

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] 0.7942857
##
## $p.value
## [1] 0
```

We can compare 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")
##
```

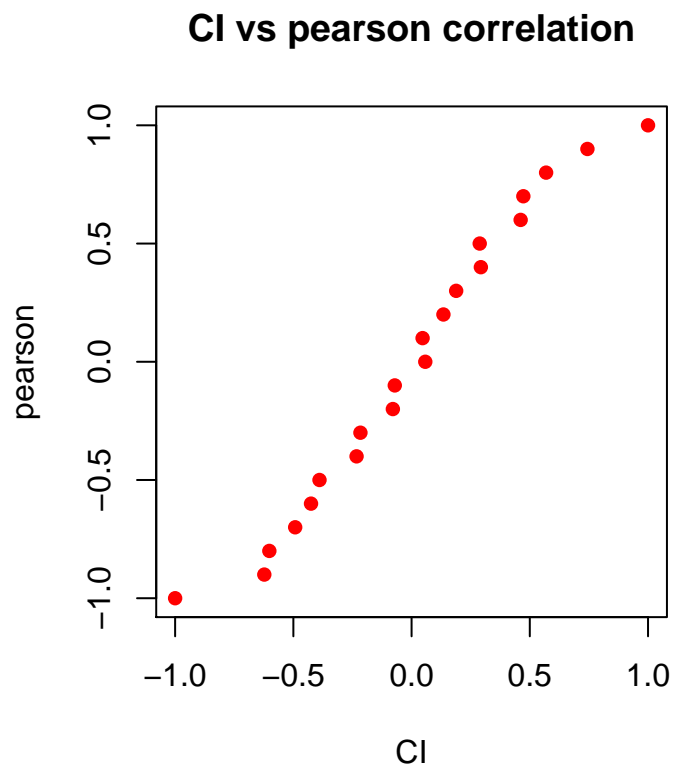
```
## Spearman's rank correlation rho
##
## data: df[, 1] and df[, 2]
## S = 1296, p-value < 2.2e-16
## alternative hypothesis: true rho is not equal to 0
## sample estimates:
##      rho
## 0.9377671
```

```
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")
}
```

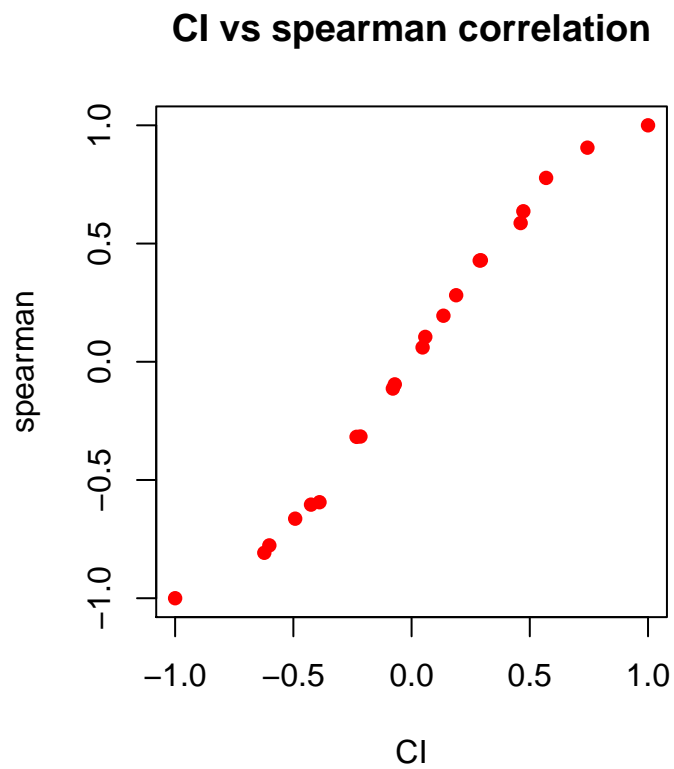
```
dt <- lapply(seq(-1,1,0.1), function(cr){
  df <- mvrnorm(50, mu = c(0,0), Sigma = matrix(c(1,cr,cr,1), ncol = 2), empirical = TRUE)
  ci <- CI(x=df[,1], y=df[,2], deltaX=0, deltaY=0, alpha =0, outx = 1, npermut=10000, ncpu = 1)
  pr <- cor.test(df[,1], df[,2], method = "pearson")
  sm <- cor.test(df[,1],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

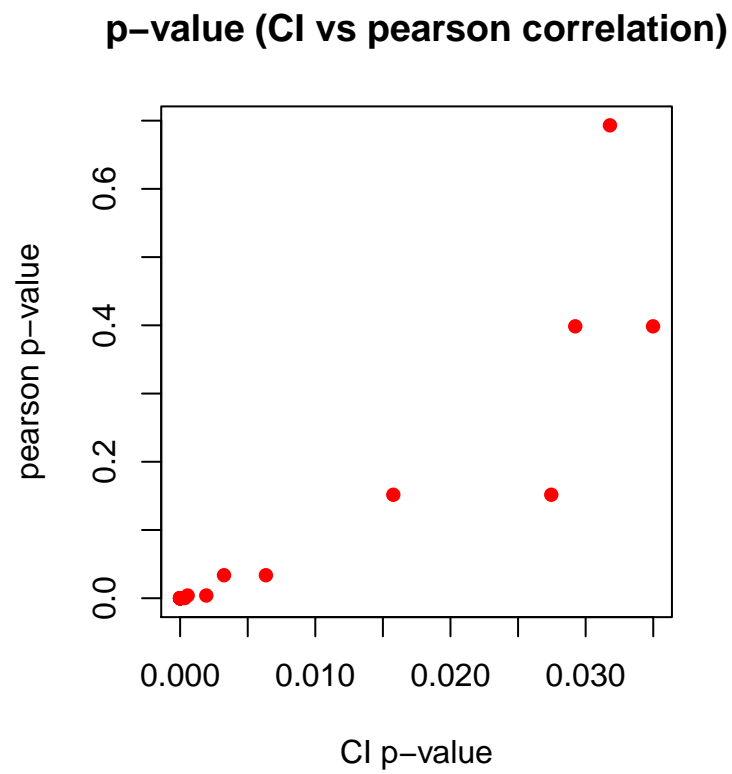
plotData(dt$ci, dt$pr,title="CI vs pearson correlation", xlab="CI", ylab="pearson")
```



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



```
p0ffset = 1
plotData(log(dt$ci.p+p0ffset), log(dt$pr.p+p0ffset), title="p-value (CI vs pearson correlation)",
         xlab="CI p-value", ylab="pearson p-value")
```



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

p-value (CI vs spearman correlation)