This advanced, highly interactive course will clarify how you can adopt state-of-the-art data mining techniques for complex customer intelligence applications. You will receive a sound mix of both theoretical and technical insights as well as practical implementation details, illustrated by several real-life cases.

Learn how to:
• apply a series of powerful, recently developed, cutting-edge data mining techniques
• ensure the practical application of these techniques to optimise strategic business decisions
• explore a futuristic vision of how new emerging data mining techniques might change your key business processes
• deploy, monitor, and optimally backtest data mining systems.

Who should attend:
Those involved in estimating, monitoring or maintaining predictive models for various types of customer intelligence; those using data mining techniques for various types of customer intelligence

Prerequisites:
Before attending this course, you should know how to:
• preprocess data (such as missing values, outliers, categorisation, sampling, and so on)
• develop predictive models using logistic regression
• develop predictive models using decision trees
• develop descriptive models using basic segmentation techniques
• quantify the performance of predictive models (lift curves, ROC curves, and so on).

You can gain this experience by completing Data Mining Techniques: Theory and Practice and Decision Tree Modeling

Course contents:
Predictive Modeling for Customer Intelligence: The KDD Process Model
A Refresher on Data Preprocessing and Data Mining
Advanced Sampling Schemes
• cross-validation (stratified, leave-one-out)
• bootstrapping.
Neural networks
• multilayer perceptrons (MLPs)
• MLP types (RBF, recurrent, etc.)
• weight learning (backpropagation, conjugate gradient, etc.)
• overfitting, early stopping, and weight regularisation
• architecture selection (grid search, SNC, etc.)
• input selection (Hinton graphs, likelihood statistics, brute force, etc.)
• self-organising maps (SOMs) for unsupervised learning
• case study: SOMs for country corruption analysis
Support Vector Machines (SVMs)
• linear programming
• the kernel trick and Mercer theorem
• SVMs for classification and regression
• multiclass SVMs (one versus one, one versus all coding)
• hyperparameter tuning using cross-validation methods
• case study: benchmarking SVM classifiers
Opening up the Neural Network and SVM Black Box

- rule extraction methods (pedagogical versus decompositional approaches such as neurorule, neurolinear, trepan, etc.)
- two-stage models.

A Recap of Decision Trees (C4.5, CART, CHAID)

Regression Trees

- splitting/stopping/assignment criteria.

Ensemble Methods

- bagging
- boosting
- stacking
- random forests.

Alternative Rule Representation Formats

- rule types (oblique, M-of-N, fuzzy, etc.)
- decision tables (lexicographical ordering, contraction methods, etc.)
- decision diagrams
- case study: decision tables and diagrams for customer scoring.

Bayesian Network Classifiers

- naive Bayes
- tree augmented naive Bayes (TAN)
- unrestricted Bayesian network classifiers
- Bayesian inference
- case study: Bayesian networks for churn prediction

Survival Analysis

- censoring
- Kaplan-Meier analysis
- parametric survival analysis
- proportional hazards regression
- neural networks for survival analysis
- case study: neural network survival analysis for customer scoring

Learning Using Networked Data

- Markov random fields
- homophily (guilt by association)
- local classifiers
- relational classifiers (relational neighbor, probabilistic relational neighbor, relational logistic regression, etc.)
- collective inference (Gibbs sampling, iterative classification, etc.)

Monitoring and Backtesting Analytical Models

- quantitative versus qualitative model monitoring
- model backtesting (model stability, binomial/Hosmer-Lemeshow test, traffic light indicator approach, impact of macro-economic effects)
- model benchmarking (internal versus external benchmarking, benchmarking statistics)
- qualitative validation of analytical models (data quality, model design, documentation, involvement of management)
- case study: backtesting a customer scoring model

Other Predictive Modeling Techniques (Short)

- semi-supervised learning
- genetic algorithms
- fuzzy techniques
- ant colony optimisation
- case study: Antminer+

Learners receive a hardcopy of the course notes and, in some courses, can choose to take home a copy of the course data.

Software addressed:

This course addresses:

- SAS® Enterprise Miner™
- SAS/INSIGHT™
- SAS/STAT®
- SAS® Customer Intelligence Studio

Customer Intelligence Training Path

Learning Using Networked Data

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