

VARIABLE SELECTION PROCEDURES FOR LOGISTIC REGRESSION MODELS

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ABSTRACT

Variable selection procedures are applicable to predictive model building process such as logistic regression, and generally for generalized linear modelling. The essence of variable selection is to select the best parsimonious adequate model among the available models for a data set, to avoid using redundant predictors in a model. In this study, variable selection procedures suitable for logistic regression model are considered namely: stepwise procedures, criterion-based procedures and cross-validation procedures. The three procedures of variable selection were exemplified on predictive logistic models using real life data sets on births and coronary heart disease (CHD) to determine the most suitable variable selection procedure for the logistic regression models. The logistic regression model for the birth data is to estimate the functional relationship between the binary response variable, type-of-birth and the predictors. For the coronary heart disease (CHD) data the interest is to explore the relationship between the risk factors, such as age, sex and cholesterol level of patients and the presence or absence of CHD in the study population. The stepwise procedures were computationally intensive. The criterion-based procedures and cross-validation procedures are investigated in this study, though, involve a wider search but in a preferable manner compared to the stepwise procedures that use restricted search through the space of potential models. It is therefore recommended to use criterion-based procedures when building a predictive logistic regression model for a data set with dichotomous response variable.

KEYWORDS: *Forward Selection Method, Backward Elimination Method, Stepwise Selection, Leave- One-Outcross-Validation (LOOCV), k-Fold Method, Delete-d Cross-Validation*

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