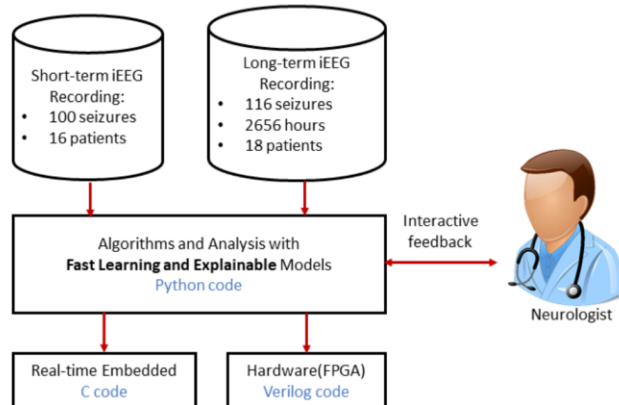


1. Create an empty “iEEG dataset” folder in the same directory as the current code
2. Go to <http://ieeg-swez.ethz.ch/> and scrolling down

## The SWEC-ETHZ iEEG Database and Algorithms

### Overview

Motivated by *Open Science*, this page contains FREE datasets, source codes, and papers based on human intracranial electroencephalography (iEEG) recorded and analysed during pre-surgical evaluations of patients with pharmacoresistant epilepsies at the Sleep-Wake-Epilepsy-Center (SWEC) of the University Department of Neurology at the [Inselspital Bern](#) and the [Integrated Systems Laboratory](#) of the ETH Zurich. The source codes, datasets, and results on these sites are free of charge only for research and education purposes. Please read this page carefully before using any of the resources. We suggest to refer to the resources as the SWEC-ETHZ iEEG Database and Algorithms, and to cite the related paper in the following sections. If you have any questions or face any issues, please contact us at [ieeg@iis.ee.ethz.ch](mailto:ieeg@iis.ee.ethz.ch).



3. Continue scrolling down after finding the short-term dataset title

### Related Paper

A. Burrello, L. Cavigelli, K. Schindler, L. Benini, A. Rahimi, “Laelaps: An Energy-Efficient Seizure Detection Algorithm from Long-term Human iEEG Recordings without False Alarms” in *proceedings of the ACM/IEEE Design, Automation, and Test in Europe Conference (DATE)*, Florence, Italy, March 25-29, 2019. **Received Best Paper Nomination** [\[OpenAccess\]](#)

## Short-term Dataset and Algorithms

### Dataset

In this study, we included a total of 100 anonymized intracranially recorded electroencephalographic (iEEG) datasets of 16 patients with pharmaco-resistant epilepsy who were evaluated for epilepsy surgery at the Sleep-Wake-Epilepsy-Center (SWEC) of the University Department of Neurology at the Inselspital Bern. All the patients gave written informed consent that their iEEG data might be used for research purposes. The decision on the necessity for iEEG recordings, the electrode implantation scheme, and the decision about surgical therapy was made entirely on clinical grounds. These decisions were taken prior to and independently from the compilation of this dataset.

### iEEG Acquisition

The iEEG signals were recorded intracranially by strip, grid, and depth electrodes. After 16-bit analog-to-digital conversion, the data were digitally band-pass filtered between 0.5 and 150 Hz using a fourth-order Butterworth filter prior to analysis and written onto disk at a rate of 512 Hz. Forward and backward filtering was applied to minimize phase distortions. All the iEEG recordings were visually inspected by an EEG board-certified experienced epileptologist (K.S.) for identification of seizure onsets and endings and exclusion of channels continuously corrupted by artifacts. Each recording consists of 3 minutes of preictal segments (i.e., immediately before the seizure onset), the ictal segment (ranging from 10 s to 1002 s), and 3 minutes of postictal time (i.e., immediately after seizure ending).

### Data Format

The dataset is provided in 19 zipped folders (each file is less than 1 GB), named with the ID of the 16 patients (e.g., [ID1.zip](#)). Each unzipped folder contains a number of [.mat](#) files as recorded seizures (e.g., [S21.mat](#), [S22.mat](#), ...) for the target patient. In each [.mat](#) file, the recording is stored in a variable called EEG as a TxM array where T is the number of sampling points and M is the number of iEEG electrodes. Seizure always starts at 3 minutes from the beginning of recording (i.e., the sampling point of 512\*3\*60=92160), and ends 3 minutes before the end of recording (i.e., sampling point of T-92160).

4. Select the data of interest for download

## Dataset

- ID1
- ID2
- ID3
- ID4a and ID4b
- ID5
- ID6
- ID7
- ID8
- ID9
- ID10
- ID11
- ID12
- ID13a and ID13b
- ID14a and ID14b
- ID15
- ID16



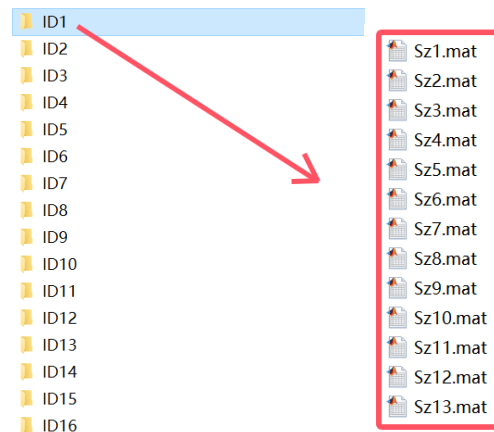
## Related Papers

Alessio Burrello, Kaspar Schindler, Luca Benini, Abbas Rahimi, “**One-shot Learning for iEEG Seizure Detection Using End-to-end Binary Operations: Local Binary Patterns with Hyperdimensional Computing,**” in *proceedings of the IEEE Biomedical Circuits and Systems Conference (BioCAS)*, Cleveland, OH, October 17-19, 2018. **Received Best Paper Award.** [[OpenAccess](#)]

Alessio Burrello, Kaspar Schindler, Luca Benini, Abbas Rahimi, “**Hyperdimensional Computing with Local Binary Patterns: One-shot Learning of Seizure Onset and Identification of Ictogenic Brain Regions using Short-time iEEG Recordings,**” *IEEE Transactions on Biomedical Engineering (TBME)*, 2019. [[OpenAccess](#)] [[SourceCode](#)]

5. Organize the downloaded data in folder “iEEG dataset” into the following format

(After clicking ID1, it should be in the following format)



6. Return to the MATLAB “iEEG\_data\_validation.m”, set ID and Sz you interested, and run