

Distribution-free inference about partial areas under receiver operating characteristic curves in factorial designs

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The receiver operating characteristic curve is a widely used performance indicator for diagnostic markers. By its nature some segments of the curve are more relevant for clinical applications than others. A suitably specified partial area under the curve aggregates the information carried by the clinically relevant segments. Our main result shows joint asymptotic normality of vectors of possibly dependent distribution-free estimators of these partial areas. We additionally show correctness of the empirical bootstrap in this situation and use it to construct asymptotically correct multiple contrast tests for comparing several, possibly correlated, diagnostic markers. Our numerical and analytical results indicate that a partial area under the curve may be preferable to the widely used total area under the curve as a basis for performance comparisons of diagnostic markers.