Robust bootstrap procedure for estimation of binary logistic regression model in the presence of high leverage points with medical applications

ABSTRACT

The classical bootstrap method should be used with caution in binary logistic regression model since it can be easily affected by high leverage points. As a remedy to this problem, we propose two robust bootstrap methods, called the diagnostic logistic before bootstrap (DLGBB) and the weighted logistic bootstrap with probability (WLGBP). In the DLGBB, the high leverage points are excluded before applying the resampling process, and for the WLGBP, the high leverage points are attributed with low probabilities to be selected in the resampling process. The usefulness of our proposed methods is investigated through medical data and simulation study. Both the empirical and simulation results confirm that the DLGBB and the WLGBP methods give significant improvement over the classical bootstrap method.