Biometrics-2013
OMICS Group Conferences
Accelerating Scientific Discovery
2nd International Conference and Exhibition on
Biometrics & Biostatistics
June 10-12, 2013 Hilton Chicago/Northbrook, USA

Predictive accuracy of covariates for survival outcomes

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Abstract

We propose a graphical measure, the negative predictive function, to quantify the predictive accuracy of covariates for survival outcomes. This new measure characterizes the survival probabilities over time conditional on a threshold linear combination of covariates and has direct clinical utility. We show that this function is maximized at the set of covariates truly related to event times and thus can be used to compare the predictive accuracy of different sets of covariates. We construct nonparametric estimators for this function under right censoring and prove that the proposed estimators, upon proper normalization, converge weakly to zero-mean Gaussian processes. To bypass the estimation of complex density functions involved in the asymptotic variances, we adopt the bootstrap approach and establish its validity. Simulation studies demonstrate that the proposed methods perform well in practical situations. A breast cancer gene expression study is provided for illustration.

Biography

Li Chen is an Assistant Professor of the Division of Cancer Biostatistics in the Department of Biostatistics and the Biostatistics Shared Resource Facility at the Markey Cancer Center, University of Kentucky. She received her PhD in Biostatistics from the University of North Carolina at Chapel Hill. Her research interest is the development and application of novel statistical methods for medical and epidemiological studies especially in cancer research. Specifically, she is interested in semi parametric and nonparametric methods, survival analysis, longitudinal data analysis, and prediction models.