Machine Learning & Pattern Recognition

SGN-41007

Course assignment (Kaggle competition)

Task #1 Report

Team #41

Christen Blom-Dahl Casanova

Ronal Bejarano

Deborah Shin

Seonghoon Wee

1. Accuracies of the different feature extraction methods using a LDA

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| --- | --- |
| **Feature extraction method** | **Accuracy** |
| Straightforward reshape | 0.2756 |
| Average over the time axis | 0.5088 |
| Average and standard deviation over the time axis (ASD) | 0.6820 |

After testing the different methods, the ASD is the one with highest performance.

2. Accuracy of the different models using the best feature extraction method (ASD)

|  |  |
| --- | --- |
| Classifier models | Accuracy |
| Linear discriminant analysis classifier | 0.6820 |
| Support vector machine (linear kernel) | 0.7456 |
| Support vector machine (RBF kernel) | 0.7067 |
| Logistic Regression | 0.7208 |
| Random forest | 0.9222 |

3. Describe in your report what was your Kaggle score and how it differs from what you estimated locally using the 20% validation set

Using the 20% validation test we got a score of 0.9222. But Kaggle provided us a feedback of 0.68933 as score of our model. The difference of -25.2% could be affected by:

* Testing data size (342) is considerably smaller than evaluation data (1705), this demonstrate the uncertainty and sensitivity of applying Random Forest method on bigger scale evaluation data sets.
* Variations of parameters for feature extraction and data split have considerable impact on results. Our submissions improved from 0.52 to 0.68 by adding *TimeSeriesSplit* from *sklearn.model\_selection*
* All 10 data channels were used to train, test and evaluate. Probably selecting channels can reduce the gap on big scale evaluation data sets
* Varoquaux et el. (2017) emphasized that by tuning C hyper-parameters (1 -1000) of SVM and Logistic Regression improved the predictive power. However, it did not deliver a significant test score for our case.

***Reference***

[1] G. Varoquaux et el., (2017), Assessing and tuning brain decoders: Cross-validation, caveats, and guidelines, Elsevier