Central_tendency

D. Tenisha 20CSEG34

30/04/2021

```
library(MASS)
View(mtcars)
length(mtcars)

## [1] 11

head(mtcars)

##                    mpg cyl disp  hp drat    wt  qsec vs am gear carb
## Mazda RX4         21.0   6  160 110 3.90 2.620 16.46  0  1    4    4
## Mazda RX4 Wag     21.0   6  160 110 3.90 2.875 17.02  0  1    4    4
## Datsun 710        22.8   4  108  93 3.85 2.320 18.61  1  1    4    1
## Hornet 4 Drive    21.4   6  258 110 3.08 3.215 19.44  1  0    3    1
## Hornet Sportabout 18.7   8  360 175 3.15 3.440 17.02  0  0    3    2
## Valiant           18.1   6  225 105 2.76 3.460 20.22  1  0    3    1

summary(mtcars)

##       mpg            cyl            disp             hp
##  Min.   :10.40   Min.   :4.000   Min.   : 71.1   Min.   : 52.0
##  1st Qu.:15.43   1st Qu.:4.000   1st Qu.:120.8   1st Qu.: 96.5
##  Median :19.20   Median :6.000   Median :196.3   Median :123.0
##  Mean   :20.09   Mean   :6.188   Mean   :230.7   Mean   :146.7
##  3rd Qu.:22.80   3rd Qu.:8.000   3rd Qu.:326.0   3rd Qu.:180.0
##  Max.   :33.90   Max.   :8.000   Max.   :472.0   Max.   :335.0
##       drat            wt             qsec             vs
##  Min.   :2.760   Min.   :1.513   Min.   :14.50   Min.   :0.0000
##  1st Qu.:3.080   1st Qu.:2.581   1st Qu.:16.89   1st Qu.:0.0000
##  Median :3.695   Median :3.325   Median :17.71   Median :0.0000
##  Mean   :3.597   Mean   :3.217   Mean   :17.85   Mean   :0.4375
##  3rd Qu.:3.920   3rd Qu.:3.610   3rd Qu.:18.90   3rd Qu.:1.0000
##  Max.   :4.930   Max.   :5.424   Max.   :22.90   Max.   :1.0000
##       am             gear            carb
##  Min.   :0.0000   Min.   :3.000   Min.   :1.000
##  1st Qu.:0.0000   1st Qu.:3.000   1st Qu.:2.000
##  Median :0.0000   Median :4.000   Median :2.000
##  Mean   :0.4062   Mean   :3.688   Mean   :2.812
##  3rd Qu.:1.0000   3rd Qu.:4.000   3rd Qu.:4.000
##  Max.   :1.0000   Max.   :5.000   Max.   :8.000
```

#mean

```
apply(mtcars,2,mean)
```

```
##        mpg        cyl       disp         hp       drat         wt
qsec
##  20.090625   6.187500 230.721875 146.687500   3.596563   3.217250
17.848750
##         vs         am       gear       carb
##   0.437500   0.406250   3.687500   2.812500
```

#Harmonic mean

```
##user defined function for Harmonic mean
hm<-function(x){
return(1/mean(1/x))
}
```

```
apply(mtcars,2,hm)
```

```
##        mpg        cyl       disp         hp       drat         wt
qsec
##  18.440917   5.647059 166.799389 118.228892   3.520704   2.918263
17.678200
##         vs         am       gear       carb
##   0.000000   0.000000   3.555556   2.026385
```

#Geometric mean

```
##user defined function for geometric mean
gm<-function(x){
return(prod(x)^(1/length(x)))
}
```

```
apply(mtcars,2,gm)
```

```
##        mpg        cyl       disp         hp       drat         wt
qsec
##  19.250064   5.919439 197.321758 131.883679   3.558394   3.070189
17.763115
##         vs         am       gear       carb
##   0.000000   0.000000   3.619405   2.395987
```

#median

```
apply(mtcars,2,median)
```

```
##     mpg     cyl    disp      hp    drat      wt    qsec      vs      am
gear
##  19.200   6.000 196.300 123.000   3.695   3.325  17.710   0.000   0.000
4.000
```

```
##    carb
##   2.000
```

#Mode

```
##user defined fun
mode_fun<-function(x){
a=table(x)
returnValue(names(a) [which(a==max(a))])
}

mode_fun(mtcars$mpg)

## [1] "10.4" "15.2" "19.2" "21"   "21.4" "22.8" "30.4"

mode_fun(mtcars$cyl)

## [1] "8"

mode_fun(mtcars$disp)

## [1] "275.8"

mode_fun(mtcars$hp)

## [1] "110" "175" "180"

mode_fun(mtcars$drat)

## [1] "3.07" "3.92"

mode_fun(mtcars$wt)

## [1] "3.44"

mode_fun(mtcars$qsec)

## [1] "17.02" "18.9"

mode_fun(mtcars$vs)

## [1] "0"

mode_fun(mtcars$am)

## [1] "0"

mode_fun(mtcars$gear)

## [1] "3"

mode_fun(mtcars$carb)

## [1] "2" "4"
```

#Mean absolute deviation

```
apply(mtcars,2,mad)
```

```
##         mpg         cyl        disp          hp        drat          wt
##   5.4114900   2.9652000 140.4763500  77.0952000   0.7042350   0.7672455
##        qsec          vs          am        gear        carb
##   1.4158830   0.0000000   0.0000000   1.4826000   1.4826000
```

#Variance

```
apply(mtcars,2,var)
```

```
##          mpg          cyl         disp           hp         drat
wt
## 3.632410e+01 3.189516e+00 1.536080e+04 4.700867e+03 2.858814e-01
9.573790e-01
##         qsec           vs           am         gear         carb
## 3.193166e+00 2.540323e-01 2.489919e-01 5.443548e-01 2.608871e+00
```

#Standard deviation

```
apply(mtcars,2,sd)
```

```
##         mpg         cyl        disp          hp        drat          wt
##   6.0269481   1.7859216 123.9386938  68.5628685   0.5346787   0.9784574
##        qsec          vs          am        gear        carb
##   1.7869432   0.5040161   0.4989909   0.7378041   1.6152000
```

#Quantile

```
apply(mtcars,2,quantile)
```

```
##            mpg cyl    disp    hp  drat      wt    qsec vs am gear carb
## 0%      10.400   4  71.100  52.0 2.760 1.51300 14.5000  0  0    3    1
## 25%     15.425   4 120.825  96.5 3.080 2.58125 16.8925  0  0    3    2
## 50%     19.200   6 196.300 123.0 3.695 3.32500 17.7100  0  0    4    2
## 75%     22.800   8 326.000 180.0 3.920 3.61000 18.9000  1  1    4    4
## 100%    33.900   8 472.000 335.0 4.930 5.42400 22.9000  1  1    5    8
```

#Quartile

```
apply(mtcars,2,IQR)
```

```
##         mpg         cyl        disp          hp        drat          wt        qsec
vs
##     7.37500     4.00000 205.17500    83.50000     0.84000     1.02875     2.00750
1.00000
##          am        gear        carb
##     1.00000     1.00000     2.00000
```