t Test(3)

2024-02-18

Dependent samples t test

null hypothesis: population means are equal.

alternative hypothesis: ppn is unequal alpha=.05

df <- read.csv("Advertise.csv")  
summary(df)

## TV Radio Newspaper Sales   
## Min. : 8.6 Min. : 2.10 Min. : 1.00 Min. : 4800   
## 1st Qu.: 51.0 1st Qu.:13.35 1st Qu.: 20.15 1st Qu.:10050   
## Median :120.2 Median :27.70 Median : 46.00 Median :12500   
## Mean :124.1 Mean :26.24 Mean : 42.03 Mean :13939   
## 3rd Qu.:201.9 3rd Qu.:38.55 3rd Qu.: 58.45 3rd Qu.:18250   
## Max. :281.4 Max. :48.90 Max. :114.00 Max. :24400

shapiro.test(df$Radio)

##   
## Shapiro-Wilk normality test  
##   
## data: df$Radio  
## W = 0.93302, p-value = 0.1271

dataset is not normally distributed

shapiro.test(df$Newspaper)

##   
## Shapiro-Wilk normality test  
##   
## data: df$Newspaper  
## W = 0.94018, p-value = 0.1813

dataset is not normally distributed

var.test(df$Newspaper, df$Radio)

##   
## F test to compare two variances  
##   
## data: df$Newspaper and df$Radio  
## F = 3.3464, num df = 22, denom df = 22, p-value = 0.006472  
## alternative hypothesis: true ratio of variances is not equal to 1  
## 95 percent confidence interval:  
## 1.419231 7.890360  
## sample estimates:  
## ratio of variances   
## 3.346377

t.test(df$Newspaper, df$Radio,  
 alternative = "two.sided",  
 paired=TRUE)

##   
## Paired t-test  
##   
## data: df$Newspaper and df$Radio  
## t = 3.5747, df = 22, p-value = 0.001691  
## alternative hypothesis: true mean difference is not equal to 0  
## 95 percent confidence interval:  
## 6.630054 24.952555  
## sample estimates:  
## mean difference   
## 15.7913

We accept the H1: that ppn means are unequal. t=3.5747 means that newspaper results are higher than that of radio.