Hypothesis Testing Solutions

Z- test

Example 1

The mean height from the entire of men and women in the population is 170cm. You want to check if there is a statistically significant difference (with a significance level of 95%) between the means of the sample and the population. Calculate the z-test to test is the observed data is different from the population data for

- i 10 men of height: 179, 188, 172, 185, 171, 199, 176, 188, 158, 200

```
data<-c(179, 188, 172, 185, 171, 199, 176, 188, 158, 200)

t.test(data,mu=170)
```

```
##
##  One Sample t-test
##
## data:  data
## t = 2.8094, df = 9, p-value = 0.0204
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
##  172.2595 190.9405
## sample estimates:
## mean of x
##     181.6
```

- ii 12 women of height: 175, 158, 159, 167, 171, 151, 160, 167, 147, 172, 154, 152

```
data<-c(175, 158, 159, 167, 171, 151, 160, 167, 147, 172, 154, 152)

t.test(data,mu=170)
```

```
##
##  One Sample t-test
##
## data:  data
## t = -3.3613, df = 11, p-value = 0.00635
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
##  155.2446 166.9221
## sample estimates:
## mean of x
##  161.0833
```

- iii 7 women and 8 men of height: 166, 189, 180, 193, 148, 174, 161, 170, 172, 179, 158, 157, 176, 171, 174

```
data<-c(166, 189, 180, 193, 148, 174, 161, 170, 172, 179, 158, 157, 176,171, 174)

t.test(data,mu=170)
```

```
##
##  One Sample t-test
##
## data:  data
## t = 0.38726, df = 14, p-value = 0.7044
## alternative hypothesis: true mean is not equal to 170
## 95 percent confidence interval:
##  164.554 177.846
## sample estimates:
## mean of x
##     171.2
```

- iv Compare the height of the 10 men and the 12 women

```
men<-c(179, 188, 172, 185, 171, 199, 176, 188, 158, 200)
women<-c(175, 158, 159, 167, 171, 151, 160, 167, 147, 172, 154, 152)
t.test(men,women,paired=FALSE)
```

```
##
##  Welch Two Sample t-test
##
## data:  men and women
## t = 4.1805, df = 15.766, p-value = 0.0007278
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  10.10008 30.93325
## sample estimates:
## mean of x mean of y
##  181.6000  161.0833
```

QUESTION 2.

A survey claims that 8 out of 10 doctors recommend aspirin for their patients with headaches. To test this claim, a random sample of 100 doctors is obtained. Of these 95 doctors, 82 indicate that they recommend aspirin.

Calculate the z-test to test is the observed data different from the population data.

```
p0<-0.8

q0<-1-p0
p<-82/95
n<-95
Z<-(p-p0)/sqrt(p0*q0/n)
Z
```

```
## [1] 1.538968
```

t-test

QUESTION 3

Read in the PearsonLeeSimple.csv data. Using an unpaired t-test compare:

- the heights of children and parents,
- within in the parents compared the Height of Mothers and Fathers.

```r
# JB_PEARSON<-read.csv("PearsonLeeSimple.csv")

# t.test(JB_PEARSON$parent,JB_PEARSON$child,paired=FALSE)
# t.test(JB_PEARSON$parent~JB_PEARSON$par,paired=FALSE)
```