Support Vector Machine with Measurement Error

Xin Liu

Shanghai University of Finance and Economics
E-mail: liu.xin@mail.shufe.edu.cn

Abstract: The Support Vector Machine (SVM) and its extensions have been widely used in various areas due to its great prediction capability. However, when the data are contaminated with measurement errors, the performance of an SVM may be deteriorated. In this research, we focus on the measurement error in the response variable with binary outcomes, and find that how it affects the classification accuracy. Correspondingly, we propose the response-error-corrected Support Vector Machine (REC-SVM) incorporating response measurement error into the standard SVM framework. Not only does the classifier outperform with error-contaminated response, but performs comparatively with error-free response as well. The excellent and robust performance of the response-error-corrected SVM is further demonstrated in the numeric investigations with synthetic data sets and a real prostate cancer data set.