

Use data include all patients but not the whole dataset. Not shuffling and split the data to 20% for test and 80% for next split. Then shuffle the rest and split it in 20% for validation and 80% for training. Features extracted from 8 channels. During training is early stopping used. If valid set is not improved in 30 rounds, training will be stopped.

Test different window size

Here test 4 window sizes: 64, 128, 256, 512

The stride is 1/4 of the window size.

accuracy				
	W64	W128	W256	W512
train	0.983459	0.989837	0.985994	0.999424
valid	0.921379	0.93305	0.943616	0.951997
test	0.895815	0.915267	0.939756	0.931797
Rest data	0.898510	0.933318	0.954702	0.954827

In generally the accuracy get higher with increasing of the window size, but it will not effect to much after window size 256. Window size 256 has the highest accuracy of test set and the accuracy on the rest data is also closed to the highest accuracy.

Test different stride: 1/8, 1/4, 1/2 of the window size 256

accuracy			
	S32	S64	S128
train	0.999272	0.985994	0.972823
valid	0.973888	0.943616	0.915667
test	0.935507	0.939756	0.931085

compare features from left and right limb

Train the model on data from left or right limb.

Window size: 256 stride: 64

accuracy		
	Right	Left
train	0.986858	0.987540
valid	0.920335	0.912332
test	0.862776	0.900466
Rest data	0.894972	0.910650

The feature from left limb has better performance on test set and the rest data.

Compare Feature from each 2 channels

Train the model on data from each 2 channels.

Window size: 256 stride: 64

top 3 accuracy on test set

	LEFT_RF_RIGHT_BF	LEFT_BF_RIGHT_BF	LEFT_BF_RIGHT_RF
test	0.911816	0.865978	0.859721

Drop one signal from 8 out

	train	valid	test
drop_LEFT_TA	0.994088	0.947981	0.92826
drop_LEFT_TS	0.976671	0.936886	0.930297
drop_LEFT_BF	0.999454	0.948527	0.92142
drop_LEFT_RF	0.979854	0.934522	0.9367
drop_RIGHT_TA	0.99286	0.94307	0.945431
drop_RIGHT_TS	0.989177	0.94016	0.941211
drop_RIGHT_BF	0.997499	0.947435	0.912835
drop_RIGHT_RF	0.990086	0.941433	0.945867

After dropping RIGHT_BF, LEFT_BF, LEFT_TA the accuracy on test set get lowest. When testing on data from each 2 channels, the top 3 accuracy on test set are include RIGHT_BF, LEFT_BF.

Parameter

```
model = xgb.XGBClassifier(max_depth=4,  
                           learning_rate=0.3,  
                           n_estimators=1000,  
                           silent=True,  
                           eval_metrics='error',  
                           objective='binary:logistic',  
                           seed=100,  
                           sub_ssample=0.8,  
                           reg_lambda = 15,  
                           )
```