sec12

Mehrab Atighi

4/15/2021

## a) Introducing data to R

y1<-c(47.8,46.4,46.3,45.1,47.6,52.5,51.2,49.8,48.1,45.0,51.2,48.5,52.,48.2,49.6,50.7,47.2,53.3,46.2,46.3)  
y2<-c(48.8,47.3,46.8,45.3,48.5,53.2,53.0,50.0,50.8,47.0,51.4,49.2,52.8,48.9,50.4,51.7,47.7,54.6,47.5,47.6)  
y3<-c(49.0,47.7,47.8,46.1,48.9,53.3,54.3,50.3,52.3,47.3,51.6,53.0,53.7,49.3,51.2,52.7,48.4,55.1,48.1,51.3)  
y4<-c(49.7,48.4,48.5,47.2,49.3,53.7,54.5,52.7,54.4,48.3,51.9,55.5,55.0,49.8,51.8,53.3,49.5,55.3,48.4,51.8)  
  
dat<-data.frame(y1,y2,y3,y4)  
dat

## y1 y2 y3 y4  
## 1 47.8 48.8 49.0 49.7  
## 2 46.4 47.3 47.7 48.4  
## 3 46.3 46.8 47.8 48.5  
## 4 45.1 45.3 46.1 47.2  
## 5 47.6 48.5 48.9 49.3  
## 6 52.5 53.2 53.3 53.7  
## 7 51.2 53.0 54.3 54.5  
## 8 49.8 50.0 50.3 52.7  
## 9 48.1 50.8 52.3 54.4  
## 10 45.0 47.0 47.3 48.3  
## 11 51.2 51.4 51.6 51.9  
## 12 48.5 49.2 53.0 55.5  
## 13 52.0 52.8 53.7 55.0  
## 14 48.2 48.9 49.3 49.8  
## 15 49.6 50.4 51.2 51.8  
## 16 50.7 51.7 52.7 53.3  
## 17 47.2 47.7 48.4 49.5  
## 18 53.3 54.6 55.1 55.3  
## 19 46.2 47.5 48.1 48.4  
## 20 46.3 47.6 51.3 51.8

H0: mean(y1,y2,y3,y4) == mu

H1: mean(y1,y2,y3,y4) != mu

## b)

Now we want to test all variable with HotelingsT2 function

library("ICSNP")

HotellingsT2(dat,mu= c(48,49,50,51),test = "chi")

##   
## Hotelling's one sample T2-test  
##   
## data: dat  
## T.2 = 1.7708, df = 4, p-value = 0.7778  
## alternative hypothesis: true location is not equal to c(48,49,50,51)

According to this test we can say that the H0 accept becuse our p-value is more than 0.05(alpha) and it means that the lower jaw bone size of boys are not equal with mu(48,49,50,51) in 8,8.5,9,9.5 years old.

## c)

Now we want to test each variable mean with mu value

#H0: mean(y1) == 48  
   
#H1: mean(y1) != 48  
  
t.test(y1,mu = 48)

##   
## One Sample t-test  
##   
## data: y1  
## t = 1.1587, df = 19, p-value = 0.2609  
## alternative hypothesis: true mean is not equal to 48  
## 95 percent confidence interval:  
## 47.47583 49.82417  
## sample estimates:  
## mean of x   
## 48.65

according to tests outputs we can say that the p-value is more that alpha and H0 accept and we can say the mean of y1 approximately is equal to 48.65.

#H0: mean(y2) == 49  
   
#H1: mean(y2) != 49  
t.test(y2, mu = 49)

##   
## One Sample t-test  
##   
## data: y2  
## t = 1.1006, df = 19, p-value = 0.2848  
## alternative hypothesis: true mean is not equal to 49  
## 95 percent confidence interval:  
## 48.43645 50.81355  
## sample estimates:  
## mean of x   
## 49.625

according to tests outputs we can say that the p-value is more that alpha and H0 accept and we can say the mean of y2 approximately is equal to 49.625.

#H0: mean(y3) == 50  
   
#H1: mean(y3) != 50  
t.test(y3, mu = 50)

##   
## One Sample t-test  
##   
## data: y3  
## t = 0.96917, df = 19, p-value = 0.3446  
## alternative hypothesis: true mean is not equal to 50  
## 95 percent confidence interval:  
## 49.33902 51.80098  
## sample estimates:  
## mean of x   
## 50.57

according to tests outputs we can say that the p-value is more that alpha and H0 accept and we can say the mean of y3 approximately is equal to 50.57.

#H0: mean(y4) == 51  
   
#H1: mean(y4) != 51  
t.test(y4, mu = 51)

##   
## One Sample t-test  
##   
## data: y4  
## t = 0.73658, df = 19, p-value = 0.4704  
## alternative hypothesis: true mean is not equal to 51  
## 95 percent confidence interval:  
## 50.17131 52.72869  
## sample estimates:  
## mean of x   
## 51.45

according to tests outputs we can say that the p-value is more that alpha and H0 accept and we can say the mean of y4 approximately is equal to 51.45.

End.