Vidyavardhini's College of Engineering and Technology

Department of Artificial Intelligence & Data Science

AY: 2023-24

Class:	TE	**Semester:**	VI
Course Code:	CSL601	**Course Name:**	Data Analytics and Visualization

Name of Student:	Ojasi Prashant Prabhu
Roll No.:	43
Experiment No.:	2
Title of the Experiment:	Implement R Program for Simple Linear Regression.
Date of Performance:	
Date of Submission:	

Evaluation

Performance Indicator	Max. Marks	Marks Obtained
Performance	5	
Understanding	5	
Journal work and timely submission	10	
Total	20	

Performance Indicator	Exceed Expectations (EE)	Meet Expectations (ME)	Below Expectations (BE)
Performance	4-5	2-3	1
Understanding	4-5	2-3	1
Journal work and timely submission	8-10	5-8	1-4

Checked by

Name of Faculty : Ms Bhavika Gharat

Signature :

Date :

EXPERIMENT NO 2

Aim: To write the implementation of linear regression.

Objective:- To understand the use of simple linear regression techniques by implementing user define dataset and importing dataset

Description:

Regression analysis is a very widely used statistical tool to establish a relationship model between two variables. One of these variables is called a predictor variable whose value is gathered through experiments. The other variable is called response variable whose value is derived from the predictor variable.

In Linear Regression these two variables are related through an equation, where the exponent (power) of both these variables is 1. Mathematically a linear relationship represents a straight line when plotted as a graph. A non-linear relationship where the exponent of any variable is not equal to 1 creates a curve.

The general mathematical equation for a linear regression is

$$y = ax + b$$

Following is the description of the parameters used –

y is the response variable. x is the predictor variable.
a and b are constants which are called the coefficients.

Procedure:

The steps to create the relationship is

1. Carry out the experiment of gathering a sample of observed values of height and corresponding weights.
2. Create a relationship model using the **lm()** functions in R.

3. Find the coefficients from the model created and create the mathematical equation using these Get a summary of the relationship model to know the average error in prediction. Also called **residuals.**

To predict the weight of new persons, use the **predict()** function in R.

Program:

```
X = c(l51,174,138,186,128,136,179,163,152,13l)
Y = c(63,8l,56,91,47,57,76,72,62,48)

plot(X,Y)
relation=lm(Y  X)
print(relation)
print(summary(relation))
a=data.frame(X= 170)
result=predict(relation ,a)
print(result)
png(file="linearregression.png")
plot(Y,X,col="green",main="Height & Weight Regression",abline(lm(X  Y)),cex=l.3,pch=
l6,Xlab="Weight in kg",Ylab="Height in cm")
dev.off()
```

Result:

Thus the implementation of linear regression was executed and verified successfully.

OUTPUT:

```
>  a=data.frame(X= 170)

>result=predict(relation  ,a)

>print(resul

 t)  1

76.22869

>png( file="linearregression. png ")

>plot(Y,X,col="green" ,main="Height & Weight Regression" ,abline(lm(X  Y))
```

Conclusion:

1. Function used for linear regression in R is **lm(formula, data)**

2. Explain use of summary().
   Summary() in R quickly summarizes a fitted linear regression model, providing key details like coefficients, standard errors, p-values, and R-squared for interpreting the model's fit and variable relation