ML4CL: Assignment 3

Zarah Weiß

July 28, 2016

Task 4

Briefly (not more than half a page) discuss the results you have obtained. Include comparison of each model for their accuracy as well as computational complexity.

For the task of binary movie review classification three machine learning algorithms were applied: Logistic regression, multilayer perceptrons, and convolutional neural networks, which were trained and tested using stratified 10-folds cross validation. **Logistic regression** achieves the highest accuracy with 85.35%. It is also the simplest model in terms of computational complexity: on the one hand, it relies on simple unigram and bigram counts, instead of employing word vectors. On the other hand, it uses fewer parameters, than the others. In fact, a **MLP** without any hidden layers would correspond to the logistic regression analysis. However, the two MLP implemented consist of multiple hidden layers. Their number was varied to find the best results. The unigram MLP has 302 hidden layers and 30,805 parameters, resulting in an accuracy of 69.75%. For bigrams, the highest accuracy of 67.20% is achieved for 420 hidden layers and 65,731 parameters. Most complex, however, is the **CNN**, which only achieves an accuracy of 52.25% with 69,026 parameters. It runs for over 5 hours.

So it turns out, that the least computationally complex model also performs best in this case. However, with more successfully tuned hyper-parameters, this would probably change and MLP and CNN would return better results. Unfortunately, these more suited hyper-parameters could not be found in the course of experimenting.