E1 215

Telecommunications fraud detection using artificial neural networks

Every year millions of rupees worth of revenue turns into bad debts due to fraud. By considering two main factors it is possible to understand the nature of this problem. Primarily these factors are usage and payment patterns. It is an extremely difficult to predict fraudster's prior to committing the fraud. This situation leads to great deal of unnecessry costs&revenue loss. There is no known effective alogorithm to predict/detect such potential fraudster. Reserch was carried out using Lanka bell (Pvt.) Ltd. Subscriber base. Approach suggests using a neural network to predict and to detect freaudulent accounts. Neural network will acquire information from database and will do a classification for a given input. Artificial neural network is designed as a multi-layer feed-forward network using Error back-propagation method of training multi layer networks. These input parameters reflect subscriber's financial behavior. Output was to classify each subscriber into 4 categories. Each classification represents risk factor. Data representation plays a major role in neural networks. Input/output preprocessing is done on run time by the database integration module. Output layer is configured with four neurons, each neuron dedicated for the four patters. Depending on the firing pattern, the output will be classified. System is developed using Oracle and visual basic, Designed to work in client server architecture. Training was done using 80 training pairs, representing the required categories. Many encoding methods were tested for data representation. Concepts like bias, momentum were used. Hundred (100)-testing pairs were tested. The results are astonishing; network performs with an accuracy of 74%. Training time was very slow. Final network architecture consists of, 9 input layer 4 output layer neurons. To produce results as above, Network was trained for a continuous period of time. Bipolar continuous activation function was used.

As a technology, neural networks have a great potential to deal with chaotic information. Results indicate that neural network is a good technology for fraud detection. Despite of long training time, network provides a great prediction capability to business. Since telecom business is operationally shares many commonlties, problems are also the same. Other telecom operators can use this neural network solution as well. Solution can be adpted with out changing the architecture of the network. By providing required information and training the network will enable to predict. As this paper discussed, neural network technology truly offers strategic advantages over conventional information systems.