Data Science @UL-FRI

Feature selection on large and sparse datasets

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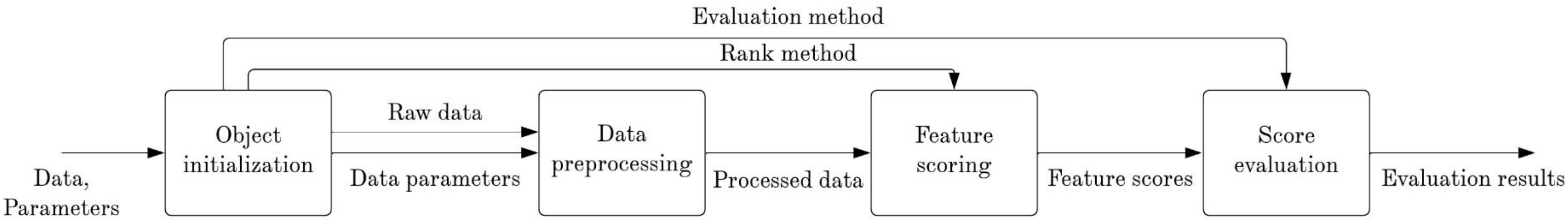
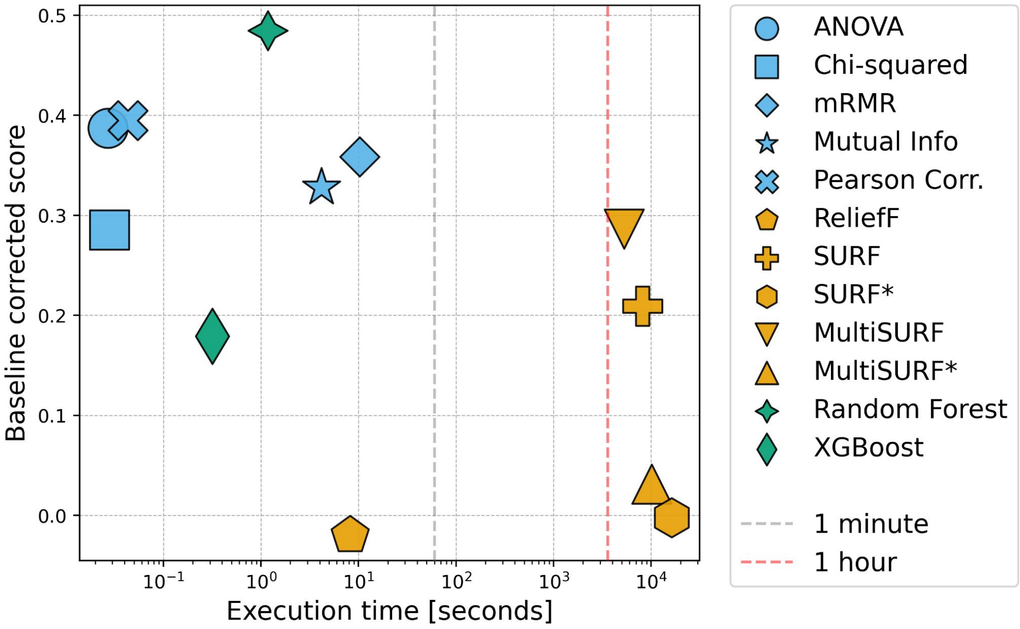
Problem & dataset

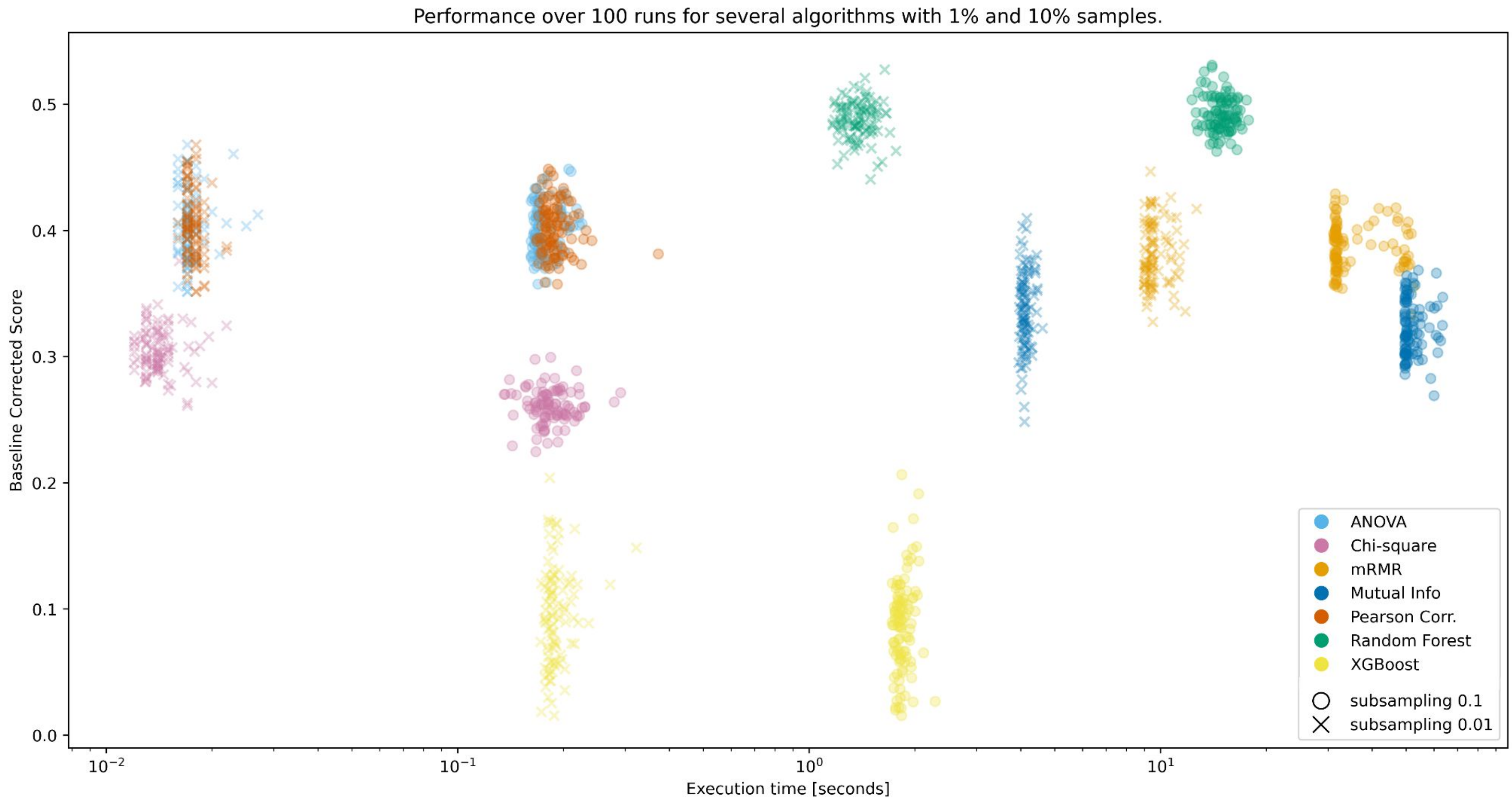
- Outbrain, web recommendation platform
- Sparsity, high cardinality, uninformative features
- Efficient feature selection approach
- Ranking & evaluation pipeline



Algorithms

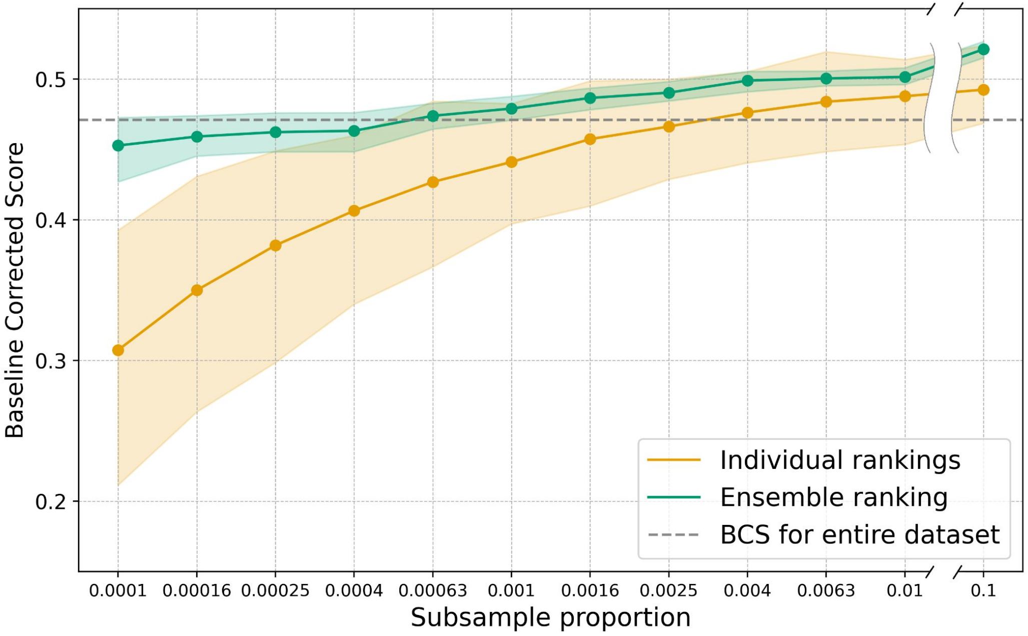
- Filter and wrapper methods
- Using statistical properties
- Relief based approaches
- Baseline corrected score
- First eliminations




Performance over 100 runs for several algorithms with 1% and 10% samples.
Baseline Corrected Score
0.0
0.1
0.2
0.3
0.4
0.5
10^{-2}
10^{-1}
10^{0}
10^{1}
Execution time [seconds]
ANOVA
Chi-square
mRMR
Mutual Info
Pearson Corr.
Random Forest
XGBoost
subsampling 0.1
subsampling 0.01

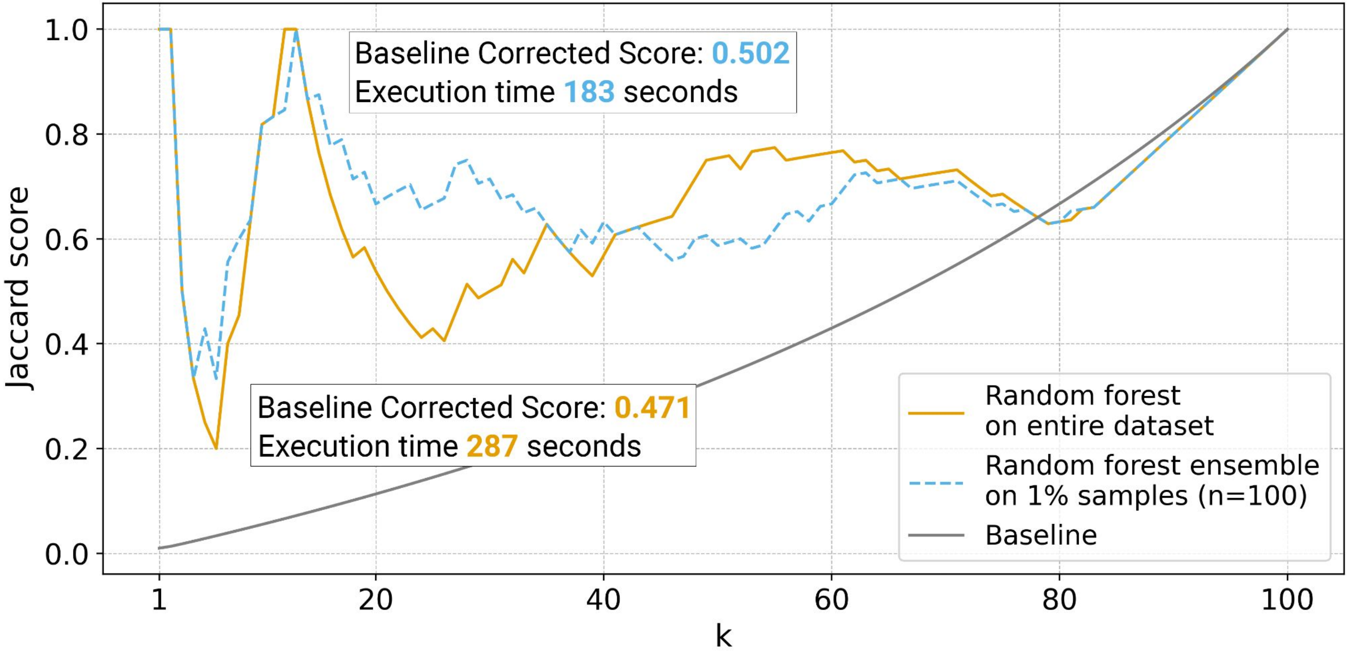
RF performance & ensemble

- Subsampling optimization
- Ensemble approach
- Borda count voting system
- Gain for the smallest samples
- Performance & variance



Conclusions

- Same data
- Faster execution
- Better scores
- Less uncertainty


Baseline Corrected Score: 0.502
Execution time 183 seconds
Baseline Corrected Score: 0.471
Execution time 287 seconds
Jaccard score
k
Random forest on entire dataset
Random forest ensemble on 1% samples (n=100)
Baseline