Regression

Simple Linear Regression

Assignment 2

BP: Delivery\_time -> Predict delivery time using sorting time.

Do the necessary transformations for input variables for getting better R^2 value for the model prepared.

1. After observing the plot between delivery time vs sorting time, the plot is almost in a linear relationship.
2. Now r value is =0.82599 and value of R2= 0.6823
3. First well known procedure is doing RMSE ( root mean square error ) for predicting the values

Now finding the confidence interval   
using , confint(reg,level=0.95)

at 95% -> 1.6167115+ X(0.5493182)

At 2.5% -> -3.1300583+ x(0.2781691)

and now we can get the predicted values in the interval using ,   
  
Predict ( reg , interval=”predict “)

we get ,

fit lwr upr

1 7.931943 4.7313012 11.132584

2 4.828866 1.6480569 8.009674

3 7.414763 4.2399538 10.589573

4 9.173174 5.8756419 12.470706

5 11.241892 7.6840436 14.799740

6 5.594291 2.4388768 8.749706

7 7.104456 3.9408862 10.268025

8 3.173891 -0.1269490 6.474731

9 6.649338 3.4963890 9.802286

10 7.001020 3.8404788 10.161561

11 7.447863 4.2716645 10.624061

12 3.691071 0.4369599 6.945181

13 6.144570 2.9951731 9.293968

14 4.001378 0.7713594 7.231397

15 4.220662 1.0058373 7.435488

16 5.399832 2.2398322 8.559831

17 4.932302 1.7560698 8.108533

18 6.736224 3.5817893 9.890658

19 2.553276 -0.8140578 5.920609

20 6.620376 3.4678653 9.772886

21 8.138815 4.9253950 11.352234

Now , we have to transform as the value of R2 is on low side ,

Now applying different methods,

The value before and after transformation are :

OUTPUT INPUT COR METHOD R2 RMSE

Sorting time delivery time 0.82599 SLR 0.6823 1.3983

Sorting time log( delivery time) 0.833 logarithmic 0.6823 1.398343

Log(sorting time) delivery time 0.8431 exponential 0.69823 1.39  
  
Sorting time sqrt( deliver time) 0.839 square root 0.704 1.349  
  
  
  
  
Therefor among all the four , square root method is yielding a better result for R2.

The values are :

at 95% -> -3.268772+ X(4.468013)

At 2.5% -> -11.961956+ x(2.346522)

The predicted values at intervals is :

fit lwr upr

1 7.998697 4.9074970 11.089897

2 4.903736 1.8379419 7.969530

3 7.526864 4.4590119 10.594716

4 9.076769 5.9072224 12.246316

5 10.733333 7.3809010 14.085765

6 5.733995 2.6911642 8.776826

7 7.236571 4.1796629 10.293478

8 2.886540 -0.3222911 6.095370

9 6.800237 3.7548040 9.845669

10 7.138537 4.0847299 10.192344

11 7.557501 4.4883407 10.626661

12 3.556109 0.4078984 6.704320

13 6.300310 3.2606072 9.340013

14 3.939242 0.8199768 7.058507

15 4.202501 1.1006224 7.304380

16 5.528035 2.4815361 8.574534

17 5.019122 1.9578143 8.080429

18 6.884551 3.8373695 9.931732

19 2.021844 -1.2831280 5.326815

20 6.772022 3.7271244 9.816920

21 8.183485 5.0812932 11.285677