The University of Mississippi

Department of Mathematics

Statistics Seminar

Robust Multiple Regression based on Winsorization and Bootstrap Methods

By

Dr. Deo Kumar Srivastava

Department of Biostatistics, St. Jude Children's Research Hospital, Memphis, TN 38105-2794

Abstract

In general, the approaches proposed in the literature provide safeguards against outliers in response variable only and utilize the residuals obtained through non-robust regression, or adopt "ad hoc" criteria for assigning lower weights to the "outlying" observations in explanatory variables, which does not adequately account for the leverage points. A robust regression approach proposed recently by Srivastava et al. (2009) uses bootstrap method in conjunction with Winsorization as a solution to providing protection against outlying observations in both response as well as explanatory variables. This approach is reasonable when it can be assumed that all the characteristics under study are continuous in nature. Also, in their simulation experiments they restricted their focus only on one explanatory variable. In this paper, we first study the performance of the approach proposed in Srivastava et al. (2009) when there are more than one continuous explanatory variable in the model and further extend the approach to incorporate covariates which could possibly be categorical. An extensive simulation experiment is also conducted in order to study performance of the proposed approach. The results indicate that the new method provides significant improvement over the usual LS estimators when the data corresponding to continuous explanatory variables are taken from non-normal multivariate populations without significant loss in the performance when the underlying assumption of multivariate normality holds.

Date: Wednesday, April 14, 2010
Time: 2 PM – 3 PM
Location: Hume 201