A new program has been developed for the derivation of ROC curves from sets of confidence-rating data. The method is based on the fitting of the data sets to a mathematical model of the receiver's operation by means of a non-linear least squares method. The fitting provides the relative widths and positions along the signal axis of the two underlying normal distributions representing the positives and the negatives, as well as the positions of the confidence thresholds relative to these distributions.

In contrast to the method that fit binormal ROC curves to the data sets by maximum likelihood estimation, the new method usually result in ROC curves that pass close to the data points even though the data points do not lie along a straight line when plotted on "normal-deviate" axes.

After fitting of the model, the course of the ROC curve in the upper right corner of the diagram is automatically analysed by the program. In case of a significant "hook", an iterative procedure is initiated in which the ROC curve is gradually forced to become more symmetric around the negative diagonal of the diagram, until the average gradient of the final section of the curve falls below a pre-set value. Even in instances of "degenerate" data sets, this constraint leads to sensible ROC curves.

Our method has proved to be very robust, and provides a comprehensive set of numerical and graphical output that facilitate the interpretation of the study.