DW & BI Sharenet

Customer Churn Prediction in Telecom using Data Mining

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Business Issue

- **Churn prediction is usually the biggest concern in a telecom companies**
  - Market Saturation
    - As the telecom market becomes saturated, acquiring the new customer is getting more expensive than retaining the existing customer base
  - Dynamic Market Changes
    - Dynamic market changes in competitors, technologies and regulations could cause greater opportunities for customers to leave for another company

Where To Start?

- **The first step is to translate the business issue into a set of questions that can be addressed by data mining**
  - Identify which customers are going to leave
  - Determine which customers you want to keep among them
  - Develop retention policy to prevent the desirable customers from leaving
- **Churn Prediction is an on-going process, not a single event**
- **Challenge is to predict the FUTURE customer behavior and take action with the customers based on that prediction**

Churn Definition

- **Churn is generally the action of the customer to leave the company for some reason**
- **We can classify churn by who initiates the action**
  - Voluntary Churn
    - Customer first initiates the churn
    - E.g. contract expiration, handset change, service quality, competition, professional churn, technology change, regulation change, etc.
  - Involuntary Churn
    - Company initiates the action
    - E.g. credit problems

Data To Be Used

- **Types of data generally needed for churn prediction modeling in telecoms :**
  - Churn Indicator
  - Customer Information Data
    - Demographic Data
    - Contract Data
  - Call Data
  - Billing and Payment Data
  - Customer Indices derived from transaction data
  - Additional Data

Microsoft Excel Worksheet

Mining Techniques for Churn Prediction

- **Decision Tree**
  - Generates the output as a tree-like structure
  - Gives an easy interpretation for marketing personnel
  - Easy identification of significant variables for the churn management.
- **Radial Basis Function (RBF)**
  - Feed-forward networks using supervised training algorithms.
  - RBF works by adding together a large number of simple functions.
  - These functions are adjusted to fit the value that should be predicted.

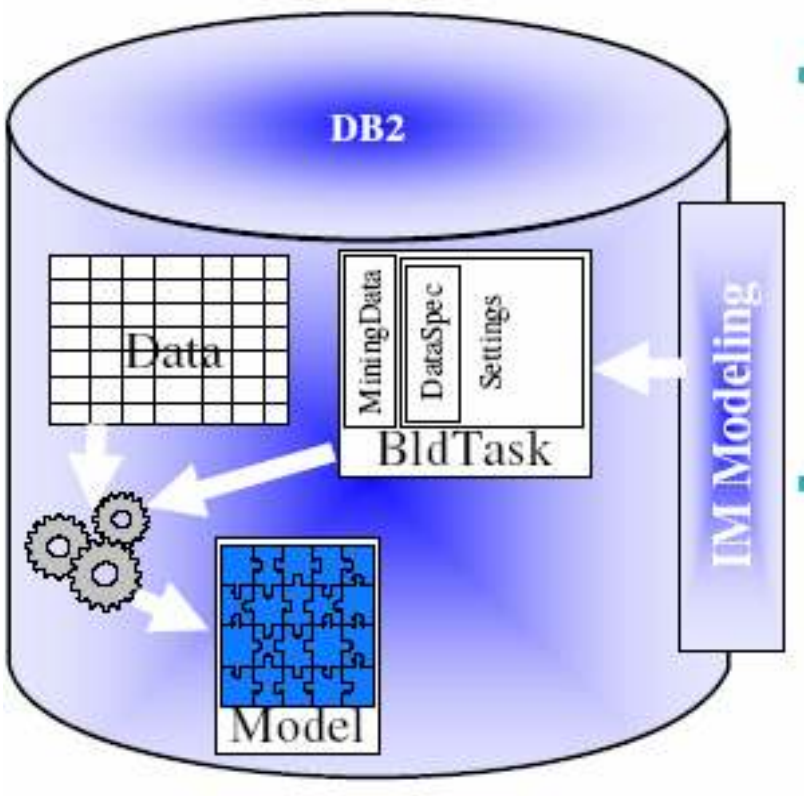
- **Neural Network**
  - works by taking inputs and passing them through a network that transforms the original values into one or more result values
  - During training phase, the network is continuously refined and adjusted
  - However, it doesn't produce the rules that give an easy interpretation, and special requirements on the input data are necessary
- **Regression**
  - Traditional statistical technique for deriving a function that describes the relationship between a number of variables and a value you want to predict
    - **Polynomial Regression** : extension of linear regression that uses a more elaborate function to fit to the data.
    - **Logistic Regression** : Produces output of 1 or 0 (binary). To obtain a logistic regression a neural network with no hidden layers can be used.

IBM DB2 Intelligent Miner V8.2 : Typical Data Mining Process

Prerequisite : Processed data

- **IM Modeling**
  - Defining a mining task
  - Doing a mining run, building the model
- **IM Visualization**
  - Visualizing the model
- **IM Scoring**
  - Scoring new data against the model (prediction)

IM Modeling : Mining Steps



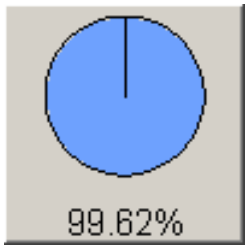
- **Building a model**
  - Specifying a data source
  - Defining mining settings
  - Defining a mining task
  - Doing a mining run
- **Next …**
  - Extracting information
  - Doing a mining test run
  - Visualizing and Scoring

Courtesy : Comprehensive Guide to IBM DB2 Intelligent Miner V8.2 – Anja Nicolussi

IM Visualization : Predicted Classes

Name Size Target Field

0



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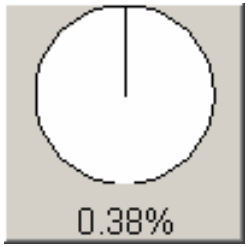
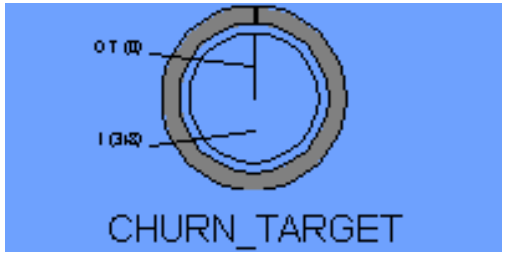
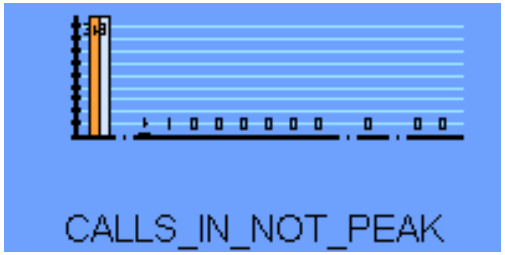
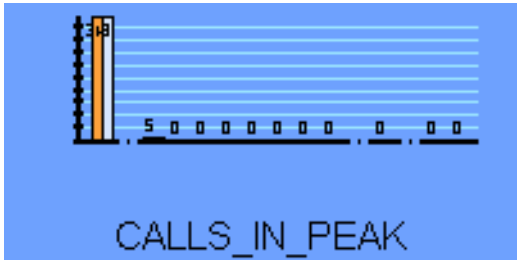






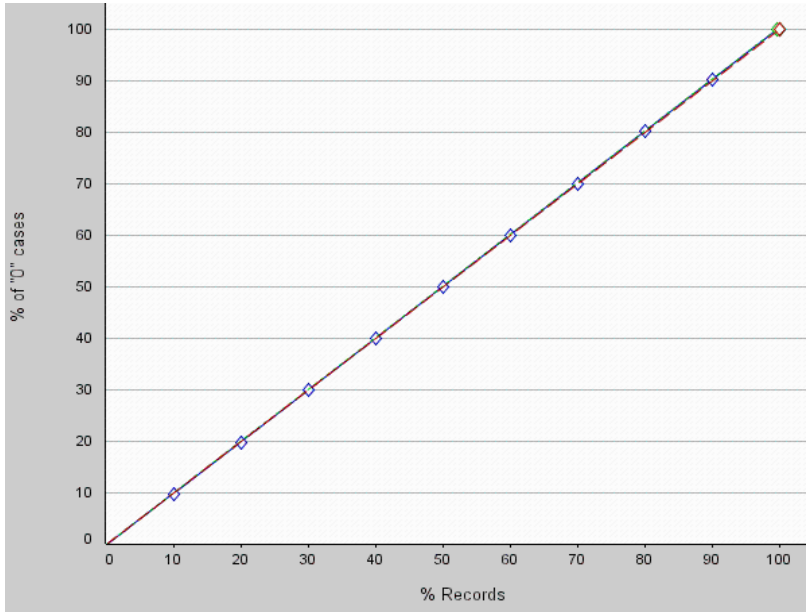


Link

IM Visualization : Gains/Lift Chart

- **Lift is a measure of the effectiveness of a predictive model calculated as the ratio between the results obtained with and without the predictive model.**
- **Visual aids for measuring model performance**
- **Consist of a lift curve and a baseline**
- **The greater the area between the lift curve and the baseline, the better the model**

Target Field *CHURN_TARGET* Target Value ***0***



churnClasModel

Optimum for DB2INST2.SS_CHURN_BASE_1

Random for DB2INST2.SS_CHURN_BASE_1

IM Visualization : Confusion Matrix

- **Each column represents the instances in a predicted class**
- **Each row represents the instances in an actual class**
- **Easy to see if the system is confusing two classes**

Number of predicted classes: 2
Number of correct classifications: 92,104 (100%)

	0 (predicted)	**1 (predicted)**	**Total**
0	91,785	25	91,810
1	29	319	348
Total	91,814	344	92,158

Conclusion

- **Churn management requires a good understanding of customer behaviour**
- **Proactive**
- **Although we can understand customer behaviour through simple queries and OLAP analysis, data mining helps in revealing customer behaviour patterns which are hidden in huge data sets, such as call transactions**
- **Proper offers to customers to prevent them from churn**
- **More revenue for the company**

Thank You