



*An Introduction to Ambiguity and Instability: New Merits for Evaluating  
Classification Performance*

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Abstract

Different statistical classification techniques are studied on both clinical and non-clinical data sets. Traditional criteria to evaluate a specific methodology such as the misclassification error rate are discussed. New performance measures: the classification ambiguity and classification instability are introduced to evaluate the risk and the consistency of an ensemble of classifiers generated by cross-validation. Numerical experiments indicate that the new definitions are useful for understanding: 1] how the classification methodology will behave for future data and 2] the similarity and differences among various algorithms on data sets with different structures.