# ICA

A screenshot of a computer

Description automatically generated

The Independent Compound Analysis (ICA) permit to decompose the EEG signal in serval compounds (panel A/step1). Then, you can select the unwanted compounds (mainly eyes movements related compound) (panel B/step2). Finally, you can rebuild the EEG signal without unwanted compounds and without losing any data point (panelC/step3).

**For now, the toolbox need that the input files are in .set format ! If it is not the case, please you the export tool on the main EEGpal windows to convert files into .set**

IMPORTANT NOTE: You will have to perform these three steps in the row without closing this window for a clean result. Otherwise each steps will record intermediate files in the folder ./temp\_ICA in a .set format.

**Step1**

1. Select the option “concatenate files from the same subjects” when you have several run/files within each participant. It is strongly recommended to do a single ICA decomposition (concatenate files) to avoid introducing processing variability in you results. For example, you want to compare two conditions and each condition has a separate EEG file, you must compute the same ICA decomposition for the two files. If you compute two separate ICA decomposition, the components will be not the same and after the rejection of bad components, you will introduce a difference in your stat that you will not able de disentangle from the difference of interest.
2. Start the ICA decomposition of your EEG files (take a long time). The intermediate results will be recorded in the folder ..\ICAtemp\decomposed\\*\_ICAdecomposed.set

**Step2**

Note: The path of the input files in the central table are automatically updated after the execution of step1. In the case of crash or if you need to reprocess your files afterwards, you don’t need to recompute the ICA decomposition (step1). You can import the ..\ICAtemp\decomposed\\*\_ICAdecomposed.set generated by step 1 in the main EEGpal windows (section Import Data and Loading the electrode coordinate file step of this manual) and directly perform this step2.

1. Click on the checkbox to inspect the ICA components for each file individually. The toolbox will show you the topography of the 24 first components with the labels estimated by ICAlabels (included in EEGlab). In the current example the compound 2 (blink = vertical movement) and the compound 5 (horizontal movement) are clearly associate with eye movement.
2. Please enter manually the indices of the component to be removed (2 and 5 in this example). The specify value will be added in the coloumn *Components\_to\_remove* of the central table. If the option 'Concatenare files from same subjects' is activated’ (point 1), the components to be removed choice and the inspection tick will spread to all files of the same participant.

**Step3**

1. When all the files of the central table is inspected (tick), press on the button *Start ICA recomposition* Reconstruct your EEG signal without the components tagged during step2. The intermediate results will be recorded in the folder ..\ICAtemp\recomposed\\*\_ICArecomposed.set
2. Now, we are going to export these results in the format you want. Select the output folder and the wanted EEG file format. You can specify a other suffix in the output files name.   
   The option *Delete Intermediate files* permits to suppress all the file in the intermediate folder ..\ICAtemp\ to save disk space. Use this option only if you are sure that you don’t need the ICA decomposition anymore.
3. Press on *Save Results* to perform the export of the final result with the option you have chosen in previous step. It will automatically update the table of the main EEGpal window and close the ICA module + write a log file with the different option you have selected.