Experiment 3.2

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AIM :-

Regression analysis using R programming.

Theory :-

Linear Regression: It is a commonly used type of predictive analysis. It is a statistical approach for modeling the relationship between a dependent variable and a given set of independent variables.

There are two types of linear regression.

- Simple Linear Regression
- Multiple Linear Regression

Simple Linear Regression:

It is a statistical method that allows us to summarize and study relationships between two continuous (quantitative) variables. One variable denoted x is regarded as an independent variable and the other one denoted y is regarded as a dependent variable. It is assumed that the two variables are linearly related. Hence, we try to find a linear function that predicts the response value as accurately as possible as a function of the feature or independent variable(x).

Output and Code:- library(RWeka)

setwd("C:\\Users\\YashGupta\\Desktop\\r")

getwd() library(tidyverse) data() head(cars,10) cars

%>% lm(dist ~ speed, data =.)%>%

summary() mod<- lm(dist ~ speed,data=cars)

mod summary(mod) attributes(mod)

mod$residuals hist(mod$residuals)

new_speeds <- data.frame(speed=c(10,15,20))

predict(mod,new_speeds)%>%round(1) cars

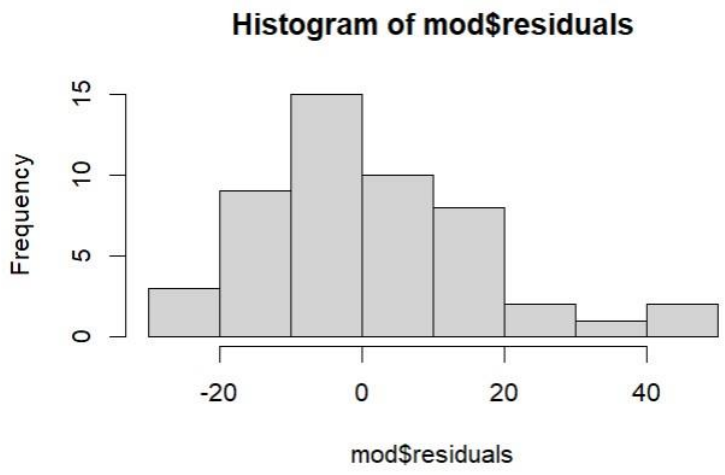
%>% lm(dist ~ speed, data=.) %>%

predict(data.frame(speed=c(10,15,20))) %>%

round()

```
Call:
lm(formula = dist ~ speed, data = .)

Residuals:
    Min      1Q  Median      3Q     Max
-29.069  -9.525  -2.272   9.215  43.201

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -17.5791     6.7584  -2.601   0.0123 *
speed         3.9324     0.4155   9.464 1.49e-12 ***
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 15.38 on 48 degrees of freedom
Multiple R-squared:  0.6511,    Adjusted R-squared:  0.6438
F-statistic: 89.57 on 1 and 48 DF,  p-value: 1.49e-12
```

```
Call:
lm(formula = dist ~ speed, data = cars)

Coefficients:
(Intercept)        speed
    -17.579        3.932

> attributes(mod)
$names
 [1] "coefficients"  "residuals"
 [3] "effects"       "rank"
 [5] "fitted.values" "assign"
 [7] "qr"            "df.residual"
 [9] "xlevels"       "call"
[11] "terms"         "model"

$class
[1] "lm"
```




```
> cars %>%
+   lm(dist ~ speed, data=.) %>%
+   predict(data.frame(speed=c(10,15,20))) %>%
+   round()
 1  2  3
22 41 61
> new_speeds <- data.frame(speed=c(10,15,20))
> predict(mod,new_speeds)%>%round(1)
   1    2    3
21.7 41.4 61.1
> mod<- lm(dist ~ speed,data=cars)
> mod

Call:
lm(formula = dist ~ speed, data = cars)

Coefficients:
(Intercept)        speed
    -17.579        3.932

> cars %>%
+   lm(dist ~ speed, data=.) %>%
+   predict(data.frame(speed=c(10,15,20))) %>%
+   round()
 1  2  3
22 41 61
>
```