Evaluate classifier performance through leave one out cross validation

Set aside one example as a test fold for evaluating classifier accuracy

Scale data: for each feature compute the mean and standard deviation across the training samples (*n*-1 examples) and use to scale all examples

Carry out leave one out cross validation to select classifier parameters: the soft margin *C* and number of feature families (ROI/graph)

n-1 times

- Set aside one example as a test fold for evaluating classifier accuracy
- Rank features according to their between group t^2 statistic as derived from the training set (*n*-2 examples) to leave the top 25% features in each family (ROI/graph)
- Evaluate SVM performance on training sample over all the range of classifier parameters
- Compute the optimal weighted sum of feature kernels using block diagonal optimization and train SVM and evaluate on test sample
- . Use the learned weights to remove the feature family with the least contribution

|feature families| x |[c_1 … c_K]|

n times

Compute accuracy over the *n*-1 training folds for every conjunction of *C*=*c* and *FeatNum*=*k*

Choose $C=c_{opt}$ and $FeatNum_{opt}=[k_1 \dots k_m]$ that attained maximal accuracy

Rank features according to their between group t^2 statistic as derived from the training set (*n*-1 examples) to leave the top 25% features in each family

For all feature families

- Compute the optimal weighted sum of feature kernels using block diagonal optimization
- Train SVM and remove least contributing feature family

Evaluate SVM with c_{opt} and *FeatNum*=[*k1* … *km*] on withheld subject establishing correctness through a (binary) majority vote

Establish feature accuracy across the *n* training folds, as well as the average feature family ranking.