Influence of Shape and Scale Parameters in Estimating the Measures of ROC Curve

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SUMMARY
Receiver Operating Characteristic (ROC) Curve is used to classify individuals into one of the two populations and area under this curve will explain the accuracy of a test to which extent the individuals are classified correctly. In practice, the data in the abnormal population tend to have variability compared to normal population, therefore there is a need to construct an ROC model based on distributions other than normal. So, taking this into consideration, the ROC model with the mixture of Half Normal (Normal Population) and Exponential distributions (Abnormal Population) was proposed by Balaswamy et al. (2015). However, in order to classify the individuals into one of the two groups one needs to consider the shape parameter along with the scale parameter, because the shape parameter plays very prominent role in shaping the distribution function. In this paper, the Hybrid ROC curve has been extended by considering generalized distributions of Exponential and Half Normal. In order to study the behavior of the proposed ROC curve and its accuracy measure AUC, simulation studies are conducted at different values of shape and scale parameters. Further, the results reveal the fact that the shape parameter influences the slope of the ROC curve as well the accuracy measure in providing maximum extent of information about the true status of the individual.

Keywords and phrases: ROC Curve; Generalized distributions; Generalized Hybrid ROC Curve and AUC.

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