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Improved estimation of area under the ROC curve using ranked set sampling

Jingjing Yin, Hani Samawi and Yi Hao

Georgia Southern University School of Medicine, USA

In medical diagnostics, the ROC curve is the graph of sensitivity against 1-specificity as the diagnostic threshold runs through all possible values. The ROC curve and its associated summary indices are very useful for the purpose of evaluating the discriminatory ability of biomarkers/diagnostic tests with continuous measurements. Among all summary indices, the area under the ROC curve (AUC) is the most popular diagnostic accuracy index and it has been extensively used by many researchers for biomarker evaluation and selection. Sometimes, taking the actual measurements of a biomarker is very difficult and expensive while ranking them without actual measurements can be easy. In such cases, ranked set sampling which based on order statistics would give more accurate estimation than simple random sampling, since ranked set samples are more likely to span the full range of population (thus is more representative). In this study, Gaussian kernel is utilized to obtain a nonparametric estimate of AUC. Intensive simulations are carried out to compare the proposed method using ranked set samples with the one using simple random samples and the proposed method out performs universally with much smaller mean squared errors (MSE). A real data set is analyzed for illustrating the proposed method.

Biography

Jingjing Yin received her Bachelor degree in Public Health Administration from Sichuan University in China. She obtained PhD in Biostatistics at University at Buffalo. Simultaneously, she was a Teaching Assistant for one Undergraduate Course and two Graduate Courses and then she became a Research Assistant working as a Biostatistician at Buffalo VA Medical Center and Statistical Consulting Laboratory at University at Buffalo. Immediately after completion of her PhD degree, she joined the Department of Biostatistics at Georgia Southern University. She has 10 publications and serves as the Associate Editor of *Biometrics & Biostatistics International Journal*.

jjin@georgiasouthern.edu

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