Using hybrid artificial intelligence for delinquency forecasting

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At present, Sri Lankan banking sector has no method for forecasting non-payment of loan instalments or delinquency by a customer. Due to non-algorithmic, incomplete and non-deterministic nature of this domain, the traditional techniques cannot be effectively used for forecasting in this context. We have developed a Delinquency Forecasting System using Artificial Intelligent techniques of Neural Networks, Expert Systems and Fuzzy Logic, which have proven capabilities to handle domain with such characteristics.

The system considers the factors such as status of the industry, previous payments, security kept over the credit, remaining instalments, etc. as input and provides forecasted delinquency situations, as an example, for the next month, what are the loan accounts possible of being unpaid. The neural network consisting of 30 neurons has been developed with 3-layer architecture and trained using famous Backpropagation Algorithm subject to the maximum error of 0.0095. The training of the neural network is done using past records taken from a commercial bank in Sri Lanka. The neural network forecasts the situations while the expert system justifies the reasons for the forecasted results. The fuzzy logic component helps to conclude the results when, implicit outputs are provided by the neural network. This system is designed to run on Windows platform and proven successful operation on personal computers with Windows 98 and above.

The evaluation carried out by credit officers in various levels shows that the system has a high acceptability. Also the outputs given by the system has about 70% accuracy. The accuracy level can be increased by increasing the number of attributes considered by introducing inputs such as the area of the business place, age of the customer, etc. The system will help the credit managers and credit officers to identify the possible situations where non-payments can occur before it happens thereby allowing to take necessary actions.

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