Novel Tests for Evaluating Two ROC Curves under Paired Samples

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Abstract

Aging population is a widespread phenomenon in many developed countries. Many medical researches have aimed to develop diagnostic tests that can be used to prevent the occurrence of severe diseases. When the diagnostic test score is measured continuously, the receiver operating characteristic (ROC) curve is often plotted and the area under the ROC curve (AUC) is regarded as an accuracy measure of a diagnostic test.

As more and more resources are invested in developing more accurate diagnostic tests, the assessment for the superiority of accuracy between evaluating two diagnostic tests is necessary. Two types of assessments are discussed in the literature, the area test comparing the equality of two AUCs and the test comparing two ROC curves. For the continuous paired data, the construction of a test needs to take into account the possible correlation between pairs. This paper reviews related results and proposes new tests for evaluating the equality of two AUCs or two ROC curves. Simulations are conducted to evaluate the feasibility of the proposed estimates and the proposed test. Finally, a real data is implemented.