

Technical information

- ▶ Feature selection, PCA, LDA, kernels, dissimilarities such as spectral angle mapper (SAM)
- ▶ Fisher, Gaussian mixtures, Parzen, k-NN, k-means, Decision trees, Random Forest, Neural networks, Support Vector Machines, naïve Bayes and more
- ▶ Detection, Classification, Rejection, Classifier fusion, Classifier cascades
- ▶ Two- and multi-class ROC analysis, rejection curves, cost-optimization
- ▶ Cross-validation, leave-one-object out, Cluster analysis
- ▶ Real-time classifier deployment via runtime DLL

System requirements

- ▶ Supported operating systems: Windows 32/64 bit, Linux 32/64 bit, Mac OS X 32/64 bit
- ▶ **Classifier design:** Matlab® 7.5 or higher
- ▶ **Production deployment:** Any environment that can call a DLL
 - ▶ Execution runtime is ready for customized embedded deployment (DSP, real-time OS)

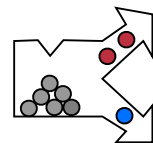
perClass users

- ▶ **Classifier design:** In-house researchers with basic knowledge of data analysis and Matlab®
- ▶ **Production deployment:** In-house developers with basic skills to integrate a DLL library
 - ▶ Typically embedded in a custom application in minutes
 - ▶ No programming needed to change or update classifiers!
- ▶ **PR Sys Design provides a full range of skill and competence building options:**
 - ▶ Comprehensive documentation & support forum
 - ▶ Training courses providing quick start & building practical skills (also in-house)
 - ▶ Dedicated on-demand support & consulting services

About PR Sys Design

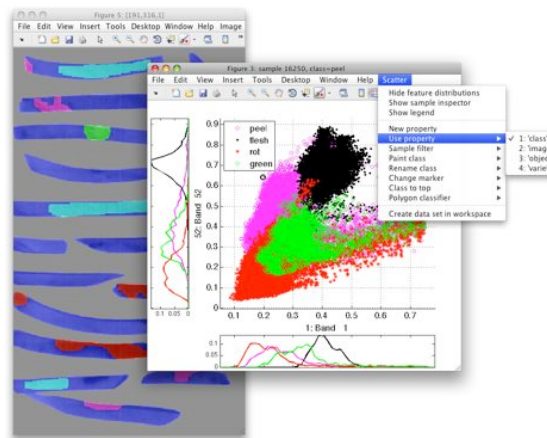
PR Sys Design is a spinoff of Delft University of Technology (The Netherlands), founded in 2006 to bring state-of-the-art pattern recognition to industrial practitioners and researchers. The initial focus on consulting services lead to development of a powerful suite of in-house software tools. The result of this continuous effort is perClass software package, available on the market since 2008. Today, perClass is adopted by a range of innovative companies in their high-tech products and by number of academic and research institutes.

Fully privately funded, PR Sys Design provides consulting and training services centered around perClass. PR Sys Design keeps collaborating with universities and is active in research on pattern recognition system design and classifier optimization.



perClass

The complete software solution for industrial machine learning



“ perClass is a very valuable and flexible tool and made our life much easier. Also the support was very good. I can recommend it to every pattern recognition system designer. ”

“ perClass development environment is easy-to-use, powerful and extensive. Deploying the created algorithms is simple and reliable. ”

pattern recognition that works



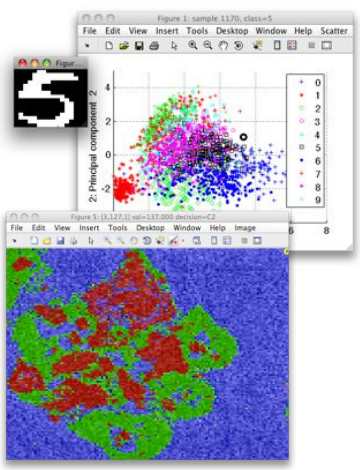
PR Sys Design
 Molengraaffsingel 12
 2629 JD, Delft
 The Netherlands

Phone: +31(0)648060368
 Fax: +31(0)107994270
 E-mail: info@perclass.com
<http://perclass.com>

The Challenge

Making robust decisions for natural objects (stones, potatoes) or outdoor scenes (face recognition) is difficult. Large signal variability and uncontrolled data acquisition make it impossible to manually adjust decision parameters on one or few images.

Statistical machine learning promises accurate systems minimizing the probability of error. However, for industrial practitioners this promise is not fulfilled due to the lack of reliable tools. **perClass brings easy-to-use dependable machine learning tools to industry.**



The Concept

perClass is a complete software solution that enables you to build classifiers. A classifier is a software component that makes automatic decisions (imagine a cancer detector in medical scans). perClass provides:

- ▶ **Easy design of classifiers.** You can quickly create accurate and robust solutions.
- ▶ **Fast deployment anywhere.** A dedicated runtime brings real-time classifiers directly into production applications. You radically shorten the time to market.

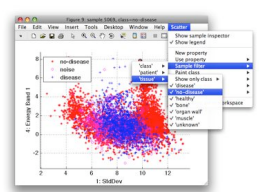
Applications

perClass is used by industrial and academic researchers in a broad range of demanding applications. It is integrated in high-throughput automatic solutions that operate real-time. Some successful applications are:

- ▶ Rock sorting in mining industry
- ▶ Classification of mineral particles
- ▶ Cancer detection in ultrasound images
- ▶ Luggage sorting at the airport
- ▶ Traffic accident detection
- ▶ Brain-computer interfaces

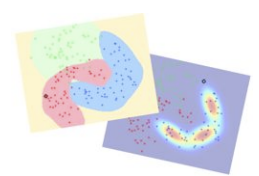


Design your system



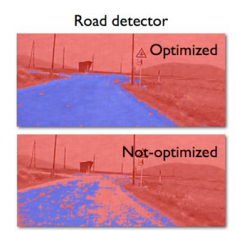
Interactive tools. Machine learning is not a black box. The more you understand your data, the better solutions you get. Interactive tools for data visualization in scatter plots or images allow you to inspect your data, find informative features, paint the classes you want to identify and make sure that the data is correctly acquired or normalized.

Replace tedious programing with point-and-click action.



Classification tools. If all you have is a hammer, everything looks like a nail. However, each pattern recognition project is different. The right classifier can lead you to more robust, accurate or faster solution. perClass offers a wide range of state-of-the-art classifiers such as neural networks, random forests, and support vector machines to name a few. It allows you even to draw your own classifier directly in the scatter plot!

Choose the best tool for the job.



Classifier optimization. Some errors of a machine learning system are more costly than others. To miss cancer costs lives but the opposite only brings inconvenience. perClass provides easy-to-use fine-tuning tools to optimize your classifiers according to the specific needs of your application. **Adjust your classifiers to your needs.**

Deploy your solutions right away

How do you bring your classifier from a research prototype into the production machine? perClass provides a unique execution runtime that may be **embedded in minutes** in your machine, and **executes real-time classifiers** without any extra programming. This lets you quickly test improved solutions in production, and dramatically shortens your development time.

Embed real-time classifiers in your machine in minutes.

