SAVEETHA SCHOOL OF ENGINEERING

SAVEETHA INSTITUTE OF MEDICAL AND TECHNICAL SCIENCES

ITA 0443 - STATISTICS WITH R PROGRAMMING FOR REAL TIME PROBLEM

DAY 4– LAB MANUAL

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LINEAR REGRESSION ANALYSIS IN R

Exercise

1. Using linear regression analysis establish a relationship between height and weight of a person using the input vector given below.

Values of height

151, 174, 138, 186, 128, 136, 179, 163, 152, 131

Values of weight.

63, 81, 56, 91, 47, 57, 76, 72, 62, 48

Predict the weight of a person with height 170. Visualize the regression graphically. Code: height <- c(151, 174, 138, 186, 128, 136, 179, 163, 152, 131) weight <- c(63, 81, 56, 91, 47, 57, 76, 72, 62, 48) data <- data.frame(height, weight) model <- lm(weight ~ height, data = data) new_data <- data.frame(height = 170) predicted_weight <- predict(model, newdata = new_data) cat("Predicted weight for a person with height 170:", predicted_weight)

plot(weight ~ height, data = data, main = "Linear Regression - Height vs. Weight", xlab =

"Height", ylab = "Weight")

abline(model, col = "red") Output:

2. Download the Dataset "water" From Rdataset Link.Find out whether there is a linear relation between attributes"mortality" and"hardness" by plot function.Fit the Data into the Linear Regression model.Predict the mortality for the hardness=88

MULTIPLE REGRESSION ANALYSIS IN R

Code:

```
data <- read.csv("https://vincentarelbundock.github.io/Rdatasets/csv/datasets/water.csv")

head(data) ggplot(data, aes(x = hardness, y = mortality)) + geom_point() + labs(x =

"Hardness", y = "Mortality") + ggtitle("Scatter Plot - Mortality vs. Hardness") model <-

lm(mortality ~ hardness, data = data) new_data <- data.frame(hardness = 88)

predicted_mortality <- predict(model, newdata = new_data) cat("Predicted mortality for

hardness = 88:", predicted_mortality)
```

Output:

Exercise:

3.Generate a multiple regression model using the built in dataset mtcars.It gives a comparison between different car models in terms of mileage per gallon (mpg), cylinder displacement("disp"), horse power("hp"), weight of the car("wt") and some more parameters.

Establish the relationship between "mpg" as a response variable with "disp","hp" and "wt" as predictor variables. Predict the mileage of the car with dsp=221,hp=102 and wt=2.91.

Code:

data(mtcars) model <- lm(mpg ~ disp + hp + wt, data = mtcars) summary(model)

new_data <- data.frame(disp = 221, hp = 102, wt = 2.91) predicted_mpg <-

predict(model, newdata = new_data) cat("Predicted mileage for disp = 221, hp =

102, and wt =

2.91:", predicted_mpg) Output:

4. Consider the data set "delivery" available in the R environment. It gives a deliverytime ("delTime")of production materials(number of productions "n.prod") with the given distance("distance") to reach the destination place.

a)Create the model to establish the relationship between "delTime" as a response variable with "n.prod" and "distance" as predictor variables.

b)Predict the delTime for the given number of production("n.prod")=9 and distance("distance")=450

Code: data(mtcars) model <- lm(mpg ~ disp + hp + wt, data = mtcars)

summary(model) new_data <- data.frame(disp = 221, hp = 102, wt = 2.91)

predicted_mpg <- predict(model, newdata = new_data) cat("Predicted mileage

for disp = 221, hp = 102, and wt = 2.91:", predicted_mpg)

Output: