CONFERENCIA

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Construction of joint confidence regions for the Youden index-based True Class Fractions in 2D and 3D ROC analysis

After establishing the utility of a diagnostic marker investigators will typically address the question of determining a cut-off point that will be used for diagnostic purposes in clinical decision-making. The most commonly used optimality criterion for cut-off point selection in the context of ROC curve analysis is the maximum of the Youden index. The pair of sensitivity and specificity proportions that correspond to the Youden index-based cut-off point characterize the performance of the diagnostic marker. The Youden index-based cut-off point is estimated from the data and as such the resulting sensitivity and specificity proportions are in fact correlated. This correlation needs to be taken into account in order to calculate confidence intervals that result in the anticipated coverage.

The three-class approach is used for progressive disorders when clinicians and researchers want to diagnose or classify subjects as members of one of three ordered categories based on a continuous diagnostic marker. The optimal cut-off points required for this classification are often chosen to maximize the generalized Youden Index. The effectiveness of these chosen cut-off points can be evaluated by estimating their corresponding True Class Fractions and their associated confidence regions. The True Class Fractions that correspond to the optimal cut-off points estimated by the generalized Youden index are correlated similarly to the two-class case.

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Organizado por el Departamento de Estadística e Investigación Operativa con la colaboración del Instituto de Matemática Interdisciplinar

Fecha: 12 de Marzo de 2015
Hora: 13:00 horas
Lugar: Seminario Sixto Ríos (Aula 215)
Facultad de CC Matemáticas, UCM