Package ‘ROCwoGS’

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ROCwoGS-package Non-parametric estimation of ROC curves without Gold Standard

Description

Function to estimate the ROC Curve of a continuous-scaled diagnostic test with the help of a second imperfect diagnostic test with binary responses.
ROCwoGS-package

Details
This package contains one function. NPROCwoGS estimates the ROC Curve of a continuous-scaled diagnostic test with the help of a second imperfect diagnostic test with binary responses

Author(s)

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References


Examples

data(score)
score$r <- (score$r >= 3)
ncutoff< 20
ROC.est< NPROCwoGS (score, ncutoff, niter=2000, C1level=0.95)
#Print results on R screen
ROC.est
#Calculate area under the curve
#Find the optimal cutoff to maximize
#Youden Index
opt.cut<- ROC.est$cutoff[which.max(ROCN$T.Se[1,]+ROCN$T.Sp[1,])-1]
# Plot ROC curve
plot(!-ROCN$T.Sp[1,],ROCN$T.Se[1,],"l", xlab="1-Specificities",ylab="Sensitivities", main=paste("AUC="", format(auc, digits=4)),
"Optimal Cutoff="opt.cut))
data.frame(!-ROCN$T.Sp[c(3,2),]>ci.tsp
data.frame(ROCN$T.Se[c(2,3),]>ci.tse
#Write Sensitivities and Specificities to 
".csv" files, saved in the R library path
#write.csv(ROCN$T.Se,
#paste(,Library,"/ROCwoGS/data/T_Se.csv",sep=''))
#write.csv(ROCN$T.Sp,
#paste(,Library,"/ROCwoGS/data/T_Sp.csv",sep=''))
Non-parametric estimation of ROC curves without Gold Standard

Description

Function to estimate the ROC Curve of a continuous-scaled diagnostic test with the help of a second imperfect diagnostic test with binary responses.

Usage

NPROCwoGS(score, ncutoff, niter, CIlevel)

Arguments

- **score**: A data frame with the first column of the continuous-scaled diagnostic test scores; the second column of the binary reference scores; the third column of a factor vector to indicate the population that the observations come from.
- **ncutoff**: Desired number of cutoff values. This determines the number of estimated pairs of sensitivities and specificities along the ROC curve.
- **niter**: Desired number of iterations for the Markov Chain Monte Carlo method.
- **CIlevel**: Desired level of credible intervals. A numeric value between 0 and 1.

Details

The method is based on a multinomial model for the joint distribution of test-positive and test-negative observations. The estimated ROC curve of the continuous-scaled test is in the form of pairs of sensitivities and specificities. Also estimated are the sensitivity and specificity of the binary reference test and the population disease prevalences.

Value

NPROCwoGS produces an ordinary list with the following components.

- **cutoff**: Cutoff values for the continuous-scaled diagnostic test. The length of cutoff is the same as the input ncutoff.
- **T.Se**: Point estimates (first row) and credible intervals (second and third rows) of the sensitivities for the continuous-scaled diagnostic test.
- **T.Sp**: Point estimates (first row) and credible intervals (second and third rows) of the specificities for the continuous-scaled diagnostic test.
- **R.Se**: Point estimate and the lower bound and upper bound of the credible interval of the sensitivity for the binary reference test.
- **R.Sp**: Point estimate and the lower bound and upper bound of the credible interval of the specificity for the binary reference test.
- **Prev**: Point estimates (first row) and credible intervals (second and third rows) of the population disease prevalences. Each column represents a population.
- **flag**: Flag for potential nonidentifiable configurations. flag=0: no flag is raised, flag=1: Flag 1 is raised; flag=2: Flag 2 is raised; flag=3: both flags are raised.
Author(s)

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References


Examples

data(score)
score$r <- (score$r > 3)
n_cutoff <- 20
ROC.est <- NPROCwoGS(score, n_cutoff, niter=2000, CIlevel=0.95)
# Print results on R screen
ROC.est
# Calculate area under the curve
# Find the optimal cutoff to maximize Youden Index
opt.cut <- ROC.est$cutoff[which.max(ROC.est$T.Se[1,]+ROC.est$T.Sp[1,])]-1
# Plot ROC curve
data.frame(1-ROC.est$T.Sp[,c(3,2)] )->ci.tsp
data.frame(ROC.est$T.Se[,c(2,3)])->ci.tse
# Write Sensitivities and Specificities to ".csv" files, saved in the R library path
write.csv(ROC.est$T.Se, 
# paste(.Library,"/ROCwoGS/data/T_Se.csv",sep=''))
write.csv(ROC.est$T.Sp, 
# paste(.Library,"/ROCwoGS/data/T_Sp.csv",sep=''))

Description

A data frame with the first column of the continuous-scaled diagnostic test scores; the second column of the binary reference scores; the third column of a factor vector to indicate the population that the observations come from.

Usage

data(score)
Format

A data frame with 4214 observations on the following 3 variables.

- `t` a numeric vector
- `r` a numeric vector
- `Group` a factor with levels 1 2 3

Examples

data(score)

# maybe str(score) ; plot(score) ...
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