

uni software plus

Profile. Products. Solutions.

Mathematica
UnRisk
machine learning framework

from

- Wolfram Research
- MathConsult / IMCC
- SCCH
- FLL

for

- Over 25 research institutions – CERN, Fraunhofer Gesellschaft
- Hundreds of industrial enterprises – Sony, TRUMPF, VOITH
- Over 50 banks and financial institutions – Austrian Central Bank, RBC, SWX, ZKB

A network of distinguished technology partners and exciting products for the benefit of our customers

WELCOME

Uni software plus creates mathematical software-solutions for finance, engineering, processing /manufacturing. Uni software plus is owned and run by generalists in mathematics, software engineering and communication. We achieve excellence by building a close working relationship with customers and technology partners.

This is a new type of company. Uni software plus partners with distinguished technology providers and makers of exciting products. We are passionate about new technologies but old fashioned in our business principle: adding values.

Formed in 1989, uni software plus has transformed mathematical approaches into values and has since built an international reputation.

FIELDS OF EXPERIENCE

SYMBOLIC COMPUTATION

Computers can manipulate higher symbolic objects in order to provide general solutions of industrial problems for a wide problem-range. Mathematica - our selected product - is renowned for its unprecedented symbolic computation power. We offer extensions of Mathematica into the universe of financial derivatives, machine learning and data mining and know how to manage symbolic constructors serving as interfaces for a large variety of algorithms including parallelization. For grid-computing we combine forces with R. Maeder who has developed the Parallel Computing Toolkit for gridMathematica. We have now reached a point where there is no compromise between speed and generality.

HIGH-END NUMERICS

Because of its readability and accuracy one wants to maintain models in symbolic form. But this is not always possible. Numerical algorithms need to be applied to solve the most sophisticated models. MathConsult's leading edge knowledge embraces fast-paced and accurate numerical schemes, especially for solving complex partial differential equations and parameter identification. Distinguished MathConsult solutions, like UnRisk2, combine numerically optimized engines with Mathematica. Mathematica provides the right framework for a generic design of very special problem solvers for optimizing complex processes as well as pricing exotic options.

MACHINE LEARNING/DATA MINING

With machine learning one can extract models from data. Partnering with Software Competence Center Hagenberg (SCCH) uni software plus is emphasizing on methods which create understandable computational models and has developed machine learning framework for Mathematica. Its machine learning approach is empowered by fuzzy logic

FUZZY LOGIC

Fuzzy logic has emerged as a profitable methodology for diagnosis- and other expert systems as well as controlling processes. It allows for the creation of interpretable models, which are computational and provide human-like decisions. Together with the Fuzzy Logic Laboratorium Linz (FLLL) we have successfully applied fuzzy logic to machine control, image processing and machine learning.

MATHEMATICAL SOFTWARE ENGINEERING

We achieved excellence in fields where mathematics and computer science intersect. This includes advanced object oriented techniques and declarative programming in Mathematica. We like a few lines of code doing unexpected complex tasks. UnRisk and machine learning framework are based on an optimized C++ engine integrated into Mathematica. To us this kind of hybrid-system designs mark the future of software development. Instant Mathematics. Document-centered approaches. Declarative programming. Imaging and graphics. Office and data base integration. Designed to run on desktops, in networks, on web-servers and in grids.

PRODUCTS

WOLFRAM RESEARCH PRODUCTS

- Mathematica
- webMathematica
- gridMathematica

MATHCONSULT SOLUTIONS

- UnRisk2 PRICING ENGINE
- UnRisk STANDARD

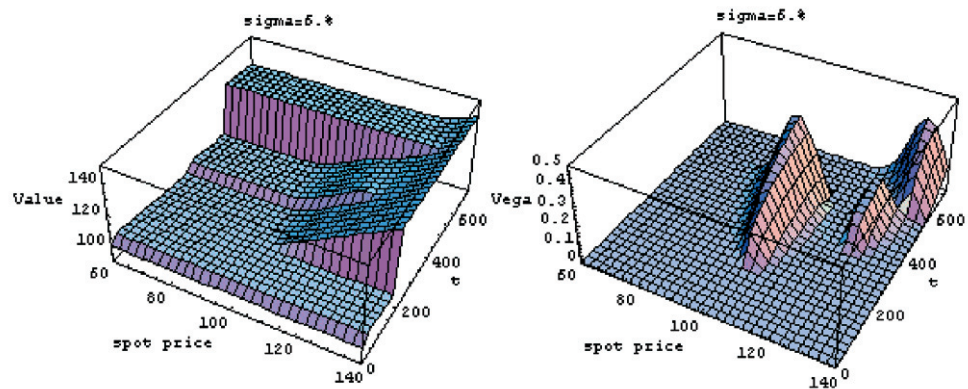
UNI SOFTWARE PLUS PRODUCTS

- machine learning framework
- MathLink for AppleScript

SOLUTIONS

COMPUTATIONAL FINANCE

With MathConsult, we build the UnRisk consortium. UnRisk2 solutions are made for advanced derivatives and structured products analytics and global risk management. Due to MathConsult's proprietary numerical methods UnRisk2 is extremely fast and accurate. The consortium continues to explore new methods for front and back offices in innovative financial institutions.



This example shows the dirty value and the vega of a callable puttable convertible bond as a function of the spot price of the underlying and of time to maturity.

IMAGE- AND SIGNAL PROCESSING

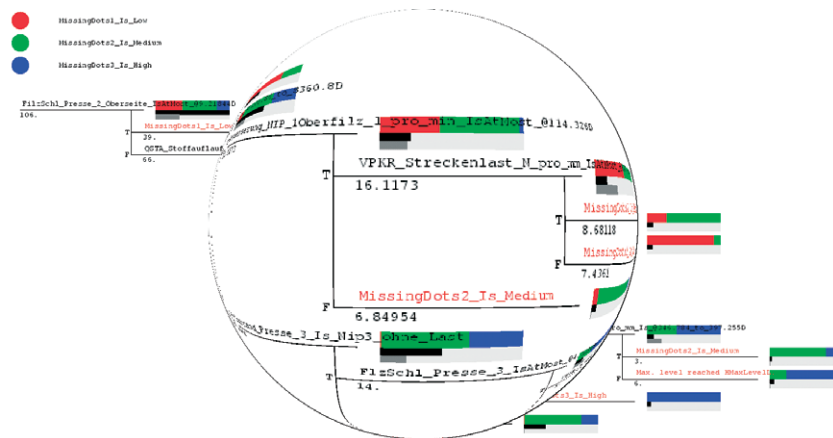
Human-like error detection or feature recognition in images are challenging tasks. The intelligent combination of classical methods with fuzzy logic is the key for solving ambitious problems with this special requirement. Together with SCCH and FLLL, we have developed computer solutions, which successfully assess the quality of prints, video, music and create clusters and segmentations on 2D, 3D and 4D data.



For a human Missing Dots in a printed face are much more tolerable than in homogeneously coloured areas. For computer calculations, this distinction is not so easy. With fuzzy rules we can simulate human-like recognition.

PROCESS OPTIMIZATION – MACHINE LEARNING

For process- and manufacturing engineers, quality assurance professionals and automation experts, who want to extract computational models from process and quality data, we build machine learning solutions based on our machine learning framework. Together with SCCH we have successfully optimized processes, which are as complex as paper production and assembly automation.



Compact decision trees created by fuzzy variants of inductive learning methods can describe complex process behaviour

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