國立高雄大學統計學研究所
巨量資料研究中心
聯合演講

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A Covariate-Adjusted Classification for Multiple Longitudinal Biomarkers

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時間 | 2021年6月2日(星期三)下午3:30-4:30

摘要

The classification methods based on a linear combination of multiple biomarkers have been widely used to improve the accuracy in disease screening and diagnosis. However, their extensions to multiple longitudinal biomarkers are often computationally expensive and rely on restrictive assumptions such as equally spaced time points. Oftentimes, important covariates that are associated with biomarkers or patient outcomes are not incorporated in these classification procedures due to the model complexity. In this paper, we propose a simple classification method that is particularly for multiple longitudinal biomarkers with an adjustment for important covariates. With the technique of natural cubic spline basis, each longitudinal biomarker can be characterized by spline coefficients with a significant dimension reduction. The proposed method is a non-parametric two-stage method that first combines all spline coefficients obtained from every longitudinal biomarker and then adjusts for important covariates as the second step. Specifically, the optimal linear combination of those spline coefficients can be acquired using an AUC-based stepwise method without any distributional assumption. Afterward, covariates are included for additional improvement in classification. The asymptotic properties can be shown with the maximum rank correlation estimators. For illustration, the proposed method is applied to Alzheimer's Disease data and the primary biliary cirrhosis data. We also conduct an extensive simulation study to assess the finite-sample performance of the proposed method for multiple longitudinal biomarkers.

近期演講內容: http://www.stat.nuk.edu.tw/
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