

AbstractID: 2290 Title: A New Model for Analyzing Detection and Localization Data and an Update on JAFROC Methodology

The ubiquitous two-Gaussian ROC model, which forms the basis for several current methods of analyzing observer data, has remained unchanged ever since ROC methods were introduced in the mid sixties. In this work we present a new model that allows for differences between observers to be modeled at two levels: detection-performance when the observer is shown the location of the possible lesion is modeled by the separation of the signal and noise Gaussian distributions. The ability of the observer to screen out large areas of the image as normal using peripheral-vision is modeled by the number ( $T$ ) of sites needing foveal-vision examination for possible lesions. This number can be quite small for experts. A mathematical model for this process is proposed and this was used to generate simulated FROC detection and location data. We examined the statistical behavior of the recently proposed JAFROC method and the DBM. We found that the JAFROC method had greater statistical power than the DBM method for detection localization studies.