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Extended variable selection models for missing data with application to predict median effective dose and maximum effect

Maiying Kong
University of Louisville, USA

Abstract

When missing covariates exist, the statistical methods for variable selection along with predicting modeling could be challenging. Although Multiple Imputation (MI) is a universally accepted technique for solving missing data problem, how to combine the MI results for variable selection is not very clear because different imputations may result different selected variables. The widely applied variable selection methods are the penalized least squares methods, such as the elastic net method. In this presentation, we propose a MI based weighted elastic net method, which is based on the MI stacked data set. In the MI based weighted elastic net method, MI accounts for sampling and imputation uncertainty for missing values, and the weight accounts for the observed information. Extensive simulations are carried out to compare our proposed MI based weighted elastic net method with other existing alternatives, such as the elastic net method (ENET) and the sparse partial least squared (SPLS) method. In addition, we applied the MI based weighted elastic net method to examine the predictors for cardiac function.

Key words: variable selection, multiple imputation, elastic net, penalized least squares

Biography

Maiying Kong has completed her Ph.D in 2004 from Indiana University (Bloomington, IN) and postdoctoral studies from M.D. Anderson Cancer Center at University of Texas. Currently, she is an associate professor at the University of Louisville. She has published more than 30 papers in reputed journals