Using CI

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Contents

Load library

```
library(CI)
library(MASS)
```

Generate data for analysis

```
cr = 0.95
df <- mvrnorm(50, mu = c(0,0), Sigma = matrix(c(1,cr,cr,1), ncol = 2), empirical = TRUE)
```

Calculate concordance index

```
CI(x=df[,1], y=df[,2], deltaX=0, deltaY=0, alpha =0, outx = 1, npermut=10000)
## $ci
## [1] 0.7991837
##
## $p.value
## [1] 0
```

We can compair this to correlations. Calculate correlations

```
cor.test(df[,1], df[,2])
##
##  Pearson's product-moment correlation
##
## data:  df[, 1] and df[, 2]
## t = 21.079, df = 48, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.9131049 0.9714633
## sample estimates:
##  cor
## 0.95
cor.test(df[,1], df[,2], method = "pearson")
##
##  Pearson's product-moment correlation
##
## data:  df[, 1] and df[, 2]
## t = 21.079, df = 48, p-value < 2.2e-16
## alternative hypothesis: true correlation is not equal to 0
## 95 percent confidence interval:
##  0.9131049 0.9714633
## sample estimates:
##  cor
## 0.95
cor.test(df[,1], df[,2], method = "spearman")
##
```

```
##  Spearman's rank correlation rho
##
## data:  df[, 1] and df[, 2]
## S = 1276, p-value < 2.2e-16
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##       rho
## 0.9387275
```

```r
plotData <- function(x,y,title="", xlab="x", ylab="y")
{
  par(pty="s")
  plot(x,y, main=title, xlab=xlab, ylab=ylab, pch=16, col="red")
}
```

```r
dt <- lapply(seq(-1,1,0.1), function(cr){
    df <- mvrnorm(50, mu = c(0,0), Sigma = matrix(c(1,cr,cr,1), ncol = 2), empirical = TRUE)
    ci <- CI(x=df[,1], y=df[,2], deltaX=0, deltaY=0, alpha =0, outx = 1, npermut=10000, ncpu = 2)
    pr <- cor.test(df[,1], df[,2], method = "pearson")
    sm <- cor.test(df[,1], df[,2], method = "spearman")
    data.frame(ci=ci$ci, ci.p=ci$p.value,
               pr=pr$estimate, pr.p=pr$p.value,
               sm=sm$estimate, sm.p=sm$p.value)
    })

dt <- do.call(rbind.data.frame, dt)

plotData(dt$ci, dt$pr,title="CI vs pearson correlation", xlab="CI", ylab="pearson")
```
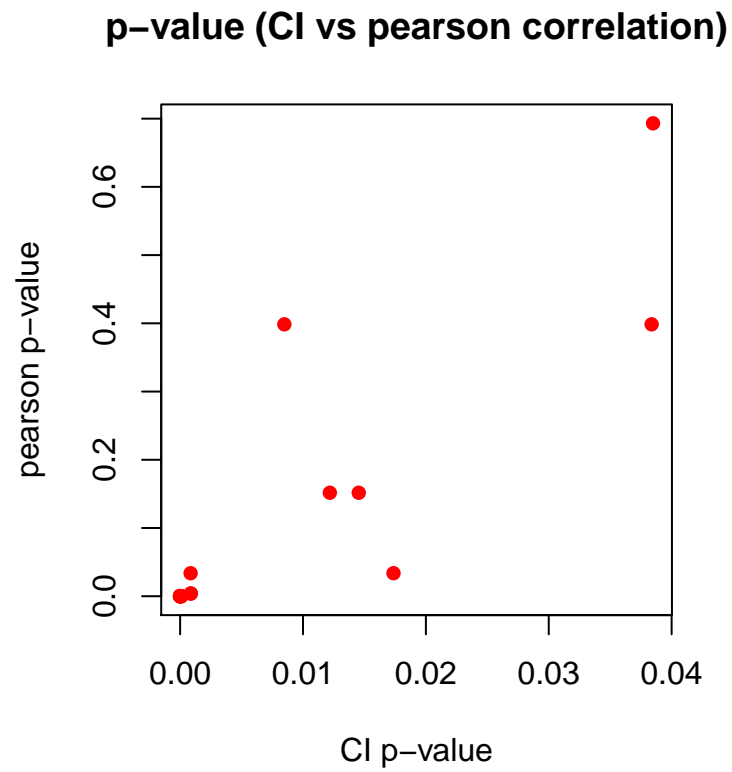
CI vs pearson correlation
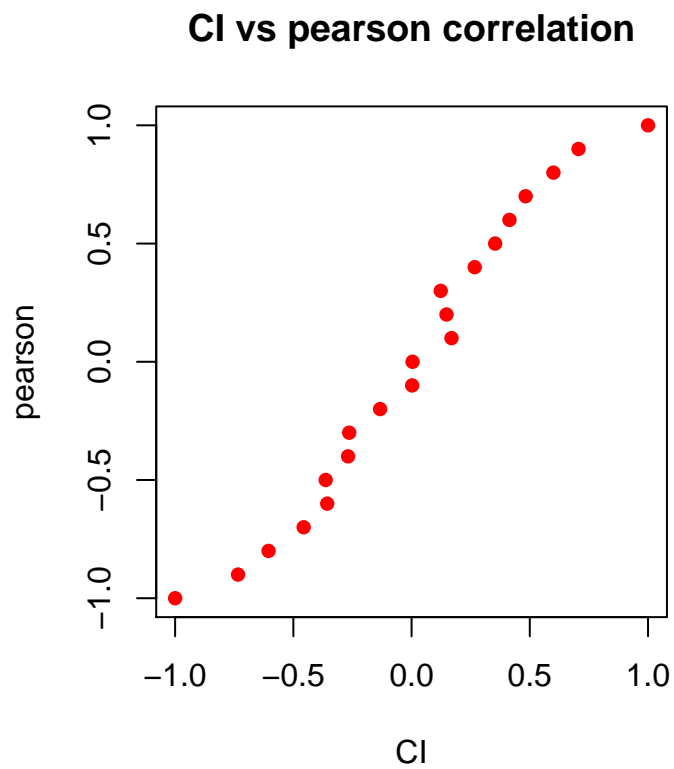

```r
plotData(dt$ci, dt$sm,title="CI vs spearman correlation", xlab="CI", ylab="spearman")
```

CI vs spearman correlation
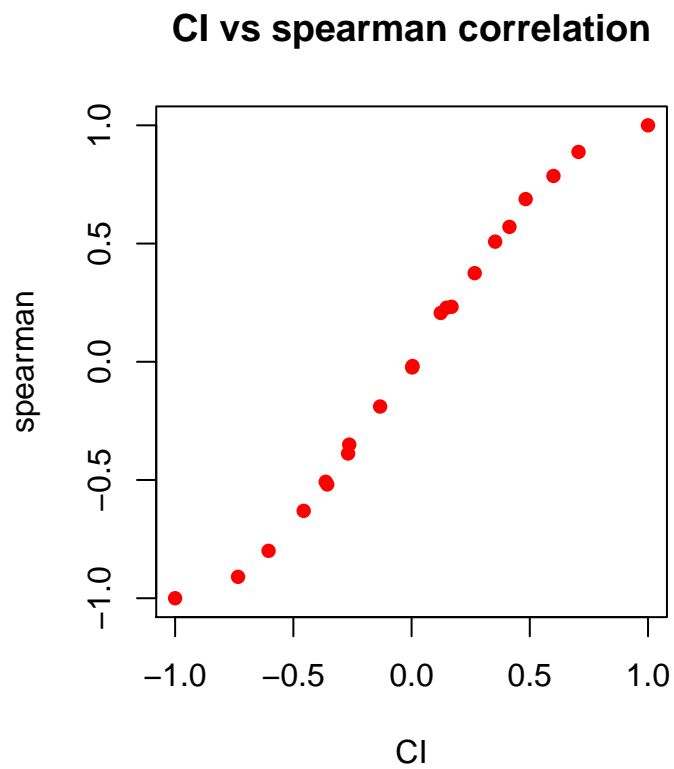

```
pOfset = 1
plotData(log(dt$ci.p+pOfset), log(dt$pr.p+pOfset), title="p-value (CI vs pearson correlation)",
         xlab="CI p-value", ylab="pearson p-value")
```

p−value (CI vs pearson correlation)


```
plotData(log(dt$ci.p+pOfset), log(dt$sm.p+pOfset), title="p-value (CI vs spearman correlation)",
         xlab="CI p-value", ylab="spearman p-value")
```

p−value (CI vs spearman correlation)