Logistic Regression

Example-Affairs Dataset

Target Variable Extra Marital Affair (EMA) is categorial variable with values "yes" and "no"

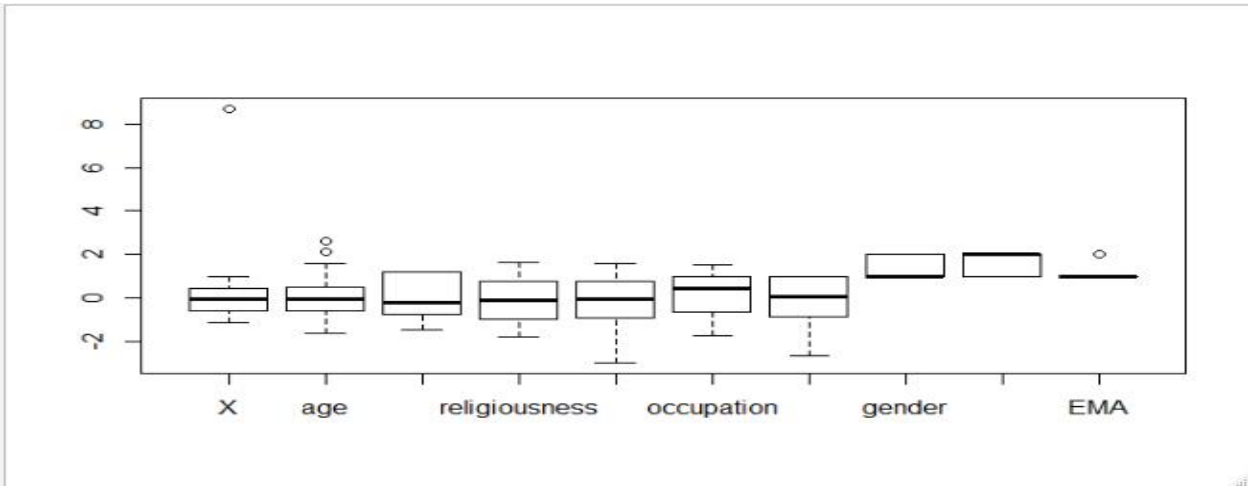
Summary ➔

X	age	yearsmarried	religiousness	education	occupation	rating
Min. : 4	Min. :17.50	Min. : 0.125	Min. :1.000	Min. : 9.00	Min. :1.000	Min. :1.000
1st Qu.: 528	1st Qu.:27.00	1st Qu.: 4.000	1st Qu.:2.000	1st Qu.:14.00	1st Qu.:3.000	1st Qu.:3.000
Median:1009	Median:32.00	Median :7.000	Median:3.000	Median:16.00	Median:5.000	Median:4.000
Mean :1060	Mean :32.49	Mean : 8.178	Mean :3.116	Mean :16.17	Mean :4.195	Mean :3.932
3rd Qu.:1453	3rd Qu.:37.00	3rdQu.:15.000	3rd Qu.:4.000	3rd Qu.:18.00	3rd Qu.:6.000	3rd Qu.:5.000
Max. :9029	Max. :57.00	Max. :15.000	Max. :5.000	Max. :20.00	Max. :7.000	Max. :5.000

EMA	gender	children
no :451	female:315	no :171
yes:150	male :286	yes:430

From the above summary, there is negligible difference between mean and median, so possibly there are less numbers of outliers.

Box Plot ➔



From above box plot, age variable contain outlier.

Splitting data into train and test ➔

Train = 419 and Test = 179

Model-1 Building ➔

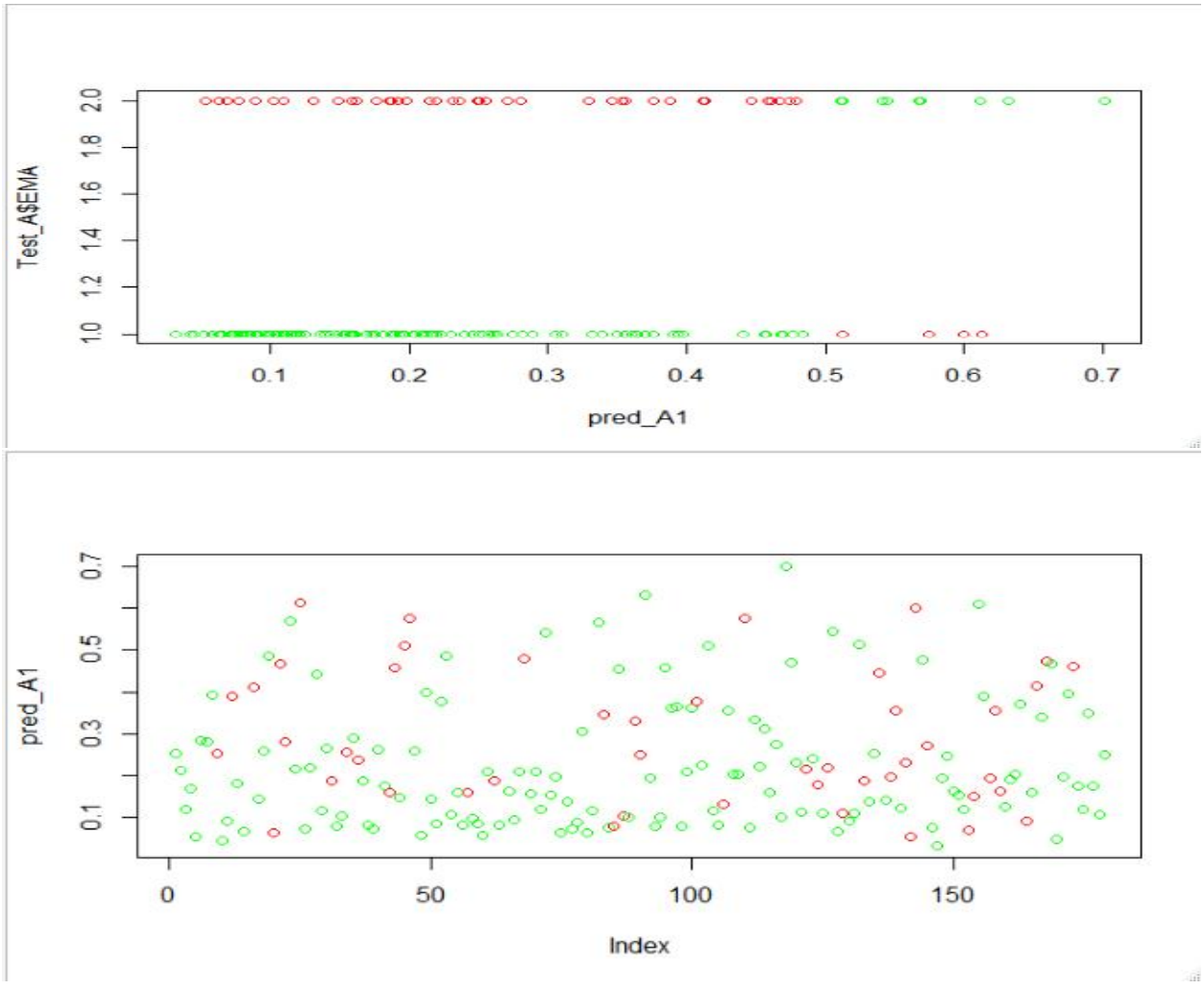
```
model_A1 <- glm(EMA~.,data=Train_A,family = 'binomial')
```

AIC: 429.34

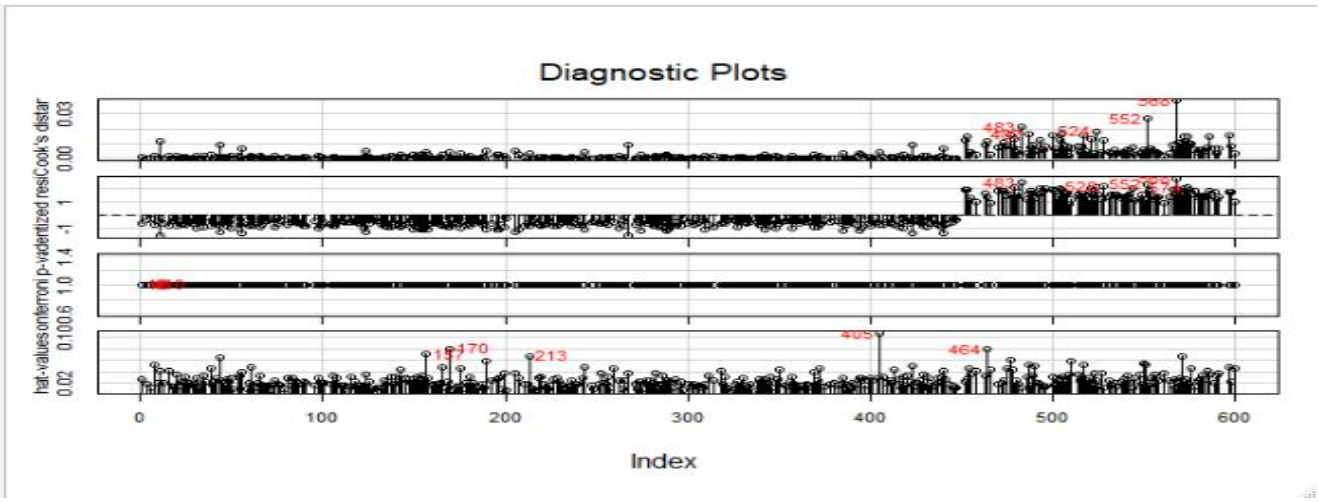
Confusion Matrix ➔

```
       FALSE TRUE
  no     122    5
  yes     41    9
```

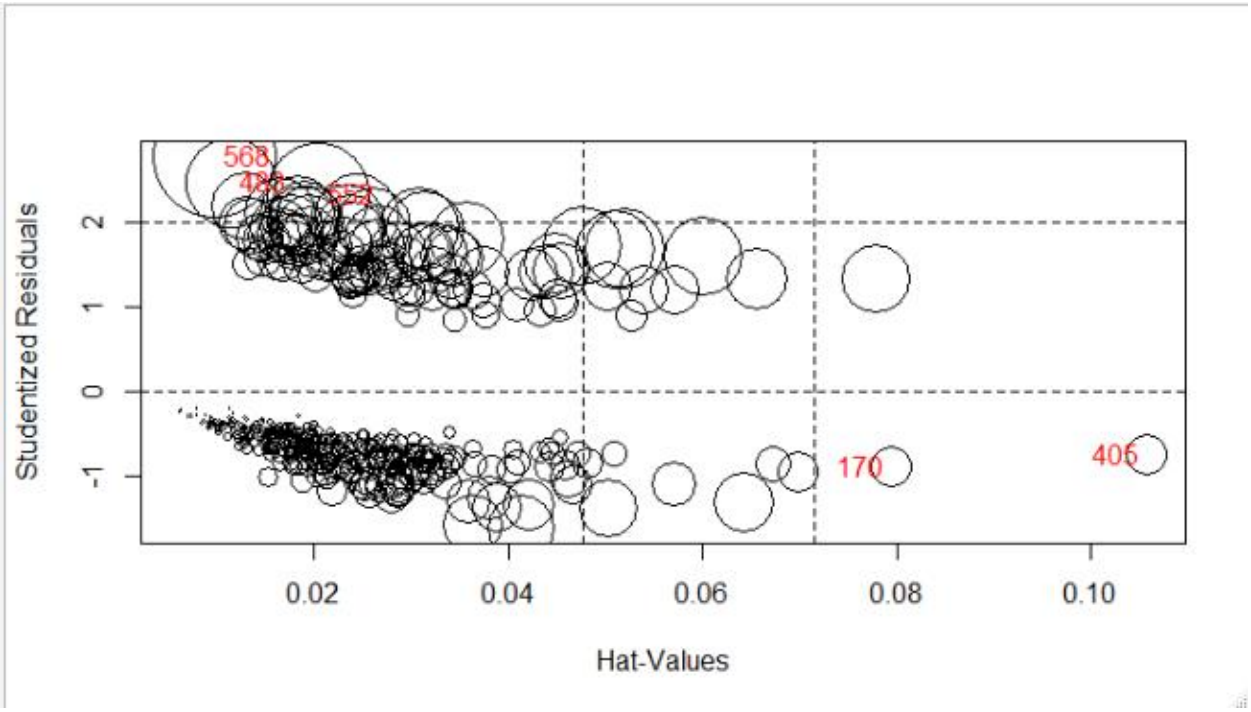
Efficiency ➔ 0.740113



In the above plot, Red is wrong prediction and Green is actual prediction.



Influence Plot



From the above plot it is seen that influencing value is in the model. So will remove this in our next model.

Model-2 Building ➔

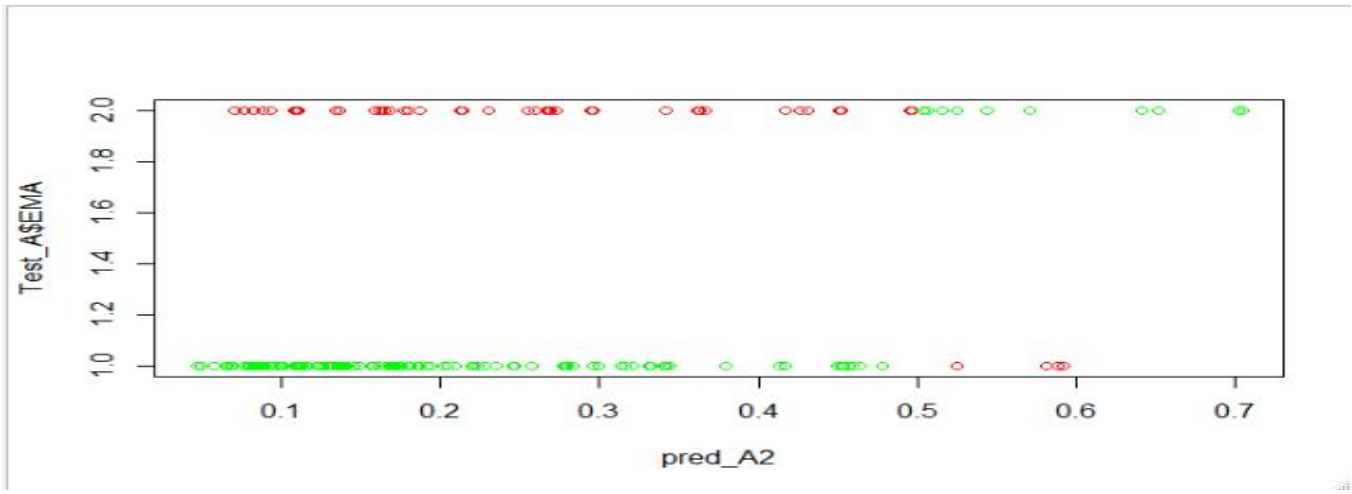
```
model_A2 <- glm(EMA~.,data=Train_A[-in_1,-c(8,7,1,5)],family = 'binomial')
```

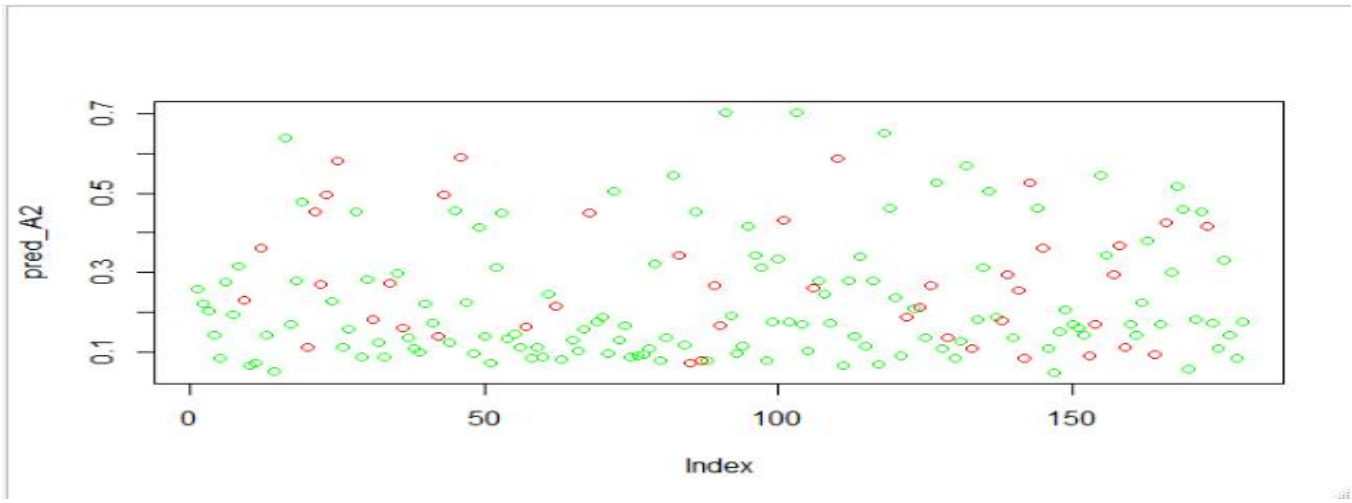
AIC: 421.8

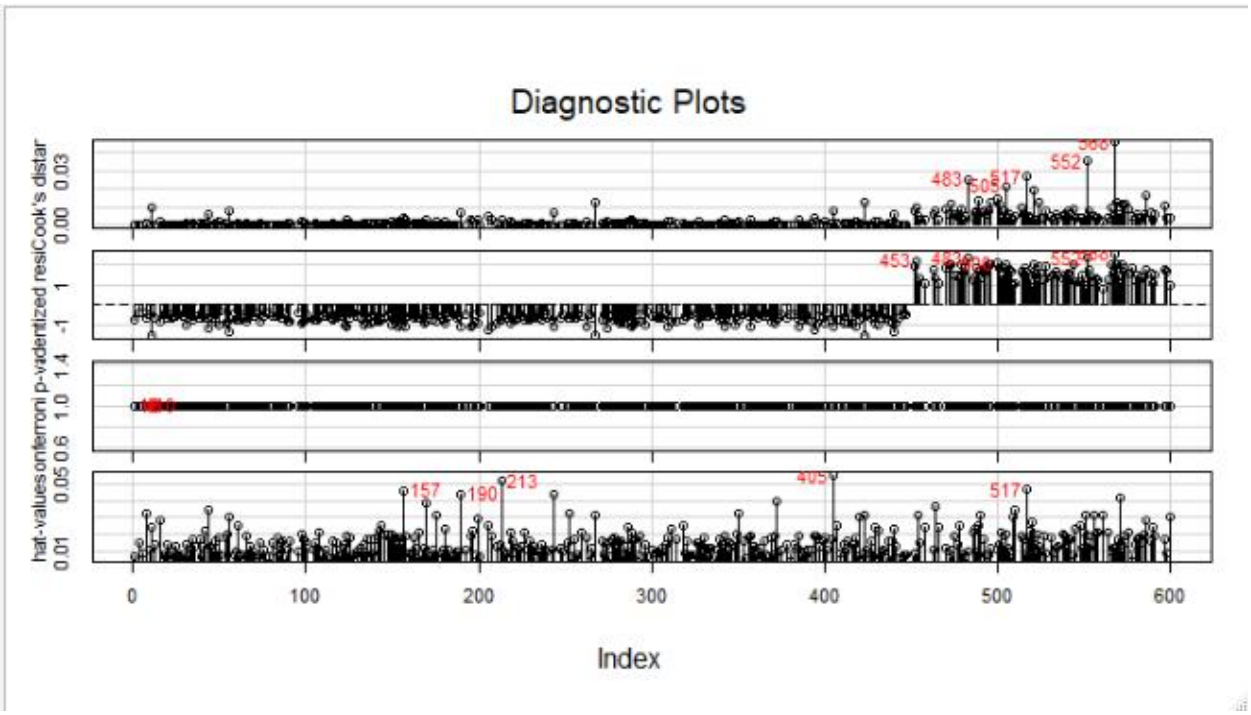
Confusion Matrix ➔

```
      FALSE TRUE
  no    123    4
  yes    39   11
```

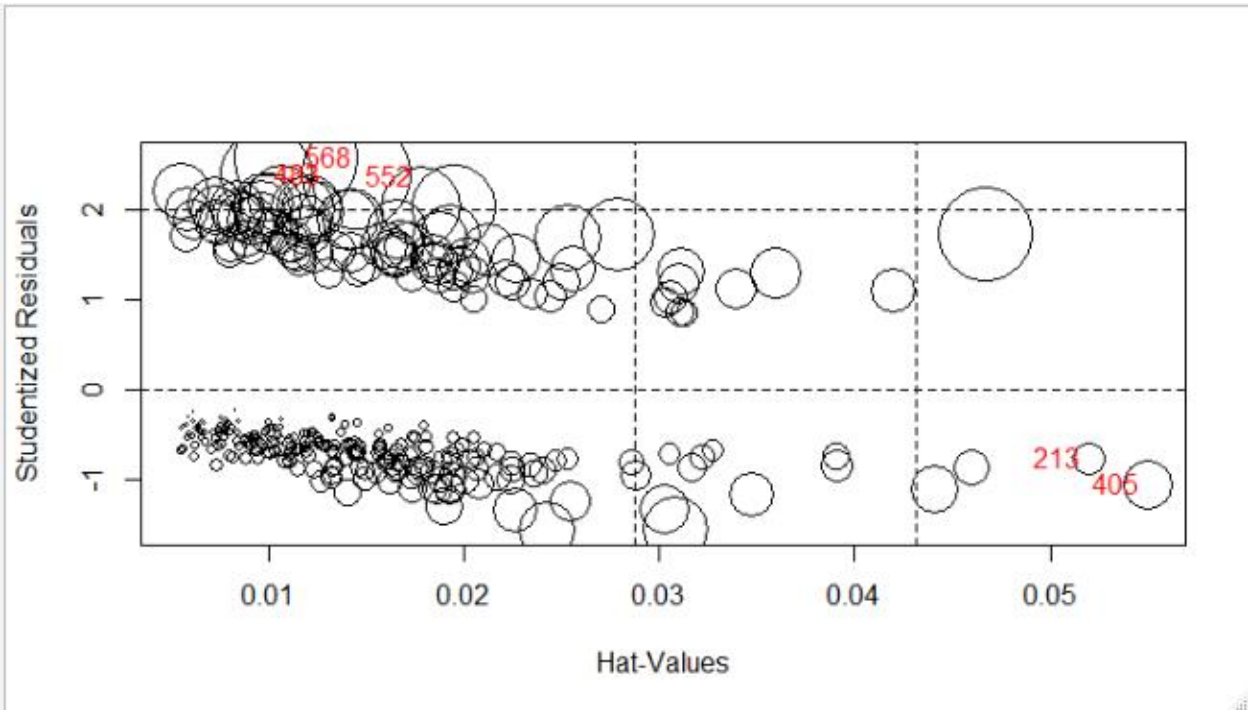
Efficiency ➔0.7570621



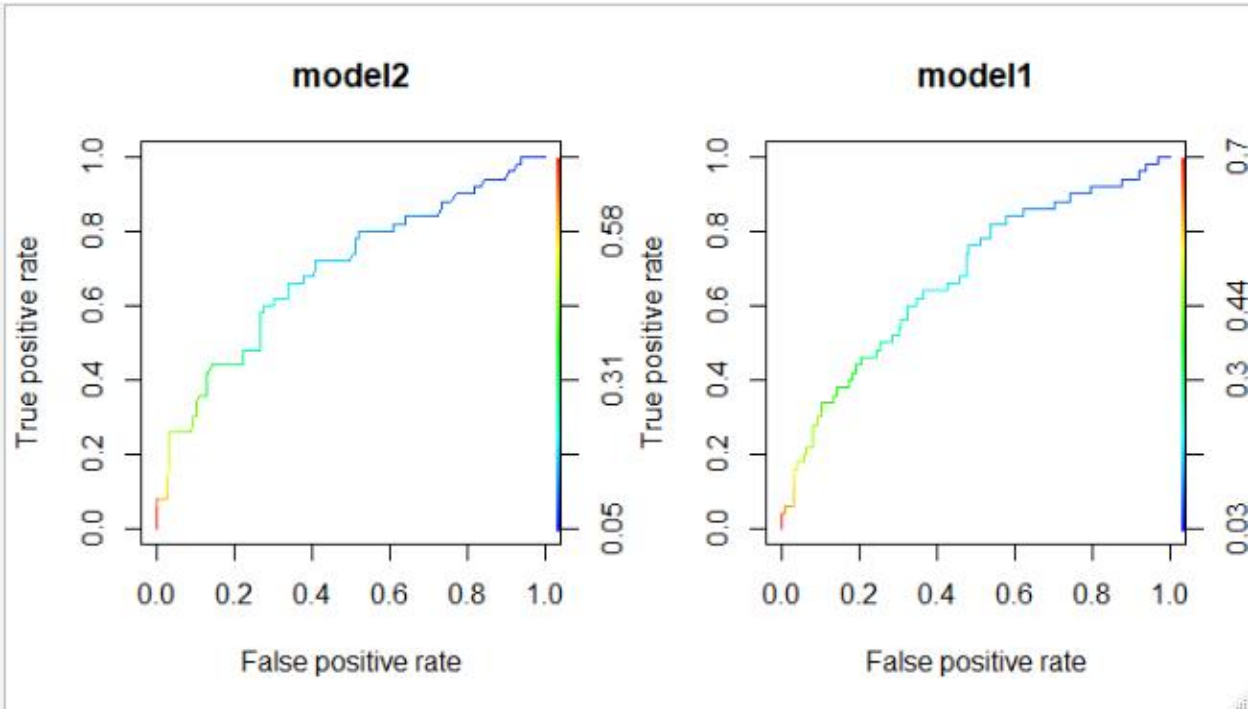




Influence Plot ➔



Comparision in Model-1 and Model-2 ➔



From the above curve we can infer that area under curve in increased in Model-2.

Model No	AIC	Efficiency	F1 Scores
Model-1	429.34	0.740113	0.8413793
Model-2	421.8	0.7570621	0.8512111

From above information we can conclude that Model-2 is final best model.