

# AI Tools and Vendors

## Fuzzy Logic Tools

### CubiCalc

A software tool for creating and using fuzzy rules. With CubiCalc, the user can write English-like IF-THEN rules and use a graphical editor to define fuzzy sets. The user can then apply the rules to his/her data or use them in a simulated dynamic scenario. CubiCalc is particularly useful for rapid prototyping. No programming is needed to set up plots, numeric displays, input and output data files, and interactive data entry windows.

<http://www.hyperlogic.com/cbc.html>

### Mathematica Fuzzy Logic Package

The package represents built-in functions that facilitate in defining inputs and outputs, creating fuzzy sets, manipulating and combining fuzzy sets and relations, applying fuzzy inference functions, and incorporating defuzzification routines. Experienced fuzzy logic designers find it easy to use the package to research, model, test, and visualise highly complex systems. *Fuzzy Logic* is compatible with *Mathematica 2.2*, and is available for Windows 95/98/NT, Macintosh, and most Unix platforms.

<http://www.wolfram.com/products/applications/fuzzylogic/>

### MATLAB Fuzzy Logic Toolbox

Features a simple point-and-click interface that guides the user through the steps of fuzzy design, from set up to diagnosis. It provides built-in support for the latest fuzzy logic methods, such as fuzzy clustering and adaptive neuro-fuzzy learning. The Toolbox 's interactive graphics let the user visualise and fine-tune system behaviour.

<http://www.mathworks.com/products/fuzzylogic/>

### FIDE

The Fuzzy Inference Development Environment (FIDE) is a complete environment for the development of a fuzzy system. It supports all phases of the development process, from the concept to the implementation. FIDE serves as the developer 's guide in creating a fuzzy controller, including its implementation as a software or hardware solution. Hardware

solutions are realised in the Motorola microcontroller units; the code is generated automatically. FIDE also supports C code by creating ANSI C code for a fuzzy inference unit.

<http://www.aptronix.com/fide/>

## **FLINT**

The Fuzzy Logic INferencing Toolkit (FLINT) is a versatile fuzzy logic inference system that makes fuzzy rules available within a sophisticated programming environment. FLINT supports the concepts of fuzzy variables, fuzzy qualifiers and fuzzy modifiers (linguistic hedges). Fuzzy rules are expressed using a simple, uncluttered syntax. Furthermore, they can be grouped into matrices, commonly known as fuzzy associative memory (FAM). FLINT provides a comprehensive set of facilities for programmers to construct fuzzy expert systems and decision support applications on all LPA-supported hardware and software platforms.

<http://www.lpa.co.uk/>

## **FOOL and FOX**

A fuzzy system development tool with interactive "foolproof" graphical user interface. FOOL stands for the Fuzzy Organiser Oldenburg, and FOX is a fuzzy engine. FOOL and FOX is a result of a project at the University of Oldenburg. FOOL provides a graphical user interface for developing fuzzy rule bases. FOOL can also be used for creating and maintaining a database that specifies the behaviour of a fuzzy-controller. FOOL and FOX are available as freeware.

<http://condor.informatik.uni-oldenburg.de/FOOL.html>

## **FUZZLE**

A fuzzy logic inference shell for the development of rule-based expert systems. The tool provides a point-and-click graphical interface. FUZZLE generates a source code in C or FORTRAN programming language that can be converted into an executable and attached to an application environment. In addition, FUZZLE has its own execution module that allows the user to obtain inference results directly from the shell. FUZZLE 3.0 is available as a free download.

<http://www.modico.com/>

## **FuzzyCLIPS**

FuzzyCLIPS is an extension of the CLIPS (C Language Integrated Production System) from NASA, which has been widely distributed for a number of years. It enhances CLIPS by providing a fuzzy reasoning capability such that the user can represent and manipulate fuzzy facts and rules. FuzzyCLIPS can deal with exact, fuzzy, and combined reasoning, allowing fuzzy and normal terms to be freely mixed in the rules and facts of an expert system. The system uses two basic inexact concepts, fuzziness and uncertainty. FuzzyCLIPS is available as a free download.

[http://ai.iit.nrc.ca/IR\\_public/fuzzy/](http://ai.iit.nrc.ca/IR_public/fuzzy/)

## **Fuzzy Judgment Maker**

A tool for developing fuzzy decision support systems. It breaks the decision scenario down into small parts that the user can focus on and input easily. It then uses theoretically optimal methods of combining the scenario pieces into a global interrelated solution. The Judgment Maker provides graphical tools for negotiating decisions, and making the consensus from two decisions.

<http://www.fuzzysys.com/>

## **FuzzyTECH**

*FuzzyTECH* is the world ' s leading family of software development tools for fuzzy logic and neural-fuzzy solutions. It provides two basic products: The "Editions" for technical applications and the "Business" for applications in finance and business. The tree view enables the structured access to all components of a fuzzy logic system under design in the same way the Windows Explorer lets users browse the structure of their PCs. The Editor and Analyser windows allow design of each single component of a fuzzy system graphically.

<http://www.fuzzytech.com/>

## **O'INCA Design Framework**

A software development platform for building "intelligent" (expert and adaptive) systems. It allows for integration of fuzzy logic, neural network and user-defined modules in a single framework. It combines graphical user interface (GUI), simulation and debugging facilities, and C code generation. Offers the point-and-click rule editor and graphical editor of membership functions.

<http://www.meridian-marketing.com/TECH/fuzneu.html>

## **TILShell**

The windows-based software development tool for designing, debugging and testing fuzzy expert systems, including embedded control systems. It offers real-time on-line debugging and tuning fuzzy rules, membership functions and rule weights; 3-D visualisation tools; fully integrated graphical simulation of fuzzy systems and conventional methods; and ANSI and Keil C code generation from the Fuzzy-C compiler.

<http://www.ortech-engr.com/fuzzy/TilShell.html>

## **Neural Network Tools**

### **Attrasoft Predictor & Attrasoft DecisionMaker**

Neural network based tools that use the data in databases or spreadsheets to detect subtle changes, predict results, and make business decisions. The DecisionMaker is especially good for applications to terabyte or gigabyte databases because of its accuracy and speed. The software does not require any special knowledge in building neural networks.

<http://attrasoft.com/products.htm>

### **BackPack Neural Network System**

Designed for users interested in developing solutions to real business problems using state-of-the-art data mining tools. The BackPack Neural Network System uses backpropagation algorithm. It reads ASCII text files and dBASE database files. The system has built-in data preprocessing capabilities, including fuzzy sets, 1-of-N, built-in graphical analysis tools for model evaluation and explanation thermometer transforms, and training dataset creation. A working trial version of BackPack is available as a free download.

<http://www.zsolutions.com/backpack.htm>

### **BrainMaker**

The neural network software for business and marketing forecasting, stock, bond, commodity, and futures prediction, pattern recognition, medical diagnosis – almost any activity where the user needs special insight. The user does not need any special

programming or computer skills. With more than 25,000 systems sold, BrainMaker is the world ' s best-selling software for developing neural networks.

<http://www.calsci.com/>

### **MATLAB Neural Network Toolbox**

The Neural Network Toolbox is a complete neural network engineering environment within MATLAB. It has modular, open, and extensible design that provides comprehensive support for many proven network paradigms such as multilayer perceptrons with back-propagation learning, recurrent networks, competitive layers and self-organizing maps. The toolbox has a graphical user interface for designing and managing the networks.

<http://www.mathworks.com/products/neuralnet/>

### **Neuframe**

Provides an easy-to-use, visual, object-orientated approach to problem solving using intelligence technologies. Options include C, C++, Java and Matlab code extraction. Neuframe supports such paradigms as multilayer perceptron, radial basis function, Kohonen, KMeans, and neuro-fuzzy logic. Neuframe 4 is available as a free download.

[http://www.ncs.co.uk//Products/fr\\_nfpro.htm](http://www.ncs.co.uk//Products/fr_nfpro.htm)

### **Neugents *ii***

Offers a complete platform for building the next generation of intelligent eBusiness solutions. The *Value Predict Neugents* learns by finding cause and effect relationships in historical data. The *Event Predict Neugents* learns by associating similar data into groups or clusters, tracking state transactions and then applying this knowledge to new data in real time. Neugents is available for free on a CD for Microsoft Outlook.

[http://www.ca.com/products/neugents\\_ii/](http://www.ca.com/products/neugents_ii/)

### **NeuralSIM**

A state-of-the-art development environment for developing and deploying real-time applications in forecasting, modelling and classification automatically. *NeuralSIM* requires no knowledge of neural network technology to develop good solutions. The system combines neural network technology with fuzzy logic, statistics and genetic algorithms to

identify solutions. For advanced and expert users, *NeuralSIM* provides direct access and control of automated features at a very low level.

<http://neuralware.com//Products.htm>

### **NeuroGenetic Optimizer (NGO)**

Automates the design and development of neural networks. It builds optimised neural networks by selecting input variables automatically and optimises the neural network types and architectures to fit the application. The NGO uses Genetic Algorithms to evolve neural network structures and simultaneously select key input variables. The NeuroGenetic Optimizer 2.6 is available as a free 45 day demo (limited to limited to 5 inputs).

<http://www.bio-comp.com//pages/neuralnetworkoptimizer.htm>

### **NeuroSolutions**

Software combines a modular, icon-based network design interface with an implementation of learning procedures, such as recurrent backpropagation and backpropagation through time. Other features include graphical user interface and C++ source code generation. There are three main levels of NeuroSolutions: the Educator, the entry level intended for those who want to learn about neural networks; the Users level, which extends the Educator with a variety of neural models for static pattern recognition applications; and the Consultants level that offers enhanced models for dynamic pattern recognition, time-series prediction and process control.

<http://www.nd.com/products.htm>

### **NeuroShell 2**

Combines powerful neural network architectures, a Microsoft Windows icon driven user interface, sophisticated utilities, and popular options to give users the ultimate neural network experimental environment. It is recommended for academic users only, or those users who are concerned with classic neural network paradigms like backpropagation. Users interested in solving real problems should consider the NeuroShell Predictor, NeuroShell Classifier, or the NeuroShell Trader.

<http://www.wardsystems.com/products.asp>

### **Partek Discover & Partek Predict**

Partek Discover provides visual and numerical analysis of clusters in the data. Also useful for mapping high-dimensional data to a lower dimension for visualisation, analysis, or modeling. Partek Predict is a tool for predictive modelling that determines an optimal set of variables to be used. It provides several methods for variable selection, including statistical methods, neural networks, and genetic algorithms.

<http://www.partek.com/html/products/products.html>

### **Saxon**

Offers solutions to prediction problems by using ASCII, Excel or dBase data files or from ODBC access. The user's only task is to tell Saxon which variable in the data set is to be predicted - everything else is automatic. SaxView lets the user visualise the actual data or randomly generated examples, and their associated predictions. Saxon 4.3 and 7 data sets are available as free downloads.

[http://www.transfertechn.de/www/ncme\\_gen.htm](http://www.transfertechn.de/www/ncme_gen.htm)

### **STATISTICA Neural Networks**

STATISTICA Neural Networks is the most technologically advanced and best performing neural networks application on the market. It offers numerous unique advantages and will appeal not only to neural network experts (by offering to them an extraordinary selection of network types and training algorithms), but also to new users in the field of neural computing (via the unique *Intelligent Problem Solver*, a tool that can guide the user through the necessary procedures for creating neural networks).

[http://www.statsoft.com/stat\\_nn.html](http://www.statsoft.com/stat_nn.html)

### **THINKS and ThinksPro**

THINKS is a personal neural development environment. It can also be used as an excellent teaching tool. With options on network architecture and processing element definition, the experienced user can quickly experiment with novel network configurations. ThinksPro is a professional neural network development environment. It offers dynamic graphing and visualisation tools to continually view inputs, weights, states, and outputs in a number of formats, illustrating the learning process. A free 30-day trial version of ThinksPro is available as a free download.

<http://www.sigma-research.com/bookshelf/rthinks.htm>

## **Evolutionary Computation Tolls**

### **ActiveX Genetic Programming Control**

Enables the user to build his/her own "genetic programs" with any OCX- or ActiveX- programming language. The user just has to provide the grammar in a plain text file and add his/her raw fitness evaluation function. A manual and a sample application are available as free downloads.

<http://www.hhsoft.com/>

### **GEATbx**

The Genetic and Evolutionary Algorithm Toolbox (GEATbx) for use with Matlab is the most comprehensive implementation of evolutionary algorithms in Matlab. A broad range of operators is fully integrated into the environment that constitutes a powerful optimisation tool applicable to a wide range of problems.

<http://www.geatbx.com/>

### **GeneHunter**

A powerful solution for optimisation problems. GeneHunter includes an Excel Add-In which allows the user to run an optimisation problem from an Excel Release 7, Excel 97, or Excel 2000 spreadsheet, as well as a Dynamic Link Library of genetic algorithm functions that may be called from programming languages such as Microsoft Visual Basic or C.

<http://www.wardsystems.com/products.asp>

### **Genetic Server and Genetic Library**

Provide a general purpose API for genetic algorithm design. The Genetic Server is an ActiveX component that can be used to easily build a custom genetic application in Visual Basic. Genetic Library is a C++ library that can be used for building custom genetic applications in C++.

<http://www.nd.com/products/genetic.htm>

### **Generator**

A general purpose genetic algorithm program. It is useful for solving a wide variety of problems such as: optimisation, curve fitting, scheduling, stock market projections, electronic circuit design, neural network design, business productivity and management theories.

<http://myweb.iea.com/~nli/>

### **GenSheet**

Implements genetic algorithms as fast C-coded dynamic link libraries. GenSheet supports genetic operations for binary, integer, real and permutation representations, and includes special commands for constrained nonlinear optimisation, genetic classifiers, job-shop scheduling, and minimum variance portfolio computation. GenSheet requires Microsoft Excel. All GenSheet commands are configured in an easy-to-use Excel menubar. GenSheet provides an interactive help and a tutorial.

<http://www.inductive.com/softgen.htm>

### **Evolver**

An optimisation add-in for Microsoft Excel. Evolver uses genetic algorithms to quickly solve complex optimisation problems in finance, distribution, scheduling, resource allocation, manufacturing, budgeting, engineering, and more. Virtually any type of problem that can be modelled in Excel can be solved by Evolver. It requires no knowledge of programming or GA theory and is shipped with a fully illustrated manual, several examples, and free, unlimited technical support.

<http://www.palisade.com/html/evolver.html>

### **Sugal**

Sugal is the SUnderland Genetic ALgorithm system. The aim of Sugal is to support research and implementation in genetic algorithms on a common software platform. It is written in ANSI C, source code provided. Sugal supports multiple data types: bit strings, integers, real numbers, symbols (from arbitrarily sized alphabets) and permutations, and provides a platform-independent graphical user interface, including fitness and diversity graphing facilities. The Sugal 2.1 source code and manual are available as free downloads.

<http://www.trajan-software.demon.co.uk/sugal.htm>

### **Ultragem**

A genetic tool for data mining that helps to discover prediction rules in data. For example, Ultragem can discover rules which will accurately predict the probability that a loan will default. Rules are easily to understand, and thus can provide new business insight. They can also be easily translated into computer programs for automated decision-making.

<http://www.ultragem.com/>

### **XpertRule**

An expert system shell with embedded genetic algorithms. The system combines the power of genetic algorithms in evolving solutions with the power of rule-based expert systems in solving scheduling and optimisation problems.

<http://www.attar.com/>

## **Expert System Shells**

### **ACQUIRE**

A knowledge acquisition and expert system development tool. Knowledge is represented by production rules and pattern-based action tables. ACQUIRE does not require special training in building expert systems. A domain expert can create a knowledge base and develop applications without help from the knowledge engineer.

<http://www.aiinc.ca/products/acquire.html>

### **Blaze Advisor**

A sophisticated tool for developing rule-based object-oriented expert systems. Advisor has two components: *Advisor Builder* (a development tool with visual editors, powerful debugging facilities and wizards, which integrate rule-based applications with databases, Java objects and COBRA objects) and *Advisor Engine* (a high performance inference engine). Advisor includes mechanisms for servicing simultaneous users, scheduling deployments, performing dynamic load balancing, and reducing memory requirements.

<http://www.blazesoft.com/index.html>

### **Exsys CORVID**

An expert system development tool for converting complex decision-making processes into a form that can be incorporated into a Web page. CORVID is based on the Visual Basic

model and provides an object-oriented structure. It also uses logic blocks – supersets of rules and trees, which can be run via forward or backward chaining. CORVID applications are delivered via a small Java applet that allows robust interface design options.

<http://www.exsys.com/>

## **Flex**

A frame-based expert system toolkit. Supports frame-based reasoning with inheritance, rule-based programming and data-driven procedures. Flex has its own English-like Knowledge Specification Language (KSL). The main structures in Flex are frames and instances with slots for organising objects, default and current values for storing data, demons and constraints for adding functionality to slot values, rules and relations for expressing knowledge and expertise, functions and actions for defining imperative processes, and questions and answers for end-user interaction. The KSL supports mathematical, Boolean and conditional expressions.

<http://www.lpa.co.uk/>

## **G2**

An interactive object-oriented, graphical environment for the development and on-line deployment of intelligent systems. Objects are organised in hierarchical classes with multiple inheritance. Developers can model an application by representing and connecting objects graphically. Expert knowledge is expressed by rules. G2 employs forward chaining to automatically respond whenever new data arrives, and backward chaining to invoke rules or procedures. G2 works efficiently in real time.

<http://www.gensym.com/products/G2.htm>

## **GURU**

A rule-based expert system development environment that offers a wide variety of information processing tools. GURU uses fuzzy logic and certainty factors to handle uncertainties in human knowledge. At the core of GURU is KGL, a knowledge and object-based fourth-generation programming language, including a self-contained relational database.

<http://www.mdb.com/html/guru.html>

## **Intellix**

A comprehensive tool developed by combining neural network and expert system technologies. The tool provides a user-friendly environment where no programming skills are required. Domain knowledge is represented by production rules and examples. The system uses a combined technique of pattern matching (neural networks) and rule interpretation, and is capable of learning in real time.

<http://www.intellix.com/>

## **JESS**

The Java Expert System Shell (JESS) is available as a free download (including its complete Java source code) from Sandia National Laboratories. JESS was originally inspired by CLIPS (C Language Integrated Production System), but has grown into a complete tool of its own. The JESS language is still compatible with CLIPS – JESS scripts are valid CLIPS scripts and vice-versa. JESS adds many features to CLIPS, including backward chaining and the ability to manipulate and directly reason about Java objects. Despite being implemented in Java, JESS runs faster than CLIPS.

<http://herzberg.ca.sandia.gov/jess>

## **KAPPA-PC**

A tool for developing rule-based object-oriented expert systems. Domain knowledge is represented by production rules and frames. Employs backward and forward chaining inference techniques. KAPPA-PC has a user-friendly graphical development environment and provides the access to databases and spreadsheets.

<http://www.intellicorp.com/kappa-pc/>

## **Level5 Object**

A tool for developing frame-based expert systems. Objects in a knowledge base are created via class declarations. Rules and demons describe rules-of-thumb and cause-and-effect relationships for making decisions and triggering certain events or actions during a session. Databases are managed by *Object-Oriented Database Management System*, which allows the system to obtain attribute values of a class from an external database.

<http://www.rulemachines.com/object/>

## **M.4**

A powerful tool for developing rule-based expert systems. Domain knowledge is represented by production rules. M.4 employs both backward and forward chaining inference techniques. It uses certainty factors for managing inexact knowledge, and supports object-oriented programming within the system.

<http://www.teknowledge.com/m4/>

### **XMaster**

The system consists of two basic packages: *XMaster Developer* and *XMaster User*. Using *XMaster Developer* the user creates a knowledge base simply by building up a list of possible *hypotheses* and a list of *items of evidence*. The items of evidence are then associated with the relevant hypotheses. *XMaster* also enables the user to incorporate uncertain or approximate relationships into the knowledge base and uses Bayesian

<http://www.chrisnaylor.co.uk/>

### **XpertRule**

A tool for developing rule-based expert systems. Domain knowledge is represented by decision trees, examples, truth tables and exception trees. Decision trees are the main knowledge representation method. Examples relate outcomes to attributes. A truth table is an extension to examples – it represents a set of examples covering every possible combination of cases. From examples, truth tables and exception trees, XpertRule automatically generates a decision tree. XpertRule also uses fuzzy reasoning, which can be integrated with crisp reasoning and with GA optimisation.

<http://www.attar.com/>