Choosing optimal customer management strategies

I-Ding Wu and David J. Hand
Department of Mathematics
Imperial College London
{i.wu@imperial.ac.uk; d.j.hand@imperial.ac.uk}

Scorecards are widely used in the personal financial services sector to guide choices between different ways of treating a customer; that is between 'actions'. For simplicity, in this paper we assume that there are just two possible courses of action. Typically, such scorecards will be constructed using data from customers who have previously been assigned to one or other of the two actions. A problem now arises, however, because customers will previously have been assigned to actions on the basis of their previously predicted responses: a customer will have been assigned to that action expected to yield the most favourable outcome. This means that the groups of customers assigned to the two actions differ in kind. It implies that the group of customers assigned to each action has a distribution which differs from the overall distribution of customers. A model built to predict likely outcome of each treatment based on the group of customers who previously received that treatment will then not yield valid predictions for likely outcome of the treatment for a customer randomly drawn from the overall customer population.

The optimal strategy for overcoming this is to randomly assign customers to the two actions, and observe the outcomes. This allows valid statistical inferences to be made about the differences in outcome, and also reduces the probability that the two groups will differ in any substantive way. However, such experiments are difficult to undertake in a commercial environment.

An alternative strategy is to attempt to model the observed outcomes, taking into account the differences between the groups. If all of the information on which the initial group assignment was made is known, then such adjustments are straightforward, involving simple model fitting and extrapolation. More generally, however, such information is not available. In such cases it may be possible to adjust the predictive model based on the observed data, to allow for the distortions in previous group assignment. In this paper we describe such an adjustment procedure, explore its sensitivity to necessary assumptions, and illustrate it in practice.