Prediction in Measurement Error Models

by

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Abstract

Predicting Y from a future X based on data (X_i, Y_i) is a fundamental inference problem. When X is observed accurately, the problem is that of standard regression estimation of E(Y|X). When the data X_i and future X are measured with error, prediction is sometimes less standard. With W denoting the future X measurement, prediction of Y requires estimation of E(Y|W). This is complicated when measurements are made under different conditions, so that errors in X_i and X are not identically distributed. We study this problem nonparametrically showing that convergence rates of estimators of E(Y|W) can vary from root-n to much slower nonparametric rates. We develop highly-adaptive, data-driven methods that perform well as illustrated by an interesting application in nutritional epidemiology.

This is joint work with Raymond J. Carroll and Peter Hall.