

Supplementary Material

On figures A, B and C it is described the basic concepts of Superchords, Flatchart and Brainprint.

On figures D, E and F it is described how the datasets are created and how the whole process of classification is implemented.

Figures G and H show the Brainprint of subject 84, for the four motor tasks, being the first figure for real action and the second one for imagery.

Figure I shows the error measurement for each subject considering only the first N superchords after the stimulus, being red for the for the real actions and blue for the imagery. Horizontal lines correspond to the mean error for each set. Figures for 10 and 100 superchords are present in the main article.

Superchord

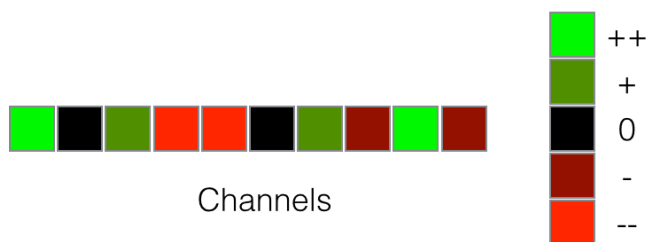


Fig. A - A superchord representation where each pixel depends on a specific channel and the color show the voltage measured at that moment, being bright red the highest negative value and bright green the highest positive one.

Flatchart

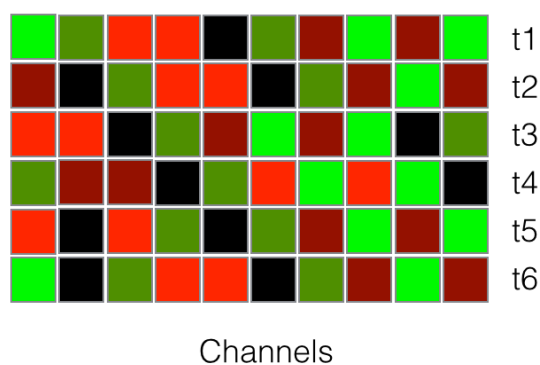


Fig. B - A Flatchart is the result of chronologically juxtaposing superchords, representing in a 2D chart a 4D process.

Real - Subject #084 Event 4

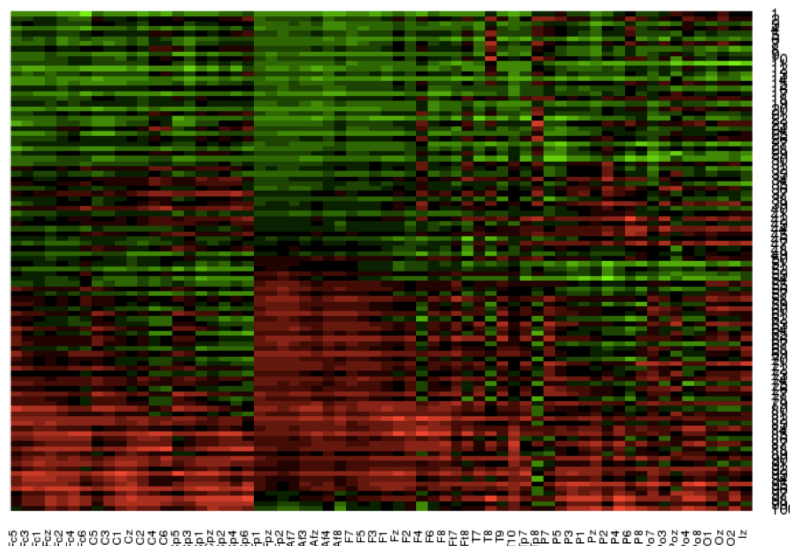


Fig. C- A Brainprint is the specific signature of a brain activity displayed in a flatchart.

Dataset Creation

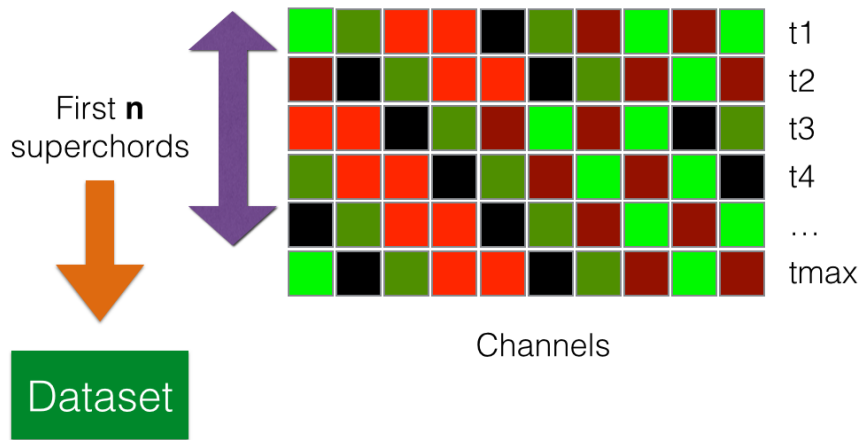


Fig. D - Shows how a dataset is created depending on the number of superchords desired.

Subject Dataset

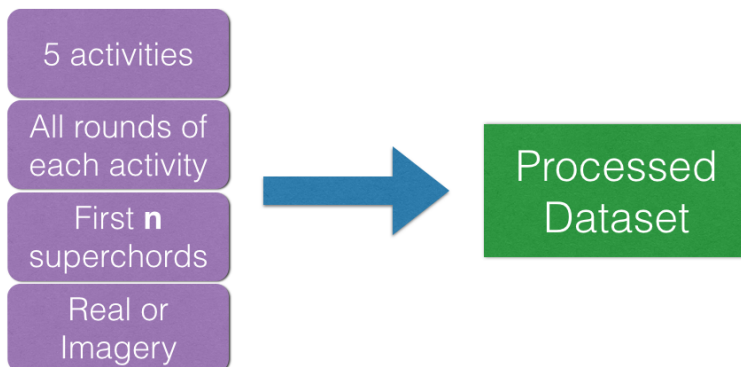


Fig. E - For each subject, the dataset created in Fig. D, for all rounds, receives the label response for each activity. There will be two datasets per subject, one for real execution and another for imagery. Each Processed Dataset is the result of this process with not other change in the raw data.

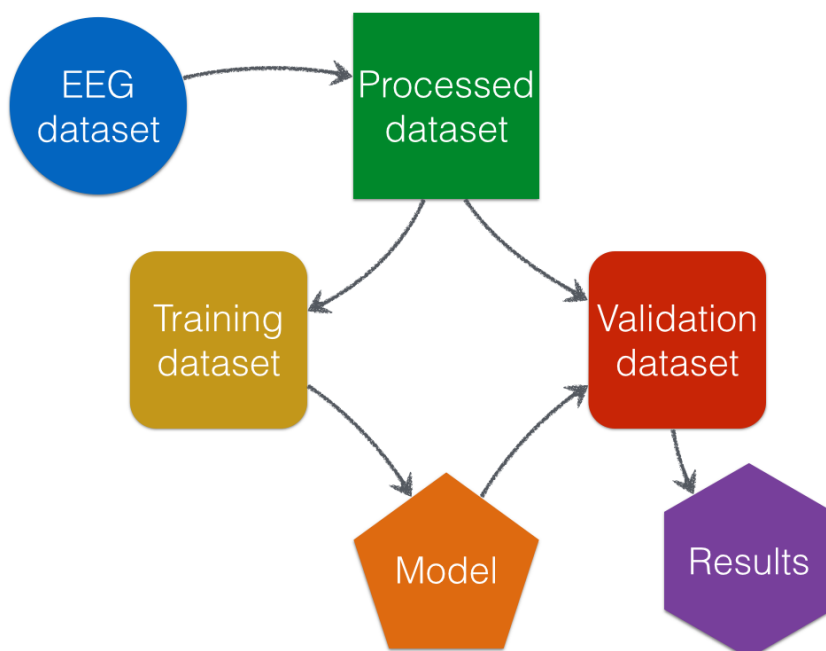


Fig. F - The complete flow from data acquisition up to the results. The Processed dataset is divided in two equal parts, being the first one for training of the Artificial Neural Network, that will create the Model. The second part then is used to validate the Results from the Model.

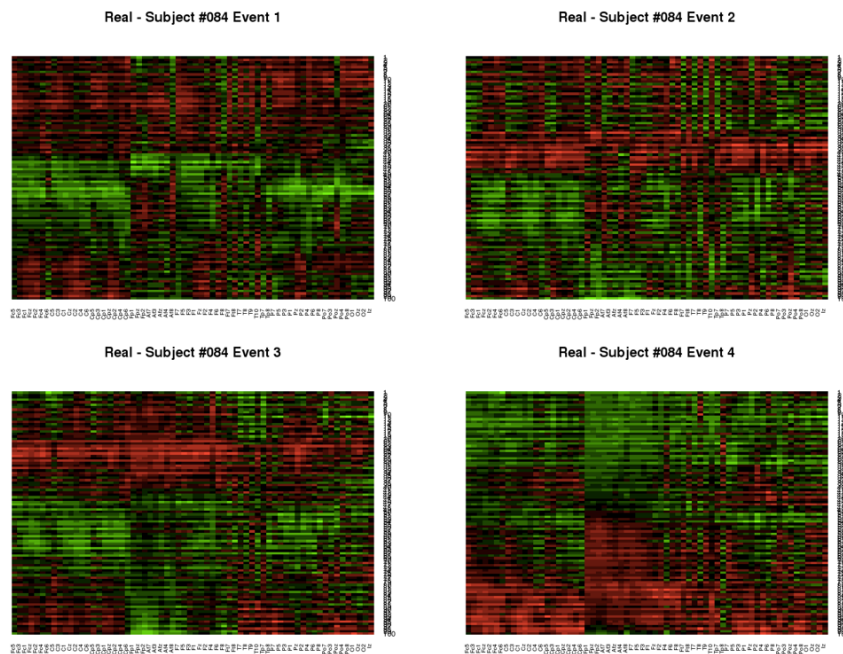


Fig. G - Brainprints of subject 84 when executing real activities. Event 1 is for moving the left hand; Event 2 is for moving the right hand; Event 3 is for moving both hands; Event 4 is for moving both feet. Horizontal axis shows the channels and vertical axis show 1-100 superchords.

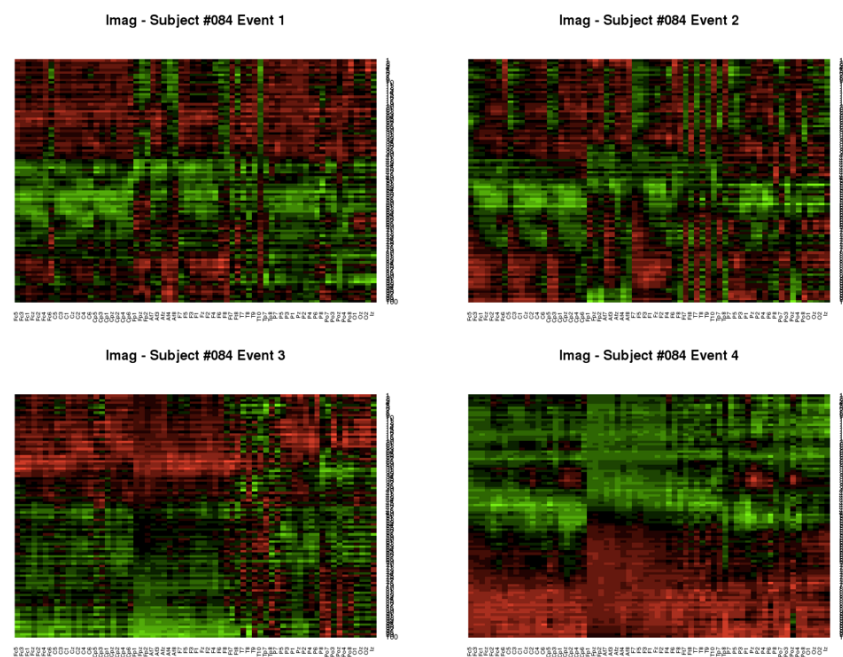


Fig. H - Brainprints of subject 84 when imagining activities. Event 1 is for moving the left hand; Event 2 is for moving the right hand; Event 3 is for moving both hands; Event 4 is for moving both feet. Horizontal axis shows the channels and vertical axis show 1-100 superchords.

Fig. 1

