Statiscal Inference Course Project Part2

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Abstact

this is the second part of the project Statistical Inference. In this second part, it is making basics inference of the data set Tooth grown.

This data set is the response of odontoblasts in each of 10 guinea pigs at each of three dose levels of vitamin C(0.5,1 and 2 mg).

load the libraries

```
library(ggplot2)
#load the library of the data set
library(datasets)
data(ToothGrowth)
#see the data set summary
summary(ToothGrowth)
```

```
##       len        supp         dose
##  Min.   : 4.20   OJ:30   Min.   :0.500
##  1st Qu.:13.07   VC:30   1st Qu.:0.500
##  Median :19.25           Median :1.000
##  Mean   :18.81           Mean   :1.167
##  3rd Qu.:25.27           3rd Qu.:2.000
##  Max.   :33.90           Max.   :2.000
```

```
str(ToothGrowth)
```

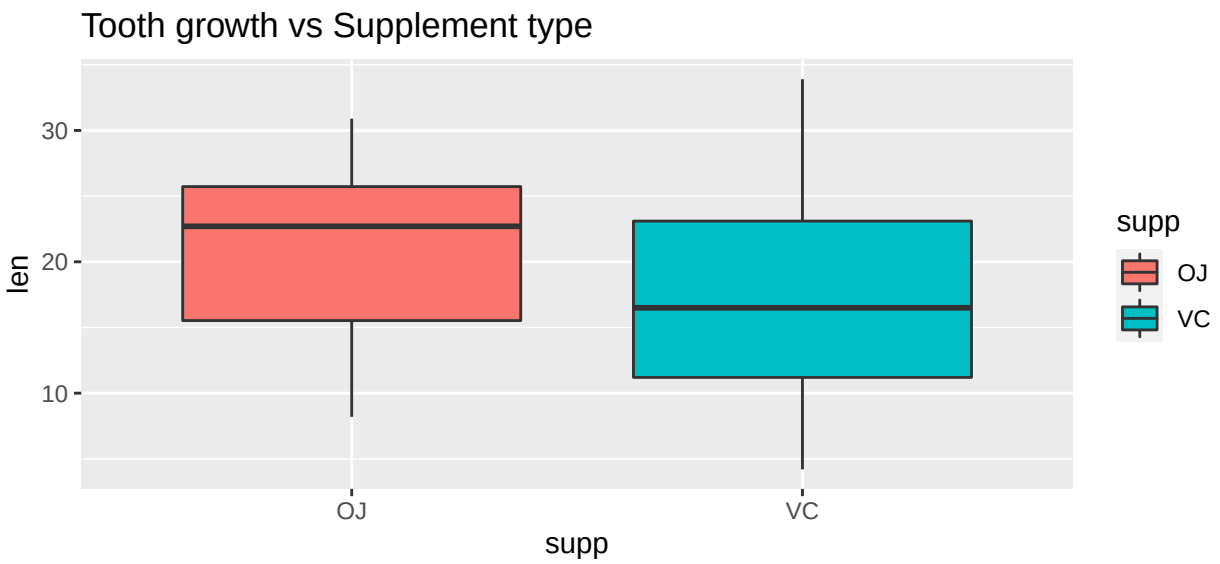
```
## 'data.frame':   60 obs. of  3 variables:
##  $ len : num  4.2 11.5 7.3 5.8 6.4 10 11.2 11.2 5.2 7 ...
##  $ supp: Factor w/ 2 levels "OJ","VC": 2 2 2 2 2 2 2 2 2 2 ...
##  $ dose: num  0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 ...
```

Provide a basic summary of the data

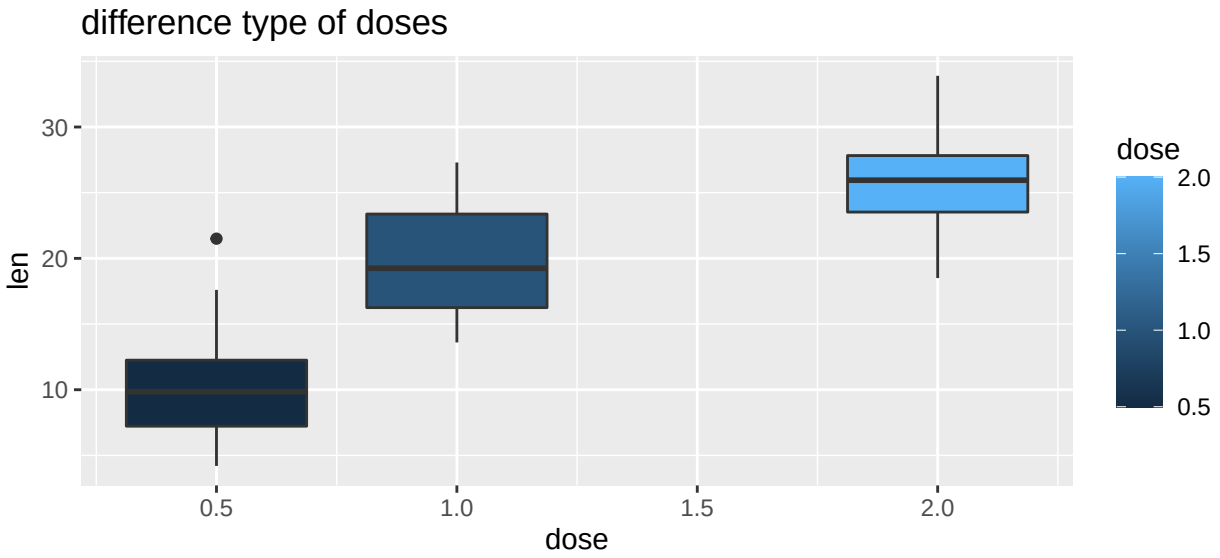
```
#see the difference case between dose levels and delivery methods
table(ToothGrowth$dose,ToothGrowth$supp)
```

```
##
##       OJ VC
##   0.5 10 10
##   1   10 10
##   2   10 10
```

```
#Visualizate the improve of tooth growth for supplement type
g<-ggplot(aes(x=supp, y=len), data=ToothGrowth) + geom_boxplot(aes(fill=supp))
g+labs(title = "Tooth growth vs Supplement type")
```




```
# see the graphics of dose levels vs delivery method
g<-ggplot(aes(x=dose, y=len,group=dose), data=ToothGrowth) + geom_boxplot(aes(fill=dose))
g+labs(title = "difference type of doses")
```



Use confidence intervlas and hypothesis to compare tooth growth by support and dose

```r
# peform the difference of support type by group
t.test(len~supp,data=ToothGrowth)
```

```
##
##     Welch Two Sample t-test
##
## data:  len by supp
## t = 1.9153, df = 55.309, p-value = 0.06063
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -0.1710156  7.5710156
## sample estimates:
## mean in group OJ mean in group VC
##         20.66333         16.96333
```

taking this results it is possible to say that the difference supplement type have not effect on the tooth length

```r
# making the analises of the three type of dose
TG0.5<-ToothGrowth[ToothGrowth$dose==0.5,]
TG1<-ToothGrowth[ToothGrowth$dose==1,]
TG2<-ToothGrowth[ToothGrowth$dose==2,]
#Make the analises for dose =0.5
t.test(len~supp, data = TG0.5)
```

```
##
##     Welch Two Sample t-test
##
## data:  len by supp
## t = 3.1697, df = 14.969, p-value = 0.006359
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  1.719057 8.780943
## sample estimates:
## mean in group OJ mean in group VC
##            13.23             7.98
```

```r
#Make the analises for dose =1
t.test(len~supp, data = TG1)
```

```
##
##     Welch Two Sample t-test
##
## data:  len by supp
## t = 4.0328, df = 15.358, p-value = 0.001038
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  2.802148 9.057852
## sample estimates:
## mean in group OJ mean in group VC
##            22.70             16.77
```

```r
#Make the analises for dose =2
t.test(len~supp, data = TG2)
```

```
##
##     Welch Two Sample t-test
##
## data:  len by supp
## t = -0.046136, df = 14.04, p-value = 0.9639
## alternative hypothesis: true difference in means is not equal to 0
## 95 percent confidence interval:
##  -3.79807  3.63807
## sample estimates:
## mean in group OJ mean in group VC
##            26.06            26.14
```

Conclucions

It is possible to say that when you improved the doses the null hypothesis of tooth growth can be reject