Using Genetic Algorithms to Develop Scoring Models For Alternative Measures of Performance.

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Abstract

Most approaches to credit scoring result in the generation of a model that minimises some function of error between actual and predicted values, or that maximises likelihood. Popular approaches include least squares methods such as linear regression and disciminant analysis, and maximum likelihood methods such as logistic regression.

In practice, the criteria by which the parameters of a model are determined and the criteria by which models are then assessed are different. Practioners tend not to be interested in standard statistical measures of model fit, such as the R^2 coefficient for linear regression or the likelihood ratio for logistic regression. Of far greater importance are the mis-classification properties of the scoring model at specific points in the score distribution. Performance will often be assessed using global measures such as the GINI coefficient or KS statistic, or by considering the misclassification rate at different points in the score distribution. For example, a common goal is to minimise the number of mis-classified cases for the cut-off score that yields the desired acceptance rate within the population.

In this paper an approach using genetic algorithms is described, in which a credit scoring model is created in the form of a linear combination of independent variables, without recourse to 'intermediate' measures of performance such as squared errors or likelihood. Instead, the training algorithm is used to directly maximise/minimise the measure of interest; that is, the maximisation of the GINI coefficient and the minimisation of the misclassification rate for a range of different acceptance rates. Empirical results are presented, with the performance of models compared to that of a range of credit scoring models produced using more traditional approaches, including logistic regression and neural networks.

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