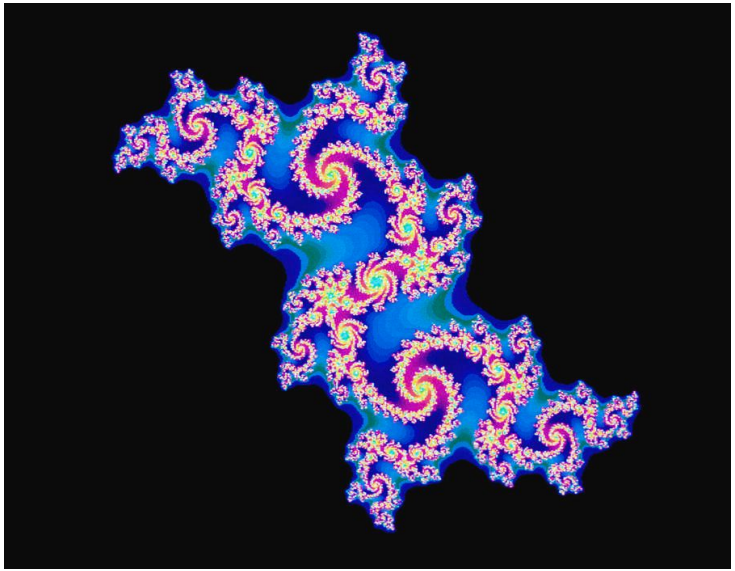
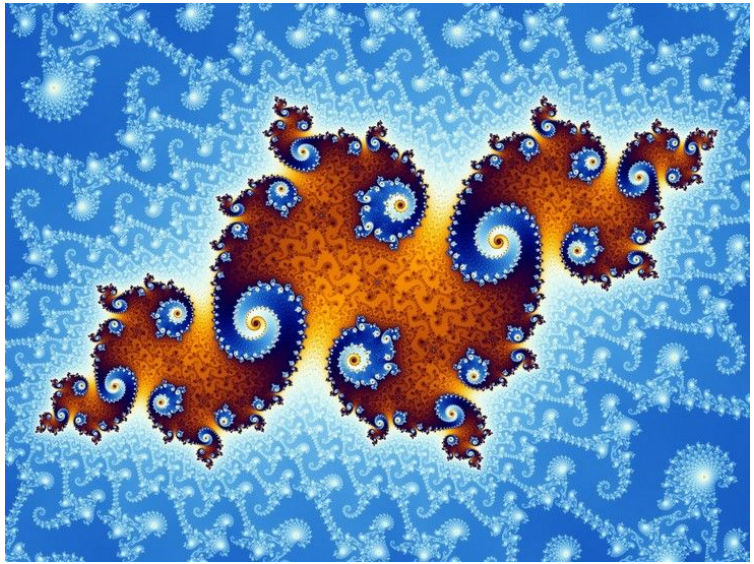
Generate live fractal with brain waves





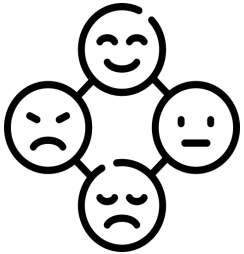
Fracted Minds
Team 037

NEUROTECHX

NTXHACKATHON22

Our Motivations :
Make brain activity accessible, using fancy maths and shiny colors

The ideas:



Translate your feelings into Art.

Grave the moment into an artistic piece.

Share your emotion in an innovative way.

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The Solution

1) Track cortical activity of a subject using EEG while he is experiencing a moment.

2) Their brain wave are live preprocessed and metrics are extracted from them.

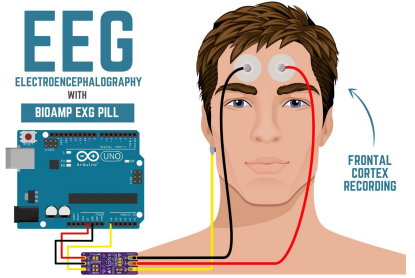
3) The metrics are used to generated a live piece of art that changes with brain activity.

Our example case:

Audio
Stimulus (music samples of differents genres)

Online EEG recording

Upside Down Labs



Arduino board | Signal Amplifier | Three electrodes

ARDUINO

Arduino software

Lab Streaming Layer (PyLSL)

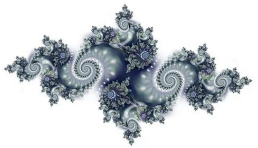
Open Vibe

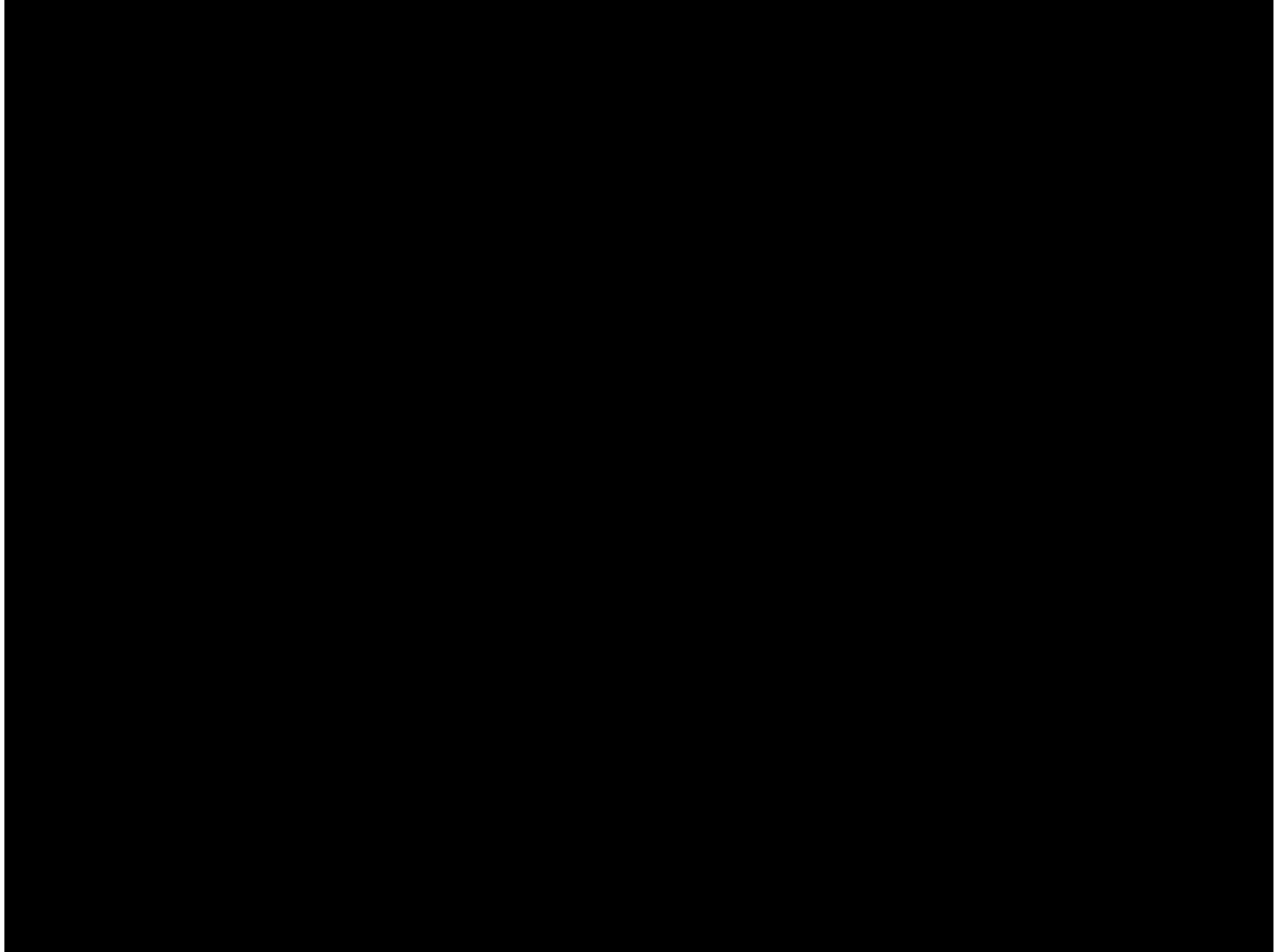
- Signal resampling
- Temporal Filter (8-14 HZ) → Extract α band (marker for wokeness and appraisal)
- Signal average → Metric to use to construct the fractal

Lab Streaming Layer

Read metrics on Python

Generate live fractal





Documentation

Video demo link : https://streamable.com/b2none

Github Link: https://github.com/ImJustWan/FractedMinds.git

Order of files to be run:

1) ‘ArduinoReadSerial.ino’ to listen to the signal and print its state out of the board
2) ‘stream_push.py’ with pylsl to transfer the signal to Lab Streaming Layer (LSL)
3) Use ‘openvibe_file.xml’ to acquire the signal in OpenVibe using LSL and apply preprocessing on it: resampling (256 Hz), pass-band filter (8-14 Hz) to extract the alpha band then average it to obtain one metric to use for the fractal. Finally export it using LSL.
4) Read the metric using ‘readFiles.py’ and use it as a parameter to generate the live Fractal.