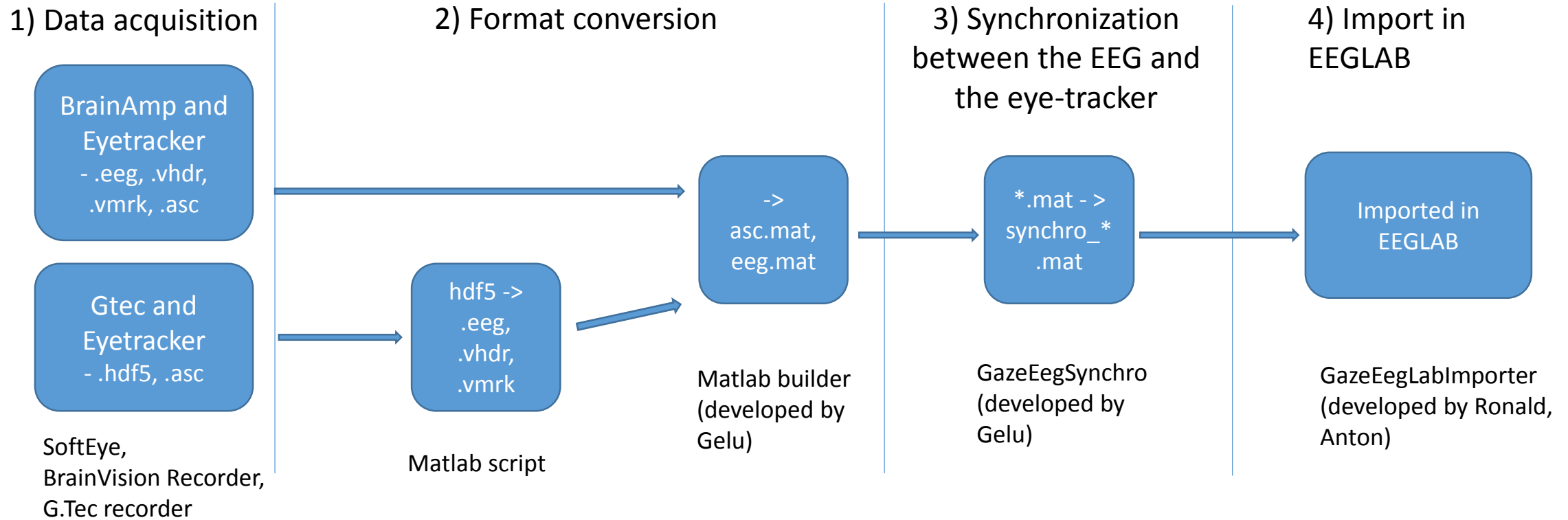


# GazeEEGLabImporter

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# Offline data processing for ERP data analysis in EEGLAB



In 1) the signal is acquired in a number of files. Normally these are .asc from the eyetracker and .eeg, .vmrk, .vmrk for EEG in the Brainamp format. The g.tec produces a .hdf5 file which is also converted to .eeg, .vmrk, .vmrk. After that the files are converted to .mat using the MatBuilder software. In 3) the two data streams EEG and Eyetracking data are synchronized leveraging the differences produced by the different acquisition devices (notably the “drift”). GazeEEGSynchro produces a .mat file and the total number of channels is the sum of the EEG and the eye tracker's channels. In 4) GazeEegLabImporter imports the result from 3) in EEGLAB and it is used for ERP analysis.

#### 4) Import in EEGLAB



## GazeEegLabImporter

- Converts to EEGLAB data structures ("EEG", "ALLEEG"), this includes the parallel port triggers
- Creates epochs – epochs are generated around a user defined list of events (usually parallel port triggers) and represent a chunk of signal. Epochs are stored in the EEG.data structure and do **not** represent a continuous signal
- Applies filtering over each epoch – phase is preserved
- Removes artifacts – EEG and non-EEG channels (deployed close to the eyes) are used to detect and attenuate the affect of eye blink artifacts. At this stage an ICA algorithm is applied developed by Gipsa-lab
- Displays a figure of the average of the selected epochs per channel

# Prerequisites:

- Download and unzip EEGLab 11\_0\_5\_4b: <http://sccn.ucsd.edu/eeglab/>
- ToolBoxGaze\_gTec\_EEG\_v2.1.0 (if not provided)
  - currently GazeEegLabImporter works on top of package ToolBoxGaze\_gTec\_EEG\_v2.1.0

# Installation:

- Add to your Matlab path: ToolBoxGaze\_gTec\_EEG\_v2.1.0
- Navigate to GazeEegLabImporter folder:
  - GazeEegLabImporter\_Example.m (*start from here*)
  - GazeEegLabImporter\_Process.m (*main execution logic*)
  - GazeEegLabImporter\_SelectEpochs.m
  - GazeEegLabImporter\_BuildEpoch.m
  - GazeEegLabImporter\_createDataFilter.m

# Main function GazeEegLabImporter\_Process parameters

- *SynchroFilename* – points to a file that contains both EEG and eye-tracker data streams. These streams **must be already synchronized** by GazeEegSynchro
- *EpochEventsStr* – a matlab array that specifies the parallel port event witch with combination of *TimeInterval* us used to generate epochs. Once GazeEegLabImporter is executed one time you will be able to access the structure *EegAcq.Events.EventTypes* and see what other events are available
- *EpochEventsStr* – a list of events that will be imported in EEGLAB and displayed when you choose Plot->Channel data(scroll) in EEGLAB menus
- *TimeInterval* – used to generate a time epoch around an event
- *StartFromTrigger* – all data before this parallel port trigger is ignored
- *FilterData* – boolean field (true/false) sets if a digital filters are applied. Default is: default is 50Hz Notch, High Pass filter 2Hz
- *NbNonEEGChan* – this parameter is need to differentiate which channels are EEG and which are not. The non-eeeg channels are expected to be last. For example if NbNonEEGChan= 5 and total number of channels is 37, then the first 37-5 channels are expected to be EEG.