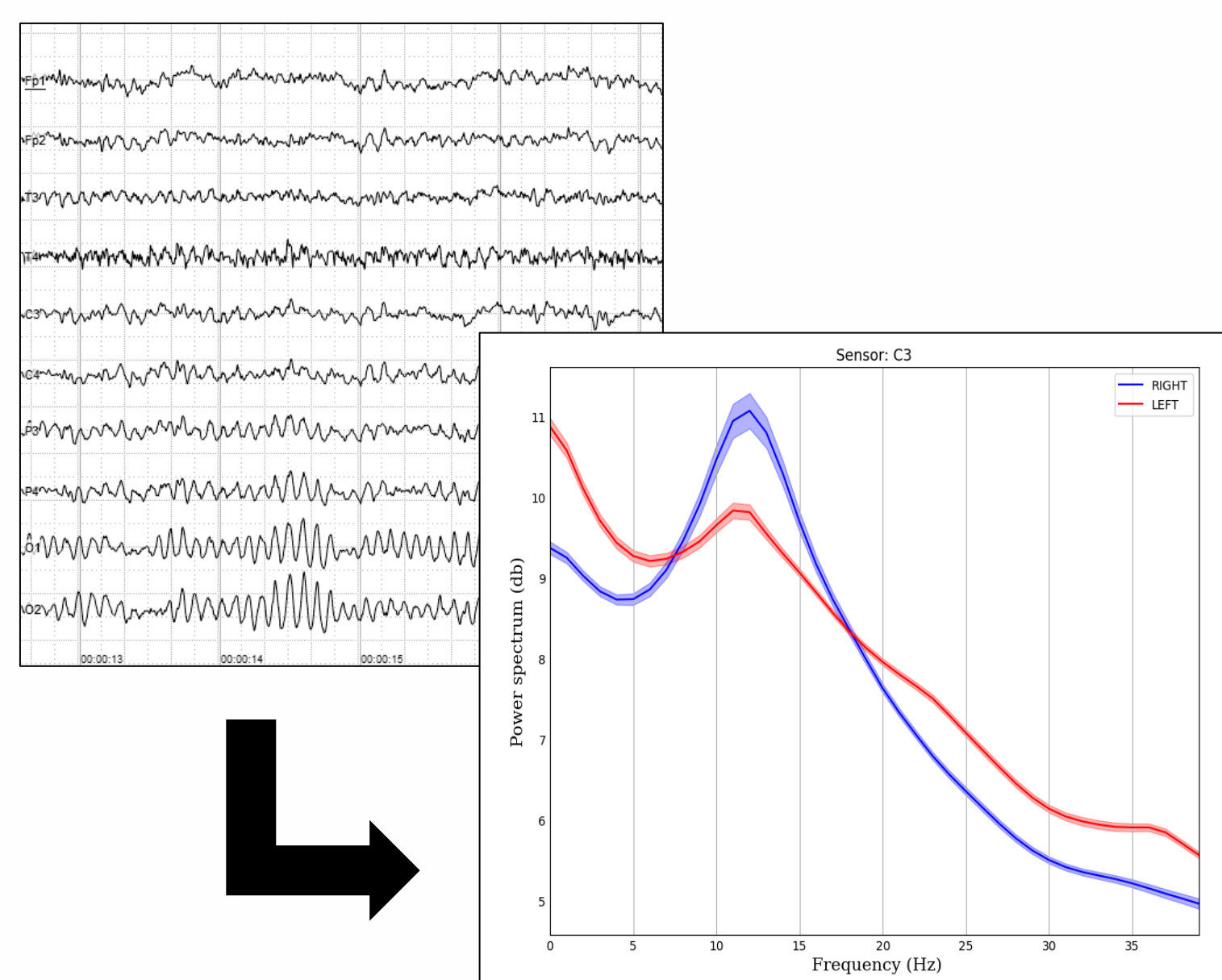
It focuses on facilitating the feature selection and training phases.

Analyze, select your features and train your classifier in less than 5 minutes!

HappyFeat - Main Functionalities

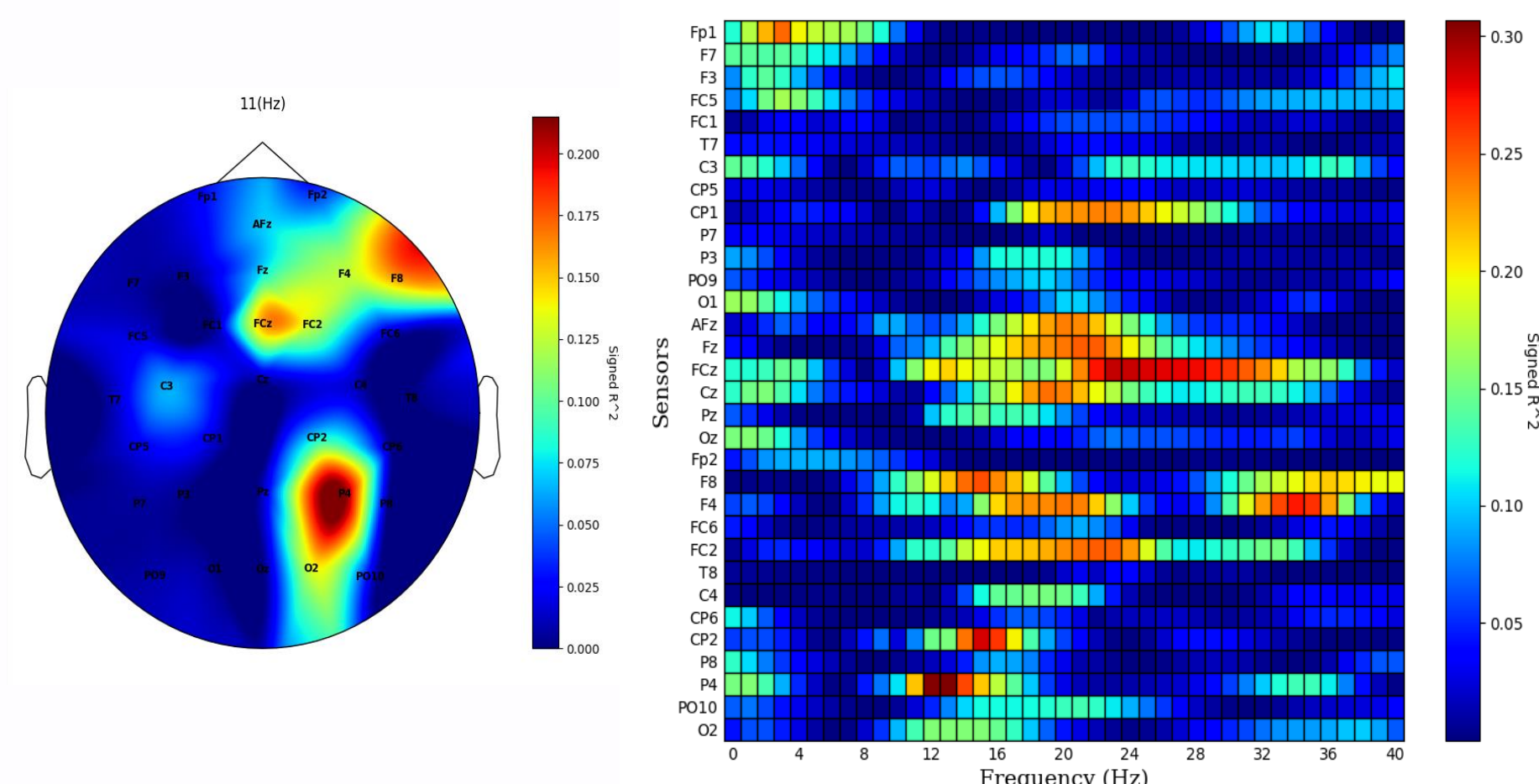
Extraction of classification features

- Signal analysis and pre-processing
- Using pre-recorded signals, or on-the-fly during the acquisition phase.



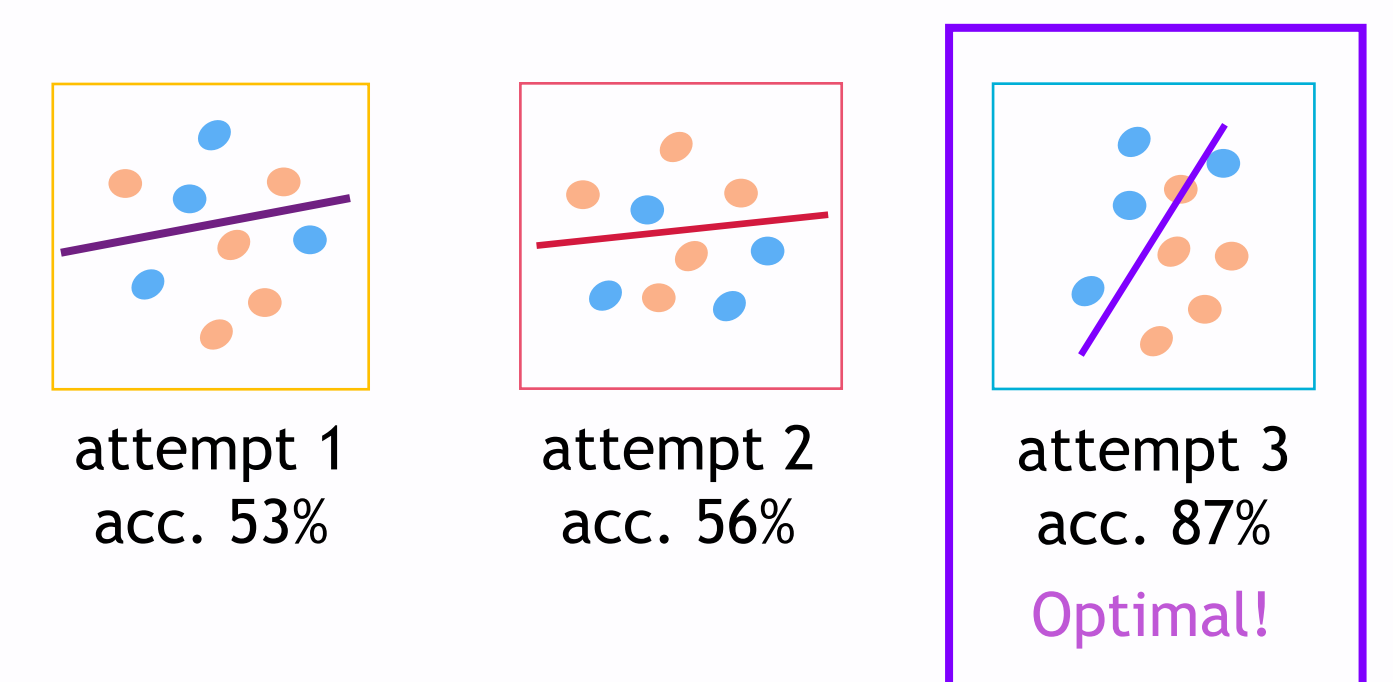
Visual analysis of spectral features

- frequency/channel map of R^2 values
- «brain topography» of R^2 values
- compared PSDs btw. MI conditions
- time/frequency ERD/ERS analysis



Classifier training, trials combinations

- Run various training attempts, in only a few clicks!
- Concatenate the trials from multiple recording sessions
- Automatically update classification weights in the “online classification” OpenViBE scenario



Key Features & Mechanisms

- Clean, risk-free working environment, avoiding unnecessary and error-prone manipulations.
- Trial-and-error oriented workflow: all steps can be repeated quickly & as many times as needed.
- Everything available within a dashboard GUI
- OpenViBE is used in the background, as a processing engine. No scenario edition necessary: everything is automated!



Final notes & Upcoming improvements...

- To be continued...
 - More pipelines & metrics based on connectivity (following research topics in Aramis / BCINET ERC)
 - Associated visualization tools
 - Choose from different classification algorithms
 - “Workspace” manager, to save/load parameters

First official release early 2023
- stay tuned!

Development version:
<https://github.com/BCI-NET/happyFeat>

