perClass

The complete software solution for industrial machine learning

Technical information

▸ Feature selection, PCA, LDA, kernels, spectral band extraction, prototype similarities (SAM)
▸ Linear discriminants, Gaussian mixtures, Parzen, k-NN, k-means, Decision trees, Random Forests, Neural networks, Support Vector Machines, naïve Bayes and more
▸ **Deep learning** for local image classification, support for multi-band images
▸ 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
▸ Local image and object-level features
▸ Real-time classifier deployment via runtime DLL

System requirements

▸ Supported operating systems: Windows 32/64 bit, Linux 32/64 bit, macOS 64 bit
▸ **Classifier design**: Matlab® 2010b or higher
▸ **Production deployment**: Any environment that can call a DLL
　▸ Execution runtime is ready for customized embedded deployment (DSP, real-time OS)

Training and consulting services

▸ **Regular training courses:** Five-day course providing practical methodology to R&D specialists
　▸ Overview of the state-of-the-art machine learning methods and practices
　▸ Intensive hands-on exercises on many industrial use-cases
　▸ From raw data to real-time embedding in a machine
　▸ Participants are welcome to bring their own data
▸ **In-house training courses**
▸ **Consulting services:**
　▸ Feasibility studies
　▸ Custom algorithm development

About perClass BV

perClass BV is a spin-off of Delft University of Technology in The Netherlands, founded (as PR Sys Design) to bring state-of-the-art pattern recognition to industrial practitioners. Initial focus on consulting services led to 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, perClass BV provides consulting and training services centered around perClass.

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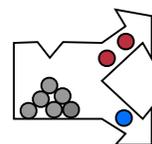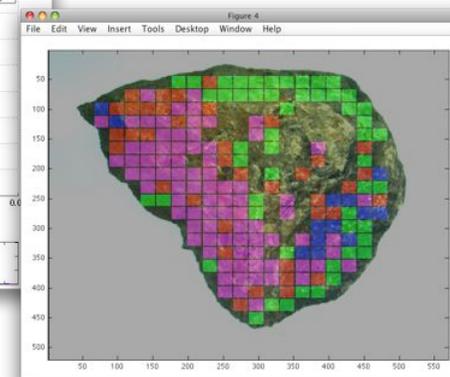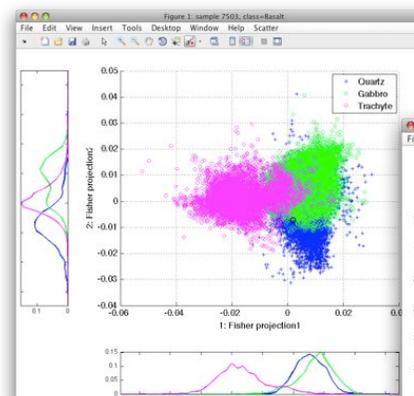
> " *I found the course very informative. I think you have done an excellent job in developing a logical framework, with powerful tools, for tackling pattern recognition problems.* "
> Dr. Garry Morrison, Senior Scientist, De Beers

> " *perClass development environment is easy-to-use, powerful and extensive. Deploying the created algorithms is simple and reliable.* "
> Jorick Naber, Type22 BV

The Challenge

Making robust decisions for natural objects (stones, potatoes) or outdoor scenes (face recognition) is difficult. High signal variability and uncontrolled lighting 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 potato sorting machine).

perClass provides:

- **Easy design of classifiers**. You can quickly create accurate and robust solutions.
- **Fast deployment anywhere**. A dedicated runtime brings real-time classifiers into prototypes and 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
- Plant disease and food defect classification
- 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 extra programing. This lets you quickly test improved solutions in production, and dramatically shortens your development time.
Deployment to C/C++, OpenCV, .Net, LabView, HALCON, Cognex Vision Pro, Matlab® compiler, MS SQL Server, etc.
Embed real-time classifiers in your machine in minutes.