

SVM Optimizer

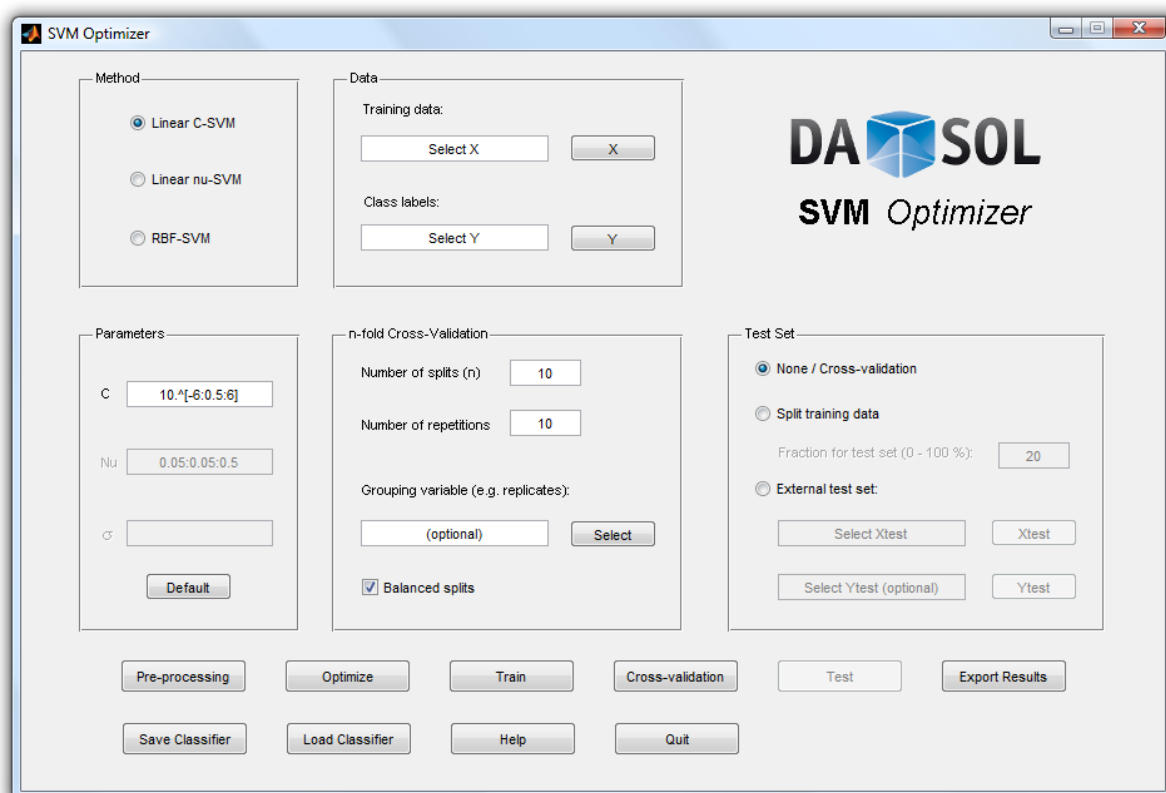
**DATA ANALYSIS SOLUTIONS
DA-SOL GmbH**

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SVM OPTIMIZER

The *SVM Optimizer* is a graphical user interface for efficiently developing SVM two-class classifiers in Matlab. In particular it implements powerful and straightforward parameter optimization approaches developed by J. von Frese and taught in his SVM courses. The *SVM Optimizer* guides the user through the whole classifier optimization and testing process.

The application of support vector machines has often been hampered by the fact that existing software is neither user-friendly nor allows for a systematic, rigorous parameter tuning. When used properly, SVMs are actually a very simple and straightforward tool and even a novice user can develop optimal models.



Existing commercial software usually applies a grid search over a pre-defined parameter space and suggests the model with the lowest cross-validation error. This has severe disadvantages:

- The optimal parameters might actually lie outside the pre-defined search grid. As the lowest achievable error is unknown and no diagnostics for over- or underfitting is provided, the found solution might actually be far from optimal.
- As no data specific knowledge is used, the search grid is usually laid out on a logarithmic scale and thus might offer no or only limited coverage of the optimal region and therefore result in suboptimal or instable models.
- As cross-validation has been used for parameter optimization, the respective error estimate is optimistically biased and a further test set would be required for a valid error assessment.

Features

- Offers the linear C- and nu-SVM as well as the non-linear C RBF-SVM as essential toolset for tackling all numerical two-class classification problems.
- Uses the efficient LIBSVM optimization module.
- Fast training even for large data sets
- Provides several pre-processing options:
Optional auto-scaling for variables measured on different scales, advanced custom pre-processing through a seamless interface to the commercial PLS-Toolbox (www.eigenvector.com, not included).
For applying the non-linear RBF-SVM to high-dimensional data, a prior dimensionality reduction by PCA or PLS can be performed.
- Provides unique diagnostics for optimizing the linear SVM parameters C or nu, establishing for each trial solution, if over- or underfitting occurred.
- Provides efficient diagnostics from the data at hand for choosing the RBF parameter σ reliably.
- Repeated n-fold cross-validation for error assessment
- Allows the rigorous definition of cross-validation partitions (e.g. leaving all replicates of a certain sample or a specific subgroup out).
- When using an independent test set, often the rather wide confidence intervals for such an estimate are neglected. The *SVM Optimizer* also provides this crucial information. The corresponding Matlab function can also be used independently.
- Ability to inspect the model
- Ability to save and apply existing models

Note: This is version 1.0 of the software. - For efficient computation, the SVM optimizations are performed within a compiled C library ("MEX-file"). This library is provided for Windows 32 and 64 bit systems.

Introductory Price:

Single user commercial license
Other licenses on request

300 € (+ 19 % VAT)

The price includes the next update which will include the option for double cross-validation, thus providing further validation for the chosen parameters.

Please refer to our [SVM Starter Page](#) for more information on SVMs!