

```
#Data Analysis in R by Syed Abdul Sami
```

```
#load the data into a dataframe variable
```

```
d <- customer_dbase
```

```
#view the Dataframe for evaluation
```

```
View(d)
```

```
#descriptive statistical summary of each variable(column) in dataset
```

```
summary(d)
```

```
custid      region    townsize    gender
Length:5000   Min.   :1.000  Min.   :1.000  Min.   :0.0000
Class :character 1st Qu.:2.000  1st Qu.:1.000  1st Qu.:0.0000
Mode  :character Median :3.000  Median :3.000  Median :1.0000
Mean   :3.001  Mean   :2.691  Mean   :0.5102
3rd Qu.:4.000  3rd Qu.:4.000  3rd Qu.:1.0000
Max.   :5.000  Max.   :5.000  Max.   :1.0000
NA's   :2
```

```
    age    agecat  birthmonth    bday
Min.   :18.00  Min.   :2.000  Length:5000   Min.   :4.00
1st Qu.:32.00  1st Qu.:3.000  Class :character 1st Qu.:13.00
Median :46.00  Median :4.000  Mode  :character Median :15.00
Mean   :46.94  Mean   :4.232                Mean   :14.98
3rd Qu.:62.00  3rd Qu.:5.000                3rd Qu.:17.00
Max.   :79.00  Max.   :6.000                Max.   :25.00
```

```
    byear    ed    edcat    jobcat
Min.   :32.00  Min.   :6.00  Min.   :1.000  Min.   :1.000
1st Qu.:47.00  1st Qu.:12.00  1st Qu.:2.000  1st Qu.:1.000
Median :50.00  Median :14.00  Median :2.000  Median :2.000
```

Mean :50.01 Mean :14.54 Mean :2.672 Mean :2.764
3rd Qu.:53.00 3rd Qu.:17.00 3rd Qu.:4.000 3rd Qu.:4.000
Max. :66.00 Max. :23.00 Max. :5.000 Max. :6.000

union employ empcat retire
Min. :0.0000 Min. :0.00 Min. :1.000 Min. :0.0000
1st Qu.:0.0000 1st Qu.: 2.00 1st Qu.:2.000 1st Qu.:0.0000
Median :0.0000 Median : 7.00 Median :3.000 Median :0.0000
Mean :0.1494 Mean : 9.74 Mean :2.934 Mean :0.1464
3rd Qu.:0.0000 3rd Qu.:15.00 3rd Qu.:4.000 3rd Qu.:0.0000
Max. :1.0000 Max. :52.00 Max. :5.000 Max. :1.0000

income lninc inccat debtinc
Min. : 9.00 Min. :2.197 Min. :1.000 Min. :0.000
1st Qu.: 24.00 1st Qu.:3.178 1st Qu.:1.000 1st Qu.: 5.175
Median : 38.00 Median :3.638 Median :2.000 Median : 8.800
Mean : 55.04 Mean :3.703 Mean :2.399 Mean : 9.958
3rd Qu.: 67.00 3rd Qu.:4.205 3rd Qu.:3.000 3rd Qu.:13.500
Max. :1073.00 Max. :6.978 Max. :5.000 Max. :43.100

creddebt Increddebt othdebt lnothdebt
Min. : 0.0000 Min. : -6.59733 Min. : 0.0000 Min. : -4.09211
1st Qu.: 0.3911 1st Qu.: -0.93844 1st Qu.: 0.9803 1st Qu.: -0.01899
Median : 0.9287 Median : -0.07386 Median : 2.0882 Median : 0.73687
Mean : 1.8749 Mean : -0.12467 Mean : 3.6567 Mean : 0.69839
3rd Qu.: 2.0765 3rd Qu.: 0.73071 3rd Qu.: 4.3764 3rd Qu.: 1.47644
Max. :109.0726 Max. : 4.69201 Max. :141.4591 Max. : 4.95201

NA's :1 NA's :1
default jobsat marital spoused

Min. :0.000	Min. :1.000	Min. :0.0000	Min. :-1.000
1st Qu.:0.000	1st Qu.:2.000	1st Qu.:0.0000	1st Qu.:1.000
Median :0.000	Median :3.000	Median :0.0000	Median :-1.000
Mean :0.234	Mean :2.962	Mean :0.4882	Mean :6.245
3rd Qu.:0.000	3rd Qu.:4.000	3rd Qu.:1.0000	3rd Qu.:14.000
Max. :1.000	Max. :5.000	Max. :1.0000	Max. :24.000

spousedcat	reside	pets	pets_cats
Min. :-1.0000	Min. :1.000	Min. :0.000	Min. :0.0000
1st Qu.:1.0000	1st Qu.:1.000	1st Qu.:0.000	1st Qu.:0.0000
Median :1.0000	Median :2.000	Median :2.000	Median :0.0000
Mean :0.6712	Mean :2.224	Mean :3.081	Mean :0.4916
3rd Qu.:2.0000	3rd Qu.:3.000	3rd Qu.:5.000	3rd Qu.:1.0000
Max. :5.0000	Max. :9.000	Max. :21.000	Max. :6.0000

pets_dogs	pets_birds	pets_reptiles	pets_small
Min. :0.0000	Min. :0.0000	Min. :0.0000	Min. :0.0000
1st Qu.:0.0000	1st Qu.:0.0000	1st Qu.:0.0000	1st Qu.:0.0000
Median :0.0000	Median :0.0000	Median :0.0000	Median :0.0000
Mean :0.3896	Mean :0.1098	Mean :0.0562	Mean :0.1148
3rd Qu.:0.0000	3rd Qu.:0.0000	3rd Qu.:0.0000	3rd Qu.:0.0000
Max. :7.0000	Max. :5.0000	Max. :6.0000	Max. :7.0000

pets_saltfish	pets_freshfish	homeown	hometype
Min. :0.0000	Min. :0.000	Min. :0.0000	Min. :1.000
1st Qu.:0.0000	1st Qu.:0.000	1st Qu.:0.0000	1st Qu.:1.000
Median :0.0000	Median :0.000	Median :1.0000	Median :2.000
Mean :0.0472	Mean :1.872	Mean :0.6308	Mean :1.849
3rd Qu.:0.0000	3rd Qu.:4.000	3rd Qu.:1.0000	3rd Qu.:2.000

Max. :8.0000 Max. :16.000 Max. :1.0000 Max. :4.000

address addresscat cars carown

Min. : 0.00 Min. :1.000 Min. :0.000 Min. : -1.0000

1st Qu.: 6.00 1st Qu.:2.000 1st Qu.:1.000 1st Qu.: 0.0000

Median :14.00 Median :3.000 Median :2.000 Median : 1.0000

Mean :16.39 Mean :3.274 Mean :2.134 Mean : 0.6478

3rd Qu.:25.00 3rd Qu.:4.000 3rd Qu.:3.000 3rd Qu.: 1.0000

Max. :57.00 Max. :5.000 Max. :8.000 Max. : 1.0000

cartype carvalue carcatvalue carbought

Min. : -1.0000 Min. : -1.00 Min. : -1.000 Min. : -1.000

1st Qu.: 0.0000 1st Qu.: 9.30 1st Qu.: 1.000 1st Qu.: 0.000

Median : 0.0000 Median :17.10 Median : 1.000 Median : 0.000

Mean : 0.3476 Mean :23.42 Mean : 1.401 Mean : 0.217

3rd Qu.: 1.0000 3rd Qu.:31.60 3rd Qu.: 2.000 3rd Qu.: 1.000

Max. : 1.0000 Max. :99.60 Max. : 3.000 Max. : 1.000

carbuy commute commutecat commutetime

Min. :0.0000 Min. : 1.000 Min. :1.000 Min. : 7.00

1st Qu.:0.0000 1st Qu.: 1.000 1st Qu.:1.000 1st Qu.:21.00

Median :0.0000 Median : 1.000 Median :1.000 Median :25.00

Mean :0.3616 Mean : 2.985 Mean :1.967 Mean :25.35

3rd Qu.:1.0000 3rd Qu.: 4.000 3rd Qu.:3.000 3rd Qu.:29.00

Max. :1.0000 Max. :10.000 Max. :5.000 Max. :48.00

NA's :2

commutecar commutemotorcycle commutecarpool commutebus

Min. :0.00 Min. :0.000 Min. :0.0000 Min. :0.0000

1st Qu.:0.00 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.0000

Median :1.00 Median :0.000 Median :0.0000 Median :0.0000
Mean :0.68 Mean :0.101 Mean :0.2704 Mean :0.4068
3rd Qu.:1.00 3rd Qu.:0.000 3rd Qu.:1.0000 3rd Qu.:1.0000
Max. :1.00 Max. :1.000 Max. :1.0000 Max. :1.0000

commuterrail commutepublic commutebike commutewalk
Min. :0.0000 Min. :0.000 Min. :0.0000 Min. :0.000
1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.000
Median :0.0000 Median :0.000 Median :0.0000 Median :0.000
Mean :0.2732 Mean :0.097 Mean :0.1202 Mean :0.381
3rd Qu.:1.0000 3rd Qu.:0.000 3rd Qu.:0.0000 3rd Qu.:1.000
Max. :1.0000 Max. :1.000 Max. :1.0000 Max. :1.000

commutenonmotor telecommute reason polview
Min. :0.0000 Min. :0.0000 Min. :1.00 Min. :1.000
1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:9.00 1st Qu.:3.000
Median :0.0000 Median :0.0000 Median :9.00 Median :4.000
Mean :0.0588 Mean :0.1856 Mean :7.63 Mean :4.095
3rd Qu.:0.0000 3rd Qu.:0.0000 3rd Qu.:9.00 3rd Qu.:5.000
Max. :1.0000 Max. :1.0000 Max. :9.00 Max. :7.000

polparty polcontrib vote card
Min. :0.000 Min. :0.00 Min. :0.0000 Min. :1.000
1st Qu.:0.000 1st Qu.:0.00 1st Qu.:0.0000 1st Qu.:2.000
Median :0.000 Median :0.00 Median :1.0000 Median :3.000
Mean :0.379 Mean :0.23 Mean :0.5142 Mean :2.703
3rd Qu.:1.000 3rd Qu.:0.00 3rd Qu.:1.0000 3rd Qu.:4.000
Max. :1.000 Max. :1.00 Max. :1.0000 Max. :5.000

cardtype	cardbenefit	cardfee	cardtenure
Min. :1.000	Min. :1.000	Min. :0.00	Min. :0.00
1st Qu.:2.000	1st Qu.:2.000	1st Qu.:0.00	1st Qu.: 6.00
Median :3.000	Median :3.000	Median :0.00	Median :14.00
Mean :2.509	Mean :2.508	Mean :0.19	Mean :16.66
3rd Qu.:4.000	3rd Qu.:4.000	3rd Qu.:0.00	3rd Qu.:26.00
Max. :4.000	Max. :4.000	Max. :1.00	Max. :40.00

cardtenurecat	card2	card2type	card2benefit
Min. :1.000	Min. :1.000	Min. :1.000	Min. :1.000
1st Qu.:3.000	1st Qu.:2.000	1st Qu.:2.000	1st Qu.:2.000
Median :4.000	Median :3.000	Median :3.000	Median :3.000
Mean :3.786	Mean :2.786	Mean :2.535	Mean :2.534
3rd Qu.:5.000	3rd Qu.:4.000	3rd Qu.:4.000	3rd Qu.:4.000
Max. :5.000	Max. :5.000	Max. :4.000	Max. :4.000

card2fee	card2tenure	card2tenurecat	carditems
Min. :0.0000	Min. :0.00	Min. :1.000	Min. :0.0
1st Qu.:0.0000	1st Qu.: 5.00	1st Qu.:2.000	1st Qu.: 8.0
Median :0.0000	Median :12.00	Median :4.000	Median :10.0
Mean :0.1906	Mean :13.07	Mean :3.571	Mean :10.2
3rd Qu.:0.0000	3rd Qu.:20.00	3rd Qu.:5.000	3rd Qu.:12.0
Max. :1.0000	Max. :30.00	Max. :5.000	Max. :23.0

cardspent	card2items	card2spent	active
Min. : 0.0	Min. :0.000	Min. : 0.00	Min. :0.000
1st Qu.:184.9	1st Qu.: 3.000	1st Qu.: 67.68	1st Qu.:0.000
Median :278.7	Median : 5.000	Median :125.45	Median :0.000
Mean :339.6	Mean :4.666	Mean :161.33	Mean :0.467

3rd Qu.: 422.4 3rd Qu.: 6.000 3rd Qu.: 208.61 3rd Qu.:1.000
Max. :3926.4 Max. :15.000 Max. :2069.25 Max. :1.000

bfast tenure churn longmon
Min. :1.000 Min. : 0.00 Min. :0.0000 Min. : 0.90
1st Qu.:1.000 1st Qu.:18.00 1st Qu.:0.0000 1st Qu.: 5.70
Median :2.000 Median :38.00 Median :0.0000 Median : 9.50
Mean :2.069 Mean :38.15 Mean :0.2494 Mean :13.45
3rd Qu.:3.000 3rd Qu.:59.00 3rd Qu.:0.0000 3rd Qu.:16.50
Max. :3.000 Max. :72.00 Max. :1.0000 Max. :179.85

Inlongmon longten Inlongten tollfree
Min. :-0.1054 Min. : 0.9 Min. :-0.1054 Min. :0.000
1st Qu.: 1.7405 1st Qu.:103.6 1st Qu.: 4.6408 1st Qu.:0.000
Median : 2.2513 Median :349.0 Median : 5.8551 Median :0.000
Mean : 2.2870 Mean :707.3 Mean : 5.6087 Mean :0.478
3rd Qu.: 2.8034 3rd Qu.:914.5 3rd Qu.: 6.8184 3rd Qu.:1.000
Max. : 5.1921 Max. :13046.5 Max. : 9.4763 Max. :1.000
NA's :4 NA's :4

tollmon Intollmon tollten Intollten
Min. : 0.00 Min. :2.079 Min. : 0.0 Min. :2.169
1st Qu.: 0.00 1st Qu.:2.970 1st Qu.: 0.0 1st Qu.:5.921
Median : 0.00 Median :3.229 Median : 0.0 Median :6.860
Mean :13.38 Mean :3.245 Mean :581.4 Mean :6.588
3rd Qu.:24.75 3rd Qu.:3.511 3rd Qu.:889.6 3rd Qu.:7.457
Max. :173.00 Max. :4.622 Max. :6923.4 Max. :8.843
NA's :2610 NA's :1 NA's :2611

equip equipmon Inequipmon equipten
Min. :0.0000 Min. : 0.00 Min. :2.833 Min. : 0.0

1st Qu.:0.0000 1st Qu.: 0.00 1st Qu.:3.419 1st Qu.: 0.0
 Median :0.0000 Median : 0.00 Median :3.608 Median : 0.0
 Mean :0.3414 Mean : 13.08 Mean :3.606 Mean : 475.2
 3rd Qu.:1.0000 3rd Qu.: 31.01 3rd Qu.:3.798 3rd Qu.: 509.3
 Max. :1.0000 Max. :106.30 Max. :4.666 Max. :6525.3

NA's :3293 NA's :1

Inequipten callcard cardmon Incardmon

Min. :2.489 Min. :0.0000 Min. : 0.00 Min. :1.179
 1st Qu.:6.171 1st Qu.:0.0000 1st Qu.: 0.00 1st Qu.:2.526
 Median :7.068 Median :1.0000 Median : 13.75 Median :2.890
 Mean :6.757 Mean :0.7188 Mean : 15.46 Mean :2.906
 3rd Qu.:7.657 3rd Qu.:1.0000 3rd Qu.: 22.75 3rd Qu.:3.287
 Max. :8.783 Max. :1.0000 Max. :188.50 Max. :5.239

NA's :3294 NA's :1406

cardten Incardten wireless wiremon

Min. : 0.0 Min. :1.558 Min. :0.000 Min. : 0.00
 1st Qu.: 0.0 1st Qu.:5.858 1st Qu.:0.000 1st Qu.: 0.00
 Median : 425.0 Median :6.630 Median :0.000 Median : 0.00
 Mean : 720.6 Mean :6.422 Mean :0.275 Mean :10.92
 3rd Qu.:1075.0 3rd Qu.:7.215 3rd Qu.:1.000 3rd Qu.: 22.16
 Max. :13705.0 Max. :9.525 Max. :1.000 Max. :186.25

NA's :3 NA's :1410

Inwiremon wireten Inwireten multline

Min. :2.477 Min. : 0.0 Min. :2.542 Min. :0.0000
 1st Qu.:3.330 1st Qu.: 0.0 1st Qu.:6.158 1st Qu.:0.0000
 Median :3.593 Median : 0.0 Median :7.140 Median :0.0000
 Mean :3.603 Mean : 431.9 Mean :6.803 Mean :0.4888
 3rd Qu.:3.865 3rd Qu.: 117.1 3rd Qu.:7.769 3rd Qu.:1.0000
 Max. :5.227 Max. :12858.6 Max. :9.462 Max. :1.0000

NA's :3625 NA's :1 NA's :3626

voice pager internet callid

Min. :0.000 Min. :0.0000 Min. :0.000 Min. :0.0000

1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.0000

Median :0.000 Median :0.0000 Median :1.000 Median :0.0000

Mean :0.307 Mean :0.2444 Mean :1.199 Mean :0.4772

3rd Qu.:1.000 3rd Qu.:0.0000 3rd Qu.:2.000 3rd Qu.:1.0000

Max. :1.000 Max. :1.0000 Max. :4.000 Max. :1.0000

callwait forward confer ebill

Min. :0.0000 Min. :0.000 Min. :0.0000 Min. :0.0000

1st Qu.:0.0000 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.0000

Median :0.0000 Median :0.000 Median :0.0000 Median :0.0000

Mean :0.4824 Mean :0.484 Mean :0.4818 Mean :0.3508

3rd Qu.:1.0000 3rd Qu.:1.000 3rd Qu.:1.0000 3rd Qu.:1.0000

Max. :1.0000 Max. :1.000 Max. :1.0000 Max. :1.0000

owntv hourstv ownvcr owndvd

Min. :0.000 Min. :0.00 Min. :0.0000 Min. :0.0000

1st Qu.:1.000 1st Qu.:17.00 1st Qu.:1.0000 1st Qu.:1.0000

Median :1.000 Median :20.00 Median :1.0000 Median :1.0000

Mean :0.983 Mean :19.65 Mean :0.9158 Mean :0.9148

3rd Qu.:1.000 3rd Qu.:23.00 3rd Qu.:1.0000 3rd Qu.:1.0000

Max. :1.000 Max. :36.00 Max. :1.0000 Max. :1.0000

owncd ownpda ownpc ownipod

Min. :0.000 Min. :0.000 Min. :0.0000 Min. :0.0000

1st Qu.:1.000 1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:0.0000

Median :1.000 Median :0.000 Median :1.0000 Median :0.0000

Mean :0.933 Mean :0.204 Mean :0.6358 Mean :0.4778
3rd Qu.:1.000 3rd Qu.:0.000 3rd Qu.:1.0000 3rd Qu.:1.0000
Max. :1.000 Max. :1.000 Max. :1.0000 Max. :1.0000

owngame ownfax news response_01
Min. :0.0000 Min. :0.0000 Min. :0.0000 Min. :0.0000
1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000 1st Qu.:0.0000
Median :0.0000 Median :0.0000 Median :0.0000 Median :0.0000
Mean :0.4774 Mean :0.1826 Mean :0.4734 Mean :0.0806
3rd Qu.:1.0000 3rd Qu.:0.0000 3rd Qu.:1.0000 3rd Qu.:0.0000
Max. :1.0000 Max. :1.0000 Max. :1.0000 Max. :1.0000

response_02 response_03 bmnth
Min. :0.000 Min. :0.0000 Min. :1.000
1st Qu.:0.000 1st Qu.:0.0000 1st Qu.:4.000
Median :0.000 Median :0.0000 Median :6.000
Mean :0.133 Mean :0.1016 Mean :6.473
3rd Qu.:0.000 3rd Qu.:0.0000 3rd Qu.:9.000
Max. :1.000 Max. :1.0000 Max. :12.000

#multiple linear regression analysis of IV & DV

lm(d\$age + d\$ed ~ d\$income)

Call:

lm(formula = d\$age + d\$ed ~ d\$income)

Coefficients:

(Intercept) d\$income

57.47649 0.07269

```
#to view the anova and regression stats
```

```
View(RegModel.1)
```

```
RegModel.1[["coefficients"]]
```

```
(Intercept)    age      ed
```

```
-24.4133491  0.6685515  3.3067545
```

```
#setting parameters for visualisations
```

```
par(mfrow=c(1,4))
```

```
plot(lm(d$age + d$ed ~ d$income))
```

