**Comparative study**

**Computational cost analysis varying: mode order**

The computational cost of Principal Component Analysis method does not change with the model order. In the final part of the algorithm, it cuts all columns beginning from the value of model order and does some computations that do not influence computational cost.

**Application: brain functional region segmentation**

**Functional analysis of the obtained maps: model order, thresholding, statistics of slice comparison**

Opisać trochę skrypt w matlabie – smoothing, thresolding,

Opisać jakie dane testowałeś – link, opisać badania

Model order – 40.

Matlab script

Before applying PCA method to fMRI data, it is recommended to smooth them. It is done by smoothing every slice. In case of used data it was necessary to cut … because of too big variance.

To segment the values returned by PCA, we normalize them to Z scores.

The value of the threshold was emiprically set by performing some tests with different values, but initially based on a value 2 established in a paper [reference].

Likewise threshold, the value of model order was empirically set initially basing on a value taken from paper [reference]

The data used in the work were obtained from http://www.openfmri.org/dataset/ds000115/

**Default mode network**

The default mode network is a network of interacting brain regions known to have activity highly correlated with each other and distinct from other networks in the brain [wikipedia]. The default mode network displays more activity during rest than during task which means when a person is not focused on the outside world and the brain is at [wakeful](https://en.wikipedia.org/wiki/Wakefulness) rest, such as during daydreaming and [mind-wandering](https://en.wikipedia.org/wiki/Mind-wandering), but it is also active when the individual is thinking about others, thinking about themselves, remembering the past, and planning for the future. The netowrk activates „by default” when a person is not involved in a task.

Dysfunctional default mode network has been observed in various mental disorders, including epilepsy. For example simultaneous recording of electroencephalogram and functional MRI (EEG–fMRI) is a powerful tool for localizing epileptic networks via the detection of hemodynamic changes correlated with interictal epileptic discharges (IEDs). fMRI can be used to study the long-lasting effect of epileptic activity by assessing stationary functional connectivity during the resting-state period (especially, the connectivity of the default mode network). Temporal lobe epilepsy (TLE) and idiopathic generalized epilepsy (IGE) are associated with low responsiveness and disruption of DMN activity.