possible project topic - EGG

1. Find relationship among the parts of the brain based on EGG dataset

• Experiment description:

Hypothesis

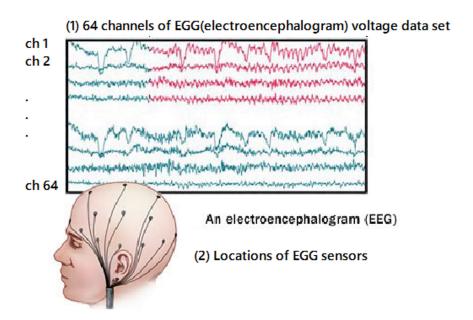
: memory will increase after taking certain amount of sleep

Procedure

- 1) After attaching sensors on head, show some scrambled images. Then ask if they have seen the image before to check the performance of memory.
- 2) Let him/she take a nap for certain amount of time.
- 3) Check memory performance again by asking again whether they've seen the images before or not.
- 4) Repeat 1) through 3) for several times

The EGG data set given to us is the result of above process.

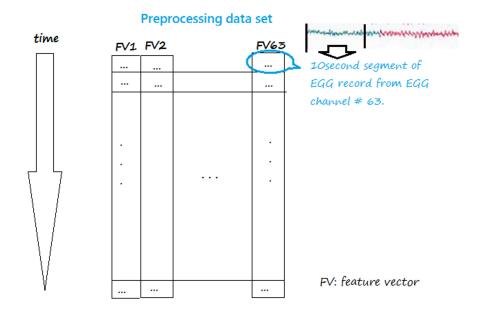
- EGG data set description:
 - The EGG data will be given as a specific format which can be read through Python library MNE. It is stored on google drive.
 - Data from multiple people will be given.
 - The data set is composed of
 - 64 channel of EGG records with the **voltage strength per millisecond**.
 - 64 locations of EGG sensor(detector) on brain (simliar location sensor will show similar pattern for its closeness -> try to remove the effect of it for it can considered as a noise)



- Default network(network that is active even when we are not doing anything) can be

considered as noise also I guess.

- What professor wants from us is "Find the connection(relationship) between the parts of brain"
 - How to find the connection?
 - => By clustering methods.
 - Possible process:
 - i. Preprocess the data
 - 1) Dimension reduction & signal processing:
 - : deciding the most relavant features is important



2) Dot product:

To stress the connection between the EGG channels.

Then above diagram will be similar replacing as ...

FV1 to FV12(connection between FV1 and FV2),

FV2 to FV13(connection between FV1 and FV3), ...

- Needs to use statistic knowledge(covariance and correlation)
- Removing the average relation(covariance) from the data will result in abnormal relationships on our data.
- ii. Find some pattern on the processed data
 - Find similar pattern between lines from preprocessed data set using some clustering methods like k-mean, mean shift, etc.
- iii. Check if the pattern is **meaningful**(validate the pattern)
- more than 3-5 clusters will be meaningful
- iv. If we find some pattern, we can predict other data using our pattern. If the prediction is correct on other data too, then it means the pattern is meaningful.

v. **Visualize** the pattern

