

## DDSanalytics Project – Case Study 02

*#Introduction: This Case Study is about analyzing the workforce planning, employee training programs, identifying high-potential employees and reducing/preventing voluntary employee turnover (attrition) for FritoLAY.*

*#Description: DDSAnalytics is an analytics company that specializes in talent management solutions for Fortune 100 companies. Talent management is defined as the iterative process of developing and retaining employees. It may include workforce planning, employee training programs, identifying high-potential employees and reducing/preventing voluntary employee turnover (attrition). To gain a competitive edge over its competition, DDSAnalytics is planning to leverage data science for talent management. The executive leadership has identified predicting employee turnover as its first application of data science for talent management. Before the business green lights the project, they have tasked your data science team to conduct an analysis of existing employee data.*

*#The data set used for this case study analysis consists of 3 Datasets:*

*#CaseStudy2-data : Dataset consists of the below details:*

*#Age:Age of the Employee (numeric)*

*#Attrition:Attrition Status of the Employee (Yes/No)*

*#Business Travel:Travel required in the job (non numeric)*

*#DailyRate:Daily Rate of the Employee (numeric)*

*#Department:Department in the company where the Employee is working for (non numeric)*

*#DistanceFromHome:Distance the employee travels from home to work (numeric)*

*#Education:Education Level of Employee (numeric)*

*#EducationField:Employee Field of study (non numeric)*

*#EmployeeCount:Count of Employee per observation (numeric)*

*#EmployeeNumber:Employee ID a unique identifier of Employee (numeric)*

*#EnvironmentSatisfaction:Employee Satisfaction number (numeric)*

*#Gender:Gender of Employee (non numeric Male/Female)*

*#HourlyRate:Hourly Rate of Employee (numeric)*

*#JobInvolvement:Job involvement of Employee (numeric)*

*#JobLevel:Job Level of Employee (numeric)*

*#JobRole:Designation of the Employee (non numeric)*

*#JobSatisfaction:Job satisfaction of Employee (numeric)*

*#MaritalStatus:Marital status of Employee (non numeric)*

*#MonthlyIncome:Monthly income of Employee (numeric)*

*#MonthlyRate:Monthly rate of employee (numeric)*

*#NumCompaniesWorked:Number of companies worked by employee (numeric)*

*#Over18:Check if Employee > 18 (Y/N)*

*#OverTime:Is the employee working overtime (Yes/No)*

*#PercentSalaryHike:Percentage of Salary Hike (numeric)*

*#PerformanceRating:Performance Rating (numeric)*

```

#RelationshipSatisfaction:Employee relationship satisfaction (numeric)
#StandardHours:Standard work hours of employee (numeric)
#StockOptionLevel:Stock option level (numeric)
#TotalWorkingYears:Total work years of experience (numeric)
#TrainingTimesLastYear:Hours of training last year (numeric)
#WorkLifeBalance:Work life balance (numeric)
#YearsAtCompany:Number of years worked in this company (numeric)
#YearsInCurrentRole:Years of Employee in current role (numeric)
#YearsSinceLastPromotion:Years of employee since last promotion (numeric)
#YearsWithCurrManager:Years of employee with same manager (numeric)

#CaseStudy2CompSet No Salary : This is a test dataset to predict the salary o
f an employee
#CaseStudy2CompSet No Attrition: This is a test dataset to predict the attrit
ion status of the employee

#The goal of this case study is to analyze the employee dataset of Fritolay t
o
#1.Predict Attrition
#2.Predict the Employee Salary
#3.Identify the top three factors that contribute to turnover
#4.Identify any job role specific trends that may exist
#5.Interesting trends and observations from your analysis

#Libraries Loaded for the ANalysis
library(XML)

## Warning: package 'XML' was built under R version 4.0.3

library(dplyr)

## Warning: package 'dplyr' was built under R version 4.0.3

##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##   filter, lag

## The following objects are masked from 'package:base':
##
##   intersect, setdiff, setequal, union

library(RCurl)

## Warning: package 'RCurl' was built under R version 4.0.3

library(httr)

## Warning: package 'httr' was built under R version 4.0.3

```

```
library(jsonlite)
## Warning: package 'jsonlite' was built under R version 4.0.3
library(tidyverse)
## Warning: package 'tidyverse' was built under R version 4.0.3
## -- Attaching packages ----- tidyverse 1.
3.0 --
## v ggplot2 3.3.3      v purrr  0.3.4
## v tibble  3.0.4      v stringr 1.4.0
## v tidyr   1.1.2      v forcats 0.5.0
## v readr   1.4.0

## Warning: package 'ggplot2' was built under R version 4.0.4
## Warning: package 'tibble' was built under R version 4.0.3
## Warning: package 'tidyr' was built under R version 4.0.3
## Warning: package 'readr' was built under R version 4.0.3
## Warning: package 'purrr' was built under R version 4.0.3
## Warning: package 'stringr' was built under R version 4.0.3
## Warning: package 'forcats' was built under R version 4.0.3
## -- Conflicts ----- tidyverse_conflict
s() --
## x tidyr::complete() masks Rcurl::complete()
## x dplyr::filter()   masks stats::filter()
## x purrr::flatten()  masks jsonlite::flatten()
## x dplyr::lag()      masks stats::lag()
library(naniar)
## Warning: package 'naniar' was built under R version 4.0.3
library(GGally)
## Warning: package 'GGally' was built under R version 4.0.3
## Registered S3 method overwritten by 'GGally':
##   method from
##   +.gg      ggplot2
library(ggplot2)
library(class)
library(caret)
## Warning: package 'caret' was built under R version 4.0.3
```

```
## Loading required package: lattice

##
## Attaching package: 'caret'

## The following object is masked from 'package:purrr':
##
##   lift

## The following object is masked from 'package:httr':
##
##   progress

library(knnp)

## Warning: package 'knnp' was built under R version 4.0.3

##
## Attaching package: 'knnp'

## The following object is masked from 'package:class':
##
##   knn

library(e1071)

## Warning: package 'e1071' was built under R version 4.0.3

library(maps)

## Warning: package 'maps' was built under R version 4.0.3

##
## Attaching package: 'maps'

## The following object is masked from 'package:purrr':
##
##   map

library(mapproj)

## Warning: package 'mapproj' was built under R version 4.0.3

library(ggcorrplot)

## Warning: package 'ggcorrplot' was built under R version 4.0.3

library(viridis)

## Warning: package 'viridis' was built under R version 4.0.3

## Loading required package: viridisLite

library(gplots)
```

```
## Warning: package 'gplots' was built under R version 4.0.4
##
## Attaching package: 'gplots'
## The following object is masked from 'package:stats':
##
##     lowess
library(leaps)
## Warning: package 'leaps' was built under R version 4.0.5
library(matrixStats)
##
## Attaching package: 'matrixStats'
## The following object is masked from 'package:dplyr':
##
##     count
library(ResourceSelection)
## Warning: package 'ResourceSelection' was built under R version 4.0.4
## ResourceSelection 0.3-5    2019-07-22
library(MASS)
## Warning: package 'MASS' was built under R version 4.0.3
##
## Attaching package: 'MASS'
## The following object is masked from 'package:dplyr':
##
##     select
library(glmnet)
## Warning: package 'glmnet' was built under R version 4.0.3
## Loading required package: Matrix
## Warning: package 'Matrix' was built under R version 4.0.3
##
## Attaching package: 'Matrix'
## The following objects are masked from 'package:tidyr':
##
##     expand, pack, unpack
## Loaded glmnet 4.1
```

```
library(ROCR)
## Warning: package 'ROCR' was built under R version 4.0.4

library(randomForest)
## Warning: package 'randomForest' was built under R version 4.0.4
## randomForest 4.6-14
## Type rfNews() to see new features/changes/bug fixes.
##
## Attaching package: 'randomForest'

## The following object is masked from 'package:ggplot2':
##
##     margin

## The following object is masked from 'package:dplyr':
##
##     combine

library(magrittr)
## Warning: package 'magrittr' was built under R version 4.0.3
##
## Attaching package: 'magrittr'

## The following object is masked from 'package:purrr':
##
##     set_names

## The following object is masked from 'package:tidyr':
##
##     extract

library(tidyr)
library(plotly)
## Warning: package 'plotly' was built under R version 4.0.4
##
## Attaching package: 'plotly'

## The following object is masked from 'package:MASS':
##
##     select

## The following object is masked from 'package:ggplot2':
##
##     last_plot
```

```
## The following object is masked from 'package:httr':
##
##      config

## The following object is masked from 'package:stats':
##
##      filter

## The following object is masked from 'package:graphics':
##
##      layout

library(forcats)
library(car)

## Warning: package 'car' was built under R version 4.0.3

## Loading required package: carData

## Warning: package 'carData' was built under R version 4.0.3

##
## Attaching package: 'car'

## The following object is masked from 'package:purrr':
##
##      some

## The following object is masked from 'package:dplyr':
##
##      recode

library(ISLR)

## Warning: package 'ISLR' was built under R version 4.0.3

library(olsrr)

## Warning: package 'olsrr' was built under R version 4.0.3

##
## Attaching package: 'olsrr'

## The following object is masked from 'package:MASS':
##
##      cement

## The following object is masked from 'package:datasets':
##
##      rivers

library(OLScurve)

## Warning: package 'OLScurve' was built under R version 4.0.3
```

```

library(shiny)

## Warning: package 'shiny' was built under R version 4.0.5

##
## Attaching package: 'shiny'

## The following object is masked from 'package:jsonlite':
##
##      validate

library(MASS)
library(tidyverse)

#Import the Employee Data
Empl<-read.csv('C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2-data.csv',header = TRUE)
Empl_nosal<-read.csv('C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2CompSet_No_Salary.csv',header = TRUE)
Empl_No_Attrition<-read.csv('C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2CompSet_No_Attrition.csv',header = TRUE)

#Quick Peek at the Summary of the available dataset
summary(Empl)

##           ID           Age           Attrition           BusinessTravel
##  Min.      :  1.0    Min.      :18.00    Length:870    Length:870
##  1st Qu.:218.2    1st Qu.:30.00    Class :character    Class :character
##  Median :435.5    Median :35.00    Mode  :character    Mode  :character
##  Mean     :435.5    Mean     :36.83
##  3rd Qu.:652.8    3rd Qu.:43.00
##  Max.     :870.0    Max.     :60.00
##  Daily.Rate      Department      Distance.From.Home      Education
##  Min.      : 103.0    Length:870    Min.      : 1.000    Min.      :1.000
##  1st Qu.: 472.5    Class :character    1st Qu.: 2.000    1st Qu.:2.000
##  Median : 817.5    Mode  :character    Median : 7.000    Median :3.000
##  Mean     : 815.2          Mean     : 9.339    Mean     :2.901
##  3rd Qu.:1165.8          3rd Qu.:14.000    3rd Qu.:4.000
##  Max.     :1499.0          Max.     :29.000    Max.     :5.000
##  EducationField      Employee.Count      Employee.Number      Environment.Satisfacti
##  Length:870          Min.      :1          Min.      :  1.0    Min.      :1.000
##  Class :character    1st Qu.:1          1st Qu.: 477.2    1st Qu.:2.000
##  Mode  :character    Median :1          Median :1039.0    Median :3.000
##                      Mean     :1          Mean     :1029.8    Mean     :2.701
##                      3rd Qu.:1          3rd Qu.:1561.5    3rd Qu.:4.000
##                      Max.     :1          Max.     :2064.0    Max.     :4.000
##  Gender           Hourly.Rate           Job.Involvement           Job.Level
##  Length:870       Min.      : 30.00    Min.      :1.000    Min.      :1.000
##  Class :character  1st Qu.: 48.00    1st Qu.:2.000    1st Qu.:1.000
##  Mode  :character  Median : 66.00    Median :3.000    Median :2.000

```



```

##          Mean    : 65.61    Mean    :2.723    Mean    :2.039
##          3rd Qu.: 83.00    3rd Qu.:3.000    3rd Qu.:3.000
##          Max.    :100.00    Max.    :4.000    Max.    :5.000
##    Job.Role    Job.Satisfaction    Marital.Status    Monthly.Income
##    Length:870    Min.    :1.000    Length:870    Min.    : 1081
##    Class :character    1st Qu.:2.000    Class :character    1st Qu.: 2840
##    Mode  :character    Median :3.000    Mode  :character    Median : 4946
##          Mean    :2.709    Mean    : 6390
##          3rd Qu.:4.000    3rd Qu.: 8182
##          Max.    :4.000    Max.    :19999
##    Monthly.Rate    Num.Companies.Worked    Over18    OverTime
##    Min.    : 2094    Min.    :0.000    Length:870    Length:870
##    1st Qu.: 8092    1st Qu.:1.000    Class :character    Class :character
##    Median :14074    Median :2.000    Mode  :character    Mode  :character
##    Mean    :14326    Mean    :2.728
##    3rd Qu.:20456    3rd Qu.:4.000
##    Max.    :26997    Max.    :9.000
##    Percent.Salary.Hike    Performance.Rating    Relationship.Satisfaction
##    Min.    :11.0    Min.    :3.000    Min.    :1.000
##    1st Qu.:12.0    1st Qu.:3.000    1st Qu.:2.000
##    Median :14.0    Median :3.000    Median :3.000
##    Mean    :15.2    Mean    :3.152    Mean    :2.707
##    3rd Qu.:18.0    3rd Qu.:3.000    3rd Qu.:4.000
##    Max.    :25.0    Max.    :4.000    Max.    :4.000
##    Standard.Hours    Stock.Option.Level    Total.Working.Years    Training.Times.Last
##    .Year
##    Min.    :80    Min.    :0.0000    Min.    : 0.00    Min.    :0.000
##    1st Qu.:80    1st Qu.:0.0000    1st Qu.: 6.00    1st Qu.:2.000
##    Median :80    Median :1.0000    Median :10.00    Median :3.000
##    Mean    :80    Mean    :0.7839    Mean    :11.05    Mean    :2.832
##    3rd Qu.:80    3rd Qu.:1.0000    3rd Qu.:15.00    3rd Qu.:3.000
##    Max.    :80    Max.    :3.0000    Max.    :40.00    Max.    :6.000
##    Work.Life.Balance    Years.At.Company    Years.In.Current.Role
##    Min.    :1.000    Min.    : 0.000    Min.    : 0.000
##    1st Qu.:2.000    1st Qu.: 3.000    1st Qu.: 2.000
##    Median :3.000    Median : 5.000    Median : 3.000
##    Mean    :2.782    Mean    : 6.962    Mean    : 4.205
##    3rd Qu.:3.000    3rd Qu.:10.000    3rd Qu.: 7.000
##    Max.    :4.000    Max.    :40.000    Max.    :18.000
##    Years.Since.Last.Promotion    Years.With.Curr.Manager
##    Min.    : 0.000    Min.    : 0.00
##    1st Qu.: 0.000    1st Qu.: 2.00
##    Median : 1.000    Median : 3.00
##    Mean    : 2.169    Mean    : 4.14
##    3rd Qu.: 3.000    3rd Qu.: 7.00
##    Max.    :15.000    Max.    :17.00

```

```
str(Empl)
```

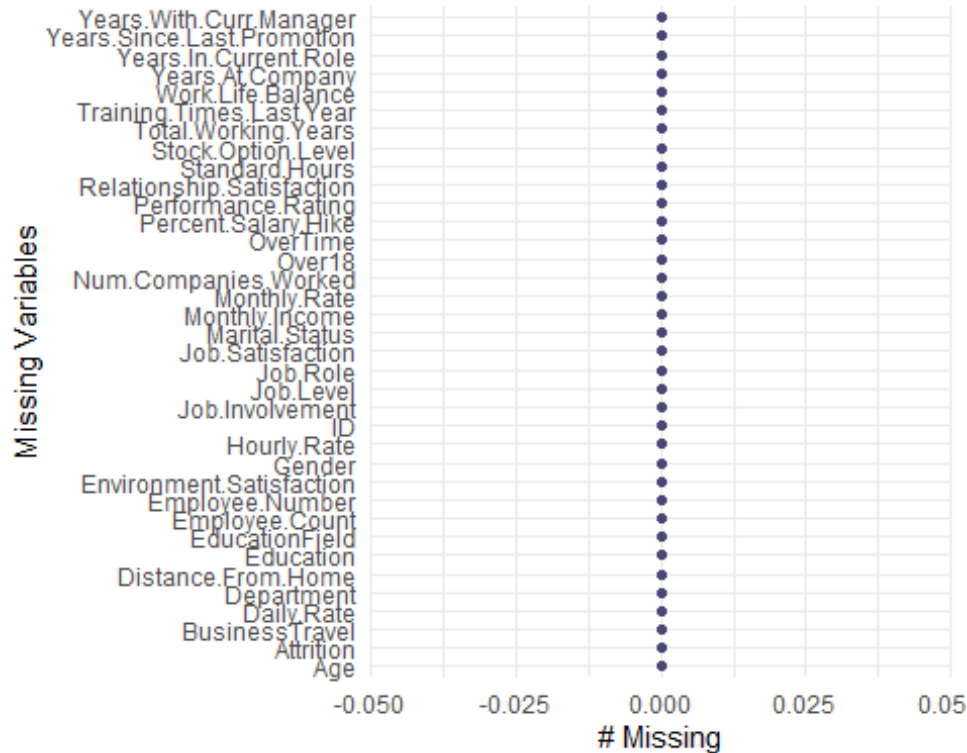
```
## 'data.frame':    870 obs. of  36 variables:
## $ ID              : int  1 2 3 4 5 6 7 8 9 10 ...
## $ Age             : int  32 40 35 32 24 27 41 37 34 34 ...
## $ Attrition       : chr  "No" "No" "No" "No" ...
## $ BusinessTravel  : chr  "Travel_Rarely" "Travel_Rarely" "Travel_Frequently" "Travel_Rarely" ...
## $ Daily.Rate      : int  117 1308 200 801 567 294 1283 309 1333 653 ...
## $ Department      : chr  "Sales" "Research & Development" "Research & Development" "Sales" ...
## $ Distance.From.Home : int  13 14 18 1 2 10 5 10 10 10 ...
## $ Education       : int  4 3 2 4 1 2 5 4 4 4 ...
## $ EducationField   : chr  "Life Sciences" "Medical" "Life Sciences" "Marketing" ...
## $ Employee.Count   : int  1 1 1 1 1 1 1 1 1 1 ...
## $ Employee.Number  : int  859 1128 1412 2016 1646 733 1448 1105 1055 1597 ...
## $ Environment.Satisfaction : int  2 3 3 3 1 4 2 4 3 4 ...
## $ Gender          : chr  "Male" "Male" "Male" "Female" ...
## $ Hourly.Rate      : int  73 44 60 48 32 32 90 88 87 92 ...
## $ Job.Involvement  : int  3 2 3 3 3 3 4 2 3 2 ...
## $ Job.Level        : int  2 5 3 3 1 3 1 2 1 2 ...
## $ Job.Role         : chr  "Sales Executive" "Research Director" "Manufacturing Director" "Sales Executive" ...
## $ Job.Satisfaction : int  4 3 4 4 4 1 3 4 3 3 ...
## $ Marital.Status   : chr  "Divorced" "Single" "Single" "Married" ...
## $ Monthly.Income   : int  4403 19626 9362 10422 3760 8793 2127 6694 2220 5063 ...
## $ Monthly.Rate     : int  9250 17544 19944 24032 17218 4809 5561 24223 18410 15332 ...
## $ Num.Companies.Worked : int  2 1 2 1 1 1 2 2 1 1 ...
## $ Over18           : chr  "Y" "Y" "Y" "Y" ...
## $ OverTime         : chr  "No" "No" "No" "No" ...
## $ Percent.Salary.Hike : int  11 14 11 19 13 21 12 14 19 14 ...
## $ Performance.Rating : int  3 3 3 3 3 4 3 3 3 3 ...
## $ Relationship.Satisfaction : int  3 1 3 3 3 3 1 3 4 2 ...
## $ Standard.Hours    : int  80 80 80 80 80 80 80 80 80 80 ...
## $ Stock.Option.Level : int  1 0 0 2 0 2 0 3 1 1 ...
## $ Total.Working.Years : int  8 21 10 14 6 9 7 8 1 8 ...
## $ Training.Times.Last.Year : int  3 2 2 3 2 4 5 5 2 3 ...
## $ Work.Life.Balance : int  2 4 3 3 3 2 2 3 3 2 ...
## $ Years.At.Company  : int  5 20 2 14 6 9 4 1 1 8 ...
## $ Years.In.Current.Role : int  2 7 2 10 3 7 2 0 1 2 ...
## $ Years.Since.Last.Promotion : int  0 4 2 5 1 1 0 0 0 7 ...
## $ Years.With.Curr.Manager : int  3 9 2 7 3 7 3 0 0 7 ...
```

*#Checking for Missing Data*

```
sapply(Emp1,function(x) sum(is.na(x)))
```

```
##              ID              Age
##              0              0
##      Attrition      BusinessTravel
##              0              0
##      Daily.Rate      Department
##              0              0
##      Distance.From.Home      Education
##              0              0
##      EducationField      Employee.Count
##              0              0
##      Employee.Number      Environment.Satisfaction
##              0              0
##      Gender      Hourly.Rate
##              0              0
##      Job.Involvement      Job.Level
##              0              0
##      Job.Role      Job.Satisfaction
##              0              0
##      Marital.Status      Monthly.Income
##              0              0
##      Monthly.Rate      Num.Companies.Worked
##              0              0
##      Over18      OverTime
##              0              0
##      Percent.Salary.Hike      Performance.Rating
##              0              0
##      Relationship.Satisfaction      Standard.Hours
##              0              0
##      Stock.Option.Level      Total.Working.Years
##              0              0
##      Training.Times.Last.Year      Work.Life.Balance
##              0              0
##      Years.At.Company      Years.In.Current.Role
##              0              0
##      Years.Since.Last.Promotion      Years.With.Curr.Manager
##              0              0
```

```
gg_miss_var(Empl)+xlab("Missing Variables")
```



```
#No missing data found
```

```
#Importing the Test Data set
```

```
#Importing Test data set to predict Employee Salary
```

```
Empl_Sal<-read.csv('C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/Cas  
eStudy2CompSet_No_Salary.csv',header = TRUE)
```

```
summary(Empl_Sal)
```

```
##      ID              Age      Attrition      BusinessTravel
##  Min.   : 871.0    Min.   :18.00    Length:300    Length:300
##  1st Qu.: 945.8    1st Qu.:29.00    Class :character    Class :character
##  Median :1020.5    Median :36.00    Mode  :character    Mode  :character
##  Mean   :1020.5    Mean   :36.27
##  3rd Qu.:1095.2    3rd Qu.:42.00
##  Max.   :1170.0    Max.   :60.00
##  Daily.Rate      Department      Distance.From.Home      Education
##  Min.   : 105.0    Length:300      Min.   : 1.00      Min.   :1.000
##  1st Qu.: 429.2    Class :character    1st Qu.: 2.00      1st Qu.:2.000
##  Median : 693.0    Mode  :character    Median : 7.00      Median :3.000
##  Mean   : 783.2              Mean   : 8.70      Mean   :2.887
##  3rd Qu.:1171.2              3rd Qu.:11.25     3rd Qu.:4.000
##  Max.   :1492.0              Max.   :29.00      Max.   :5.000
##  EducationField      Employee.Count      Employee.Number      Environment.Satisfactio
##  Length:300              Min.   :1              Min.   : 7              Min.   :1.00
##  Class :character      1st Qu.:1              1st Qu.: 477            1st Qu.:2.00
```

```

## Mode :character      Median :1      Median :1008      Median :3.00
##                      Mean :1      Mean :1014      Mean :2.77
##                      3rd Qu.:1      3rd Qu.:1569      3rd Qu.:4.00
##                      Max. :1      Max. :2068      Max. :4.00
##      Gender      Hourly.Rate      Job.Involvement      Job.Level
## Length:300      Min. : 30.00      Min. :1.000      Min. :1
## Class :character 1st Qu.: 48.00      1st Qu.:2.000      1st Qu.:1
## Mode :character  Median : 66.00      Median :3.000      Median :2
##                      Mean : 66.52      Mean :2.737      Mean :2
##                      3rd Qu.: 85.25      3rd Qu.:3.000      3rd Qu.:2
##                      Max. :100.00      Max. :4.000      Max. :5
##      Job.Role      Job.Satisfaction      Marital.Status      Monthly.Rate
## Length:300      Min. :1.000      Length:300      Min. : 2122
## Class :character 1st Qu.:2.000      Class :character 1st Qu.: 7778
## Mode :character  Median :3.000      Mode :character  Median :13508
##                      Mean :2.747      Mean :14091
##                      3rd Qu.:4.000      3rd Qu.:20464
##                      Max. :4.000      Max. :26999
## Num.Companies.Worked      Over18      OverTime      Percent.Salary
## .Hike
## Min. :0.00      Length:300      Length:300      Min. :11.00
## 1st Qu.:1.00      Class :character  Class :character 1st Qu.:12.75
## Median :2.00      Mode :character  Mode :character  Median :14.00
## Mean :2.74      Mean :15.28
## 3rd Qu.:4.00      3rd Qu.:18.00
## Max. :9.00      Max. :25.00
## Performance.Rating      Relationship.Satisfaction      Standard.Hours      Stock.Option.
## Level
## Min. :3.00      Min. :1.000      Min. :80      Min. :0.000
## 1st Qu.:3.00      1st Qu.:2.000      1st Qu.:80      1st Qu.:0.000
## Median :3.00      Median :3.000      Median :80      Median :1.000
## Mean :3.16      Mean :2.637      Mean :80      Mean :0.833
## 3rd Qu.:3.00      3rd Qu.:4.000      3rd Qu.:80      3rd Qu.:1.000
## Max. :4.00      Max. :4.000      Max. :80      Max. :3.000
## Total.Working.Years      Training.Times.Last.Year      Work.Life.Balance
## Min. : 0.00      Min. :0.00      Min. :1.000
## 1st Qu.: 6.00      1st Qu.:2.00      1st Qu.:2.000
## Median : 9.00      Median :3.00      Median :3.000
## Mean :10.78      Mean :2.82      Mean :2.717
## 3rd Qu.:14.00      3rd Qu.:3.00      3rd Qu.:3.000
## Max. :40.00      Max. :6.00      Max. :4.000
## Years.At.Company      Years.In.Current.Role      Years.Since.Last.Promotion
## Min. : 0.000      Min. : 0.0      Min. : 0.00
## 1st Qu.: 3.000      1st Qu.: 2.0      1st Qu.: 0.00

```

```

## Median : 5.000   Median : 3.0           Median : 1.00
## Mean    : 6.623   Mean    : 4.2          Mean    : 2.14
## 3rd Qu.: 9.000   3rd Qu.: 7.0          3rd Qu.: 3.00
## Max.    :33.000   Max.    :16.0          Max.    :15.00
## Years.With.Curr.Manager
## Min.    : 0.000
## 1st Qu.: 2.000
## Median  : 3.000
## Mean    : 3.817
## 3rd Qu.: 7.000
## Max.    :15.000

str(Empl_Sal)

## 'data.frame':   300 obs. of  35 variables:
## $ ID              : int  871 872 873 874 875 876 877 878 879 88
0 ...
## $ Age             : int  43 33 55 36 27 39 33 21 30 51 ...
## $ Attrition       : chr   "No" "No" "Yes" "No" ...
## $ BusinessTravel  : chr   "Travel_Frequently" "Travel_Rarely" "T
ravel_Rarely" "Non-Travel" ...
## $ Daily.Rate      : int  1422 461 267 1351 1302 895 750 251 131
2 1405 ...
## $ Department      : chr   "Sales" "Research & Development" "Sale
s" "Research & Development" ...
## $ Distance.From.Home : int  2 13 13 9 19 5 22 10 23 11 ...
## $ Education       : int  4 1 4 4 3 3 2 2 3 2 ...
## $ EducationField   : chr   "Life Sciences" "Life Sciences" "Marke
ting" "Life Sciences" ...
## $ Employee.Count   : int  1 1 1 1 1 1 1 1 1 1 ...
## $ Employee.Number  : int  1849 995 1372 1949 1619 42 160 1279 15
9 1367 ...
## $ Environment.Satisfaction : int  1 2 1 1 4 4 3 1 1 4 ...
## $ Gender          : chr   "Male" "Female" "Male" "Male" ...
## $ Hourly.Rate      : int  92 53 85 66 67 56 95 45 96 82 ...
## $ Job.Involvement  : int  3 3 4 4 2 3 3 2 1 2 ...
## $ Job.Level        : int  2 1 4 1 1 2 2 1 1 4 ...
## $ Job.Role         : chr   "Sales Executive" "Research Scientist"
"Sales Executive" "Laboratory Technician" ...
## $ Job.Satisfaction : int  4 4 3 2 1 4 2 3 3 2 ...
## $ Marital.Status   : chr   "Married" "Single" "Single" "Married"
...
## $ Monthly.Rate     : int  19246 17241 9277 9238 16290 3335 15480
25308 22310 24439 ...
## $ Num.Companies.Worked : int  1 3 6 1 1 3 0 1 1 3 ...
## $ Over18          : chr   "Y" "Y" "Y" "Y" ...
## $ OverTime        : chr   "No" "No" "Yes" "No" ...
## $ Percent.Salary.Hike : int  20 18 17 22 11 14 13 20 25 16 ...
## $ Performance.Rating : int  4 3 3 4 3 3 3 4 4 3 ...
## $ Relationship.Satisfaction : int  3 1 3 2 1 3 1 3 3 2 ...

```

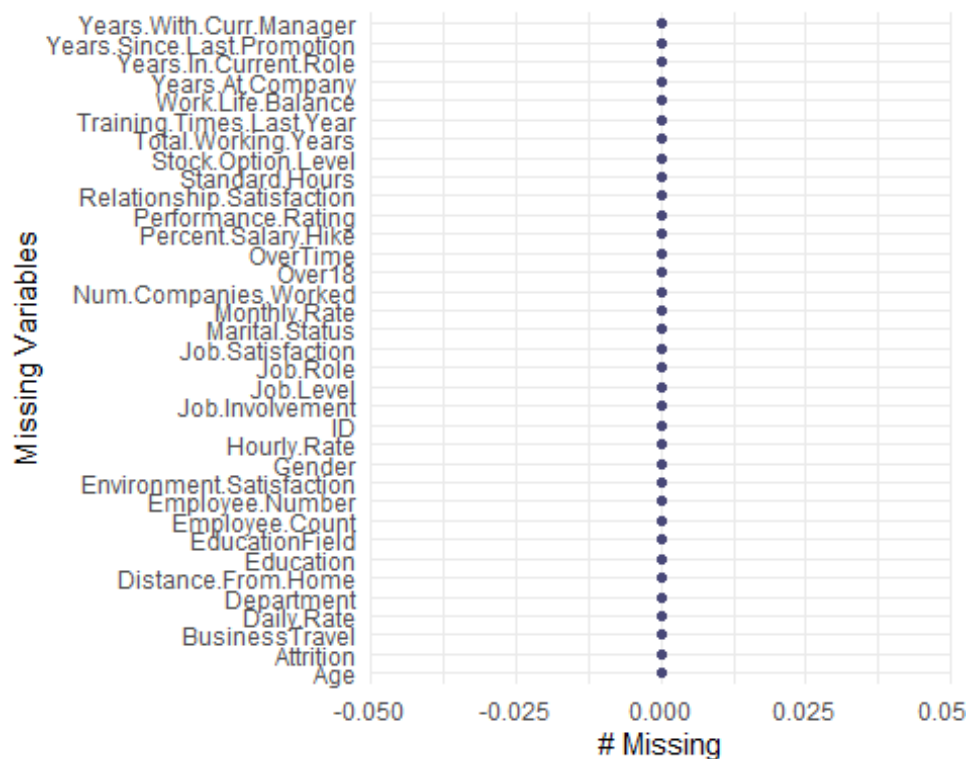
```
## $ Standard.Hours      : int  80 80 80 80 80 80 80 80 80 80 ...
## $ Stock.Option.Level  : int  1 0 0 0 2 1 1 0 3 0 ...
## $ Total.Working.Years : int  7 5 24 5 7 19 8 2 10 29 ...
## $ Training.Times.Last.Year : int  5 4 2 3 3 6 2 2 2 1 ...
## $ Work.Life.Balance   : int  3 3 2 3 3 4 4 1 2 2 ...
## $ Years.At.Company    : int  7 3 19 5 7 1 7 2 10 5 ...
## $ Years.In.Current.Role : int  7 2 7 4 7 0 7 2 7 2 ...
## $ Years.Since.Last.Promotion: int  7 0 3 0 0 0 0 2 0 0 ...
## $ Years.With.Curr.Manager : int  7 2 8 2 7 0 7 2 9 3 ...
```

*#Rechecking if the data set has any missing data*

```
sapply(Empl_Sal,function(x) sum(is.na(x)))
```

```
##              ID              Age
##              0              0
##      Attrition      BusinessTravel
##              0              0
##      Daily.Rate      Department
##              0              0
## Distance.From.Home      Education
##              0              0
##      EducationField      Employee.Count
##              0              0
##      Employee.Number      Environment.Satisfaction
##              0              0
##              Gender      Hourly.Rate
##              0              0
##      Job.Involvement      Job.Level
##              0              0
##              Job.Role      Job.Satisfaction
##              0              0
##      Marital.Status      Monthly.Rate
##              0              0
##      Num.Companies.Worked      Over18
##              0              0
##              OverTime      Percent.Salary.Hike
##              0              0
##      Performance.Rating      Relationship.Satisfaction
##              0              0
##      Standard.Hours      Stock.Option.Level
##              0              0
##      Total.Working.Years      Training.Times.Last.Year
##              0              0
##      Work.Life.Balance      Years.At.Company
##              0              0
##      Years.In.Current.Role      Years.Since.Last.Promotion
##              0              0
##      Years.With.Curr.Manager
##              0
```

```
gg_miss_var(Empl_Sal)+xlab("Missing Variables")
```



```
#No Missing data found
```

```
#Importing Test data set to predict Employee Attrition
```

```
Empl_Att<-read.csv('C:/Sowmya/SMU/04_Doin Data Science/Unit-14 & Unit-15/Cas  
eStudy2CompSet_No_Attrition.csv',header = TRUE)  
summary(Empl_Att)
```

```
##      ID          Age      BusinessTravel      Daily.Rate  
##  Min.   :1171    Min.   :19.00    Length:300    Min.    : 102.0  
## 1st Qu.:1246    1st Qu.:31.00    Class :character 1st Qu.: 448.0  
## Median :1320    Median :36.00    Mode  :character Median : 775.0  
## Mean   :1320    Mean   :37.86                      Mean   : 784.8  
## 3rd Qu.:1395    3rd Qu.:44.00                      3rd Qu.:1117.0  
## Max.   :1470    Max.   :60.00                      Max.   :1490.0  
## Department      Distance.From.Home      Education      EducationField  
## Length:300      Min.    : 1.00      Min.    :1.000    Length:300  
## Class :character 1st Qu.: 2.00      1st Qu.:2.000    Class :character  
## Mode  :character Median : 7.00      Median :3.000    Mode  :character  
##                      Mean   : 9.26      Mean   :2.973  
##                      3rd Qu.:14.00      3rd Qu.:4.000  
##                      Max.    :29.00      Max.    :5.000  
## Employee.Count  Employee.Number  Environment.Satisfaction  Gender  
## Min.    :1      Min.    : 2.0      Min.    :1.000          Length:300  
## 1st Qu.:1      1st Qu.: 508.8    1st Qu.:2.000          Class :character  
## Median :1      Median : 994.5    Median :3.000          Mode  :character
```



```

## Mean :1      Mean :1020.9    Mean :2.733
## 3rd Qu.:1    3rd Qu.:1542.5    3rd Qu.:4.000
## Max. :1      Max. :2065.0    Max. :4.000
## Hourly.Rate    Job.Involvement    Job.Level    Job.Role
## Min. : 30.00    Min. :1.000    Min. :1.0    Length:300
## 1st Qu.: 50.00    1st Qu.:2.000    1st Qu.:1.0    Class :character
## Median : 66.00    Median :3.000    Median :2.0    Mode :character
## Mean : 66.07    Mean :2.743    Mean :2.2
## 3rd Qu.: 83.00    3rd Qu.:3.000    3rd Qu.:3.0
## Max. :100.00    Max. :4.000    Max. :5.0
## Job.Satisfaction    Marital.Status    Monthly.Income    Monthly.Rate
## Min. :1.000    Length:300    Min. : 1232    Min. : 2097
## 1st Qu.:2.000    Class :character    1st Qu.: 3034    1st Qu.: 8420
## Median :3.000    Mode :character    Median : 5208    Median :15091
## Mean :2.767    Mean : 7103    Mean :14499
## 3rd Qu.:4.000    3rd Qu.: 9750    3rd Qu.:20330
## Max. :4.000    Max. :19973    Max. :26914
## Num.Companies.Worked    Over18    OverTime    Percent.Salary
.Hike
## Min. :0.000    Length:300    Length:300    Min. :11.00
## 1st Qu.:1.000    Class :character    Class :character    1st Qu.:12.00
## Median :2.000    Mode :character    Mode :character    Median :14.00
## Mean :2.547    Mean :15.17
## 3rd Qu.:4.000    3rd Qu.:18.00
## Max. :9.000    Max. :25.00
## Performance.Rating    Relationship.Satisfaction    Standard.Hours    Stock.Option.
Level
## Min. :3.000    Min. :1.000    Min. :80    Min. :0.000
0
## 1st Qu.:3.000    1st Qu.:2.000    1st Qu.:80    1st Qu.:0.000
0
## Median :3.000    Median :3.000    Median :80    Median :1.000
0
## Mean :3.153    Mean :2.803    Mean :80    Mean :0.783
3
## 3rd Qu.:3.000    3rd Qu.:4.000    3rd Qu.:80    3rd Qu.:1.000
0
## Max. :4.000    Max. :4.000    Max. :80    Max. :3.000
0
## Total.Working.Years    Training.Times.Last.Year    Work.Life.Balance
## Min. : 0.00    Min. :0.000    Min. :1.000
## 1st Qu.: 6.00    1st Qu.:2.000    1st Qu.:2.000
## Median :10.00    Median :2.000    Median :3.000
## Mean :12.44    Mean :2.683    Mean :2.747
## 3rd Qu.:18.00    3rd Qu.:3.000    3rd Qu.:3.000
## Max. :38.00    Max. :6.000    Max. :4.000
## Years.At.Company    Years.In.Current.Role    Years.Since.Last.Promotion
## Min. : 0.000    Min. : 0.00    Min. : 0.00
## 1st Qu.: 3.000    1st Qu.: 2.00    1st Qu.: 0.00
## Median : 5.000    Median : 3.00    Median : 1.00

```

```
## Mean : 7.527 Mean : 4.33 Mean : 2.29
## 3rd Qu.:10.000 3rd Qu.: 7.00 3rd Qu.: 3.00
## Max. :37.000 Max. :18.00 Max. :15.00
## Years.With.Curr.Manager
## Min. : 0.00
## 1st Qu.: 2.00
## Median : 3.00
## Mean : 4.38
## 3rd Qu.: 7.00
## Max. :17.00
```

```
str(Empl_Att)
```

```
## 'data.frame': 300 obs. of 35 variables:
## $ ID : int 1171 1172 1173 1174 1175 1176 1177 1178 1179 1180 ...
## $ Age : int 35 33 26 55 29 51 52 39 31 31 ...
## $ BusinessTravel : chr "Travel_Rarely" "Travel_Rarely" "Travel_Rarely" "Travel_Rarely" ...
## $ Daily.Rate : int 750 147 1330 1311 1246 1456 585 1387 1062 534 ...
## $ Department : chr "Research & Development" "Human Resources" "Research & Development" "Research & Development" ...
## $ Distance.From.Home : int 28 2 21 2 19 1 29 10 24 20 ...
## $ Education : int 3 3 3 3 3 4 4 5 3 3 ...
## $ EducationField : chr "Life Sciences" "Human Resources" "Medical" "Life Sciences" ...
## $ Employee.Count : int 1 1 1 1 1 1 1 1 1 1 ...
## $ Employee.Number : int 1596 1207 1107 505 1497 145 2019 1618 1252 587 ...
## $ Environment.Satisfaction : int 2 2 1 3 3 1 1 2 3 1 ...
## $ Gender : chr "Male" "Male" "Male" "Female" ...
## $ Hourly.Rate : int 46 99 37 97 77 30 40 76 96 66 ...
## $ Job.Involvement : int 4 3 3 3 2 2 3 3 2 3 ...
## $ Job.Level : int 2 1 1 4 2 3 1 2 2 3 ...
## $ Job.Role : chr "Laboratory Technician" "Human Resources" "Laboratory Technician" "Manager" ...
## $ Job.Satisfaction : int 3 3 3 4 3 1 4 1 1 3 ...
## $ Marital.Status : chr "Married" "Married" "Divorced" "Single" ...
## $ Monthly.Income : int 3407 3600 2377 16659 8620 7484 3482 5377 6812 9824 ...
## $ Monthly.Rate : int 25348 8429 19373 23258 23757 25796 19788 3835 17198 22908 ...
## $ Num.Companies.Worked : int 1 1 1 2 1 3 2 2 1 3 ...
## $ Over18 : chr "Y" "Y" "Y" "Y" ...
## $ OverTime : chr "No" "No" "No" "Yes" ...
## $ Percent.Salary.Hike : int 17 13 20 13 14 20 15 13 19 12 ...
## $ Performance.Rating : int 3 3 4 3 3 4 3 3 3 3 ...
## $ Relationship.Satisfaction : int 4 4 3 3 3 3 2 4 2 1 ...
```

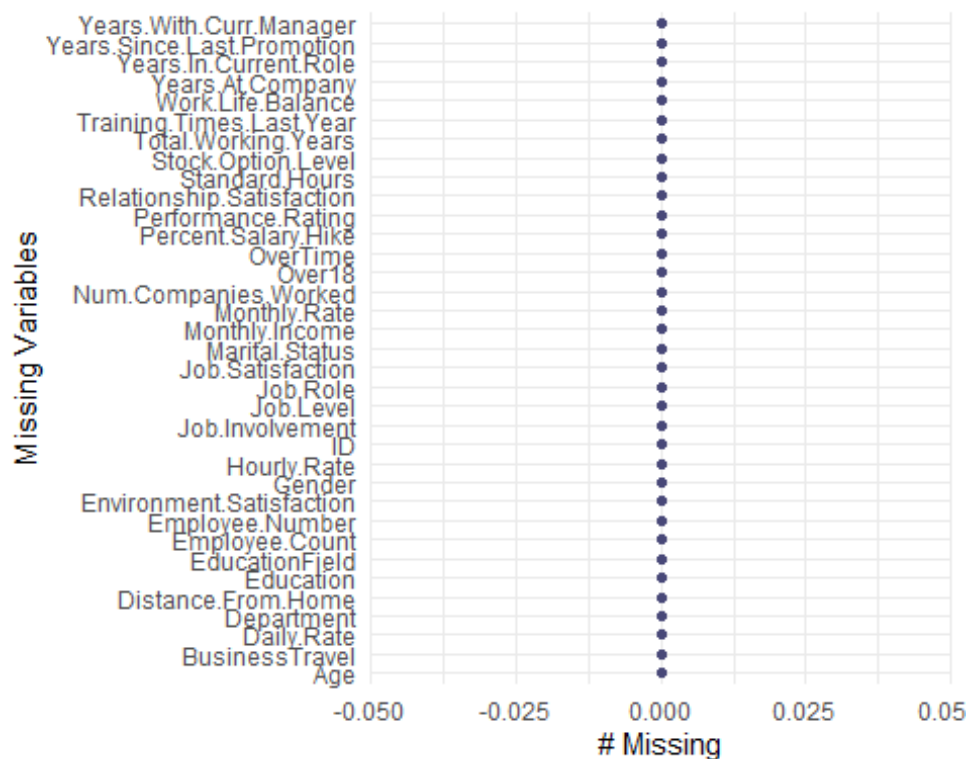
```
## $ Standard.Hours      : int  80 80 80 80 80 80 80 80 80 80 ...
## $ Stock.Option.Level  : int   2 1 1 0 2 0 2 3 0 0 ...
## $ Total.Working.Years : int  10 5 1 30 10 23 16 10 10 12 ...
## $ Training.Times.Last.Year : int  3 2 0 2 3 1 3 3 2 2 ...
## $ Work.Life.Balance    : int   2 3 2 3 3 2 2 3 3 3 ...
## $ Years.At.Company     : int  10 5 1 5 10 13 9 7 10 1 ...
## $ Years.In.Current.Role : int   9 4 1 4 7 12 8 7 9 0 ...
## $ Years.Since.Last.Promotion: int  6 1 0 1 0 12 0 7 1 0 ...
## $ Years.With.Curr.Manager : int  8 4 0 2 4 8 0 7 8 0 ...
```

*#Rechecking if the data set has any missing data*

```
sapply(Empl_Att,function(x) sum(is.na(x)))
```

```
##              ID              Age
##              0              0
##      BusinessTravel      Daily.Rate
##              0              0
##      Department      Distance.From.Home
##              0              0
##      Education      EducationField
##              0              0
##      Employee.Count      Employee.Number
##              0              0
##      Environment.Satisfaction      Gender
##              0              0
##      Hourly.Rate      Job.Involvement
##              0              0
##      Job.Level      Job.Role
##              0              0
##      Job.Satisfaction      Marital.Status
##              0              0
##      Monthly.Income      Monthly.Rate
##              0              0
##      Num.Companies.Worked      Over18
##              0              0
##      OverTime      Percent.Salary.Hike
##              0              0
##      Performance.Rating      Relationship.Satisfaction
##              0              0
##      Standard.Hours      Stock.Option.Level
##              0              0
##      Total.Working.Years      Training.Times.Last.Year
##              0              0
##      Work.Life.Balance      Years.At.Company
##              0              0
##      Years.In.Current.Role      Years.Since.Last.Promotion
##              0              0
##      Years.With.Curr.Manager
##              0
```

```
gg_miss_var(Empl_Att)+xlab("Missing Variables")
```



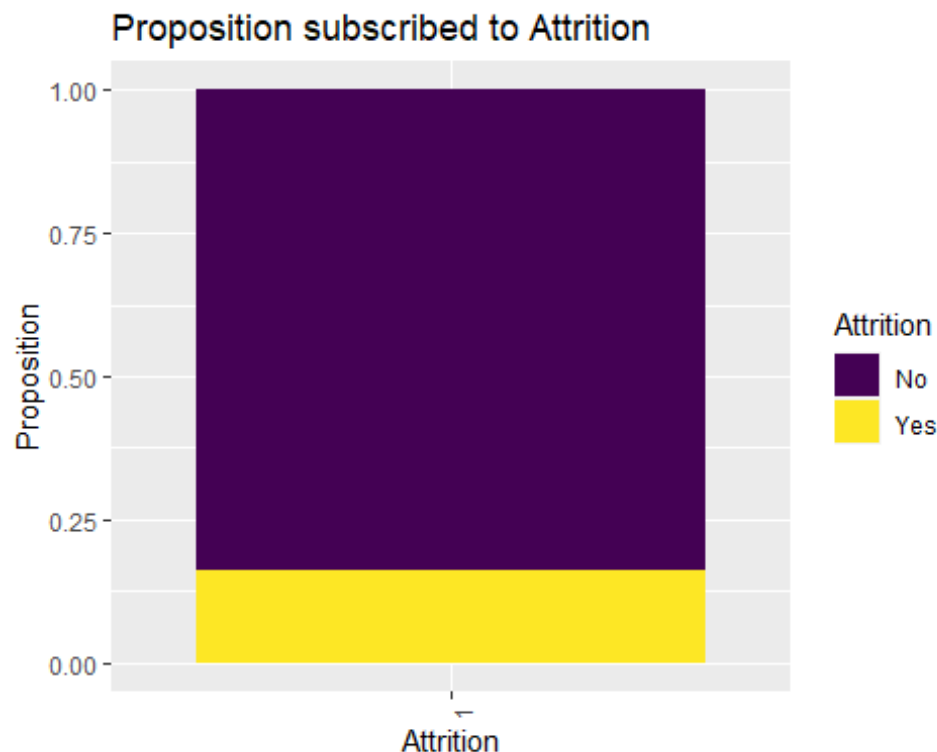
```
#No Missing data found
```

## R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
#With Attrition as Response
#Attrition
Empl%>%
  ggplot(aes(x=(as.factor(Employee.Count)), fill=Attrition)) +
  geom_bar(position = "fill") +
  scale_fill_viridis_d() +
  ylab("Proposition") +xlab("Attrition")+
  ggtitle("Proposition subscribed to Attrition")+ theme(axis.text.x = element
_text(angle=90, hjust=1))
```



*#The overall the attrition rate is 16% for Yes and 84% for No*

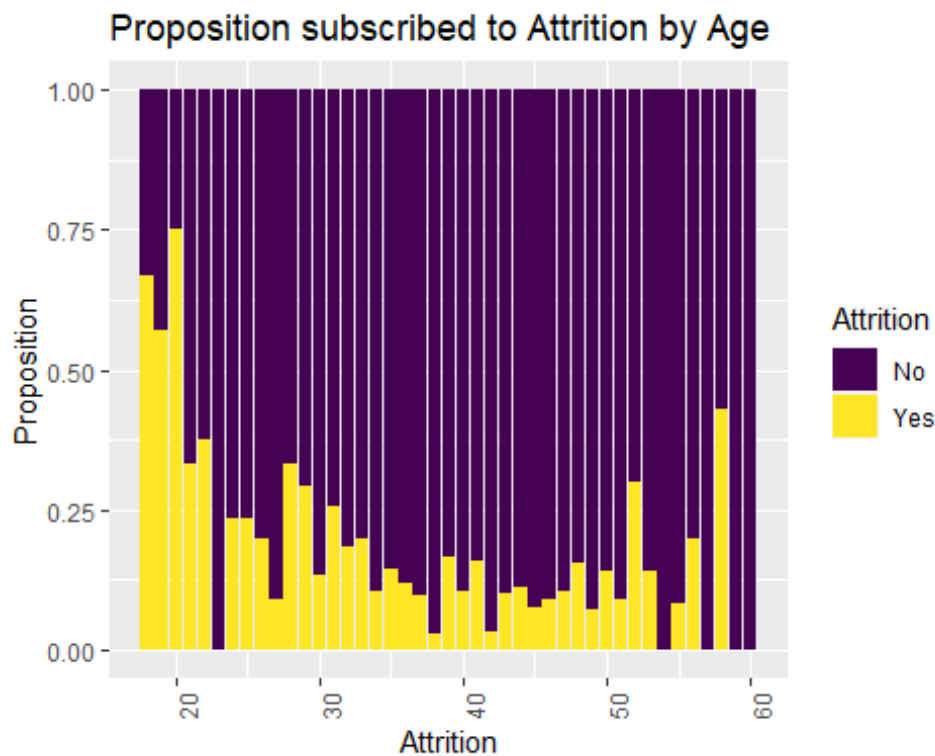
*#Age Vs Attrition*

`prop.table(table(Empl$Attrition,Empl$Age),2)`

```
##
##      18      19      20      21      22      23
## No  0.33333333 0.42857143 0.25000000 0.66666667 0.62500000 1.00000000
## Yes 0.66666667 0.57142857 0.75000000 0.33333333 0.37500000 0.00000000
##
##      24      25      26      27      28      29
## No  0.76470588 0.76470588 0.80000000 0.90909091 0.66666667 0.70731707
## Yes 0.23529412 0.23529412 0.20000000 0.09090909 0.33333333 0.29268293
##
##      30      31      32      33      34      35
## No  0.86486486 0.74358974 0.81578947 0.80000000 0.89473684 0.85416667
## Yes 0.13513514 0.25641026 0.18421053 0.20000000 0.10526316 0.14583333
##
##      36      37      38      39      40      41
## No  0.88095238 0.90322581 0.97222222 0.83333333 0.89655172 0.84000000
## Yes 0.11904762 0.09677419 0.02777778 0.16666667 0.10344828 0.16000000
##
##      42      43      44      45      46      47
## No  0.96551724 0.90000000 0.88888889 0.92307692 0.90909091 0.89473684
## Yes 0.03448276 0.10000000 0.11111111 0.07692308 0.09090909 0.10526316
##
##      48      49      50      51      52      53
```

```
## No 0.84615385 0.92857143 0.85714286 0.90909091 0.70000000 0.85714286
## Yes 0.15384615 0.07142857 0.14285714 0.09090909 0.30000000 0.14285714
##
##          54          55          56          57          58          59
## No 1.00000000 0.91666667 0.80000000 1.00000000 0.57142857 1.00000000
## Yes 0.00000000 0.08333333 0.20000000 0.00000000 0.42857143 0.00000000
##
##          60
## No 1.00000000
## Yes 0.00000000
```

```
Empl%>%
  ggplot(aes(x=Age, fill=Attrition)) +
  geom_bar(position = "fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Attrition") +
  ggtitle("Proposition subscribed to Attrition by Age") + theme(axis.text.x =
  element_text(angle=90, hjust=1))
```



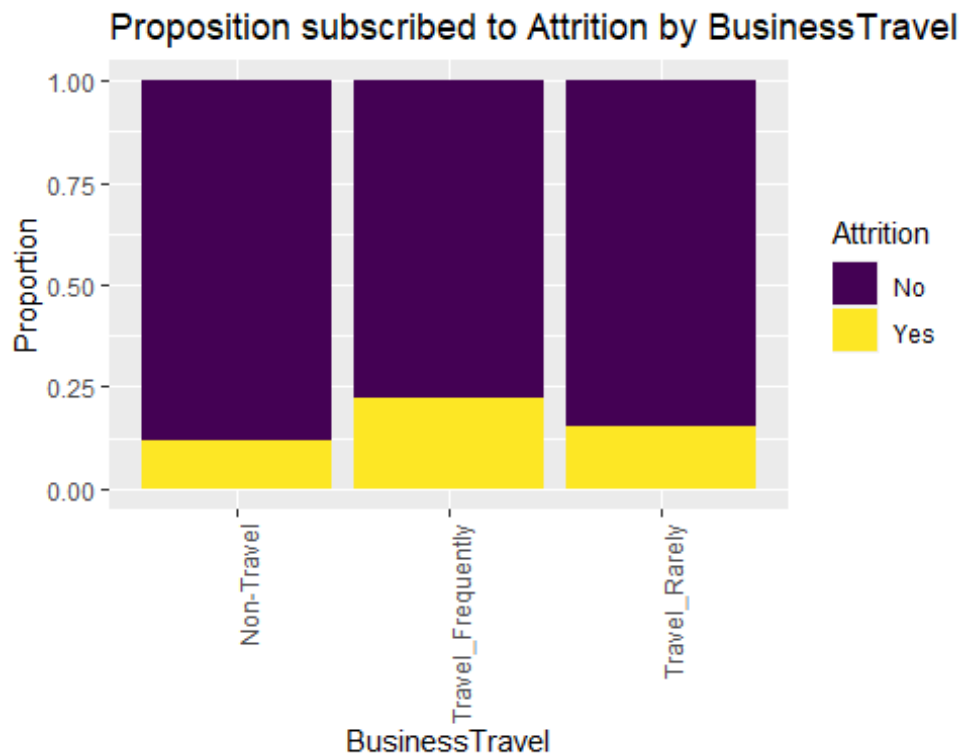
*#Attrition Rate seems to be higher for Age < 35 and slowly increases after 50 which is not as much as for ages < 35.*

```
# BusinessTravel vs Attrition
prop.table(table(Empl$Attrition, Empl$BusinessTravel), 2)
```

```
##
##      Non-Travel Travel_Frequently Travel_Rarely
```

```
## No 0.8829787 0.7784810 0.8478964
## Yes 0.1170213 0.2215190 0.1521036
```

```
Empl %>%
  ggplot(aes(x=BusinessTravel, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("BusinessTravel") +
  ggtitle("Proportion subscribed to Attrition by BusinessTravel") + theme(axis
s.text.x = element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be higher for frequent travel jobs preceding by Rarely travel jobs.*

*# Daily Rate vs Attrition*

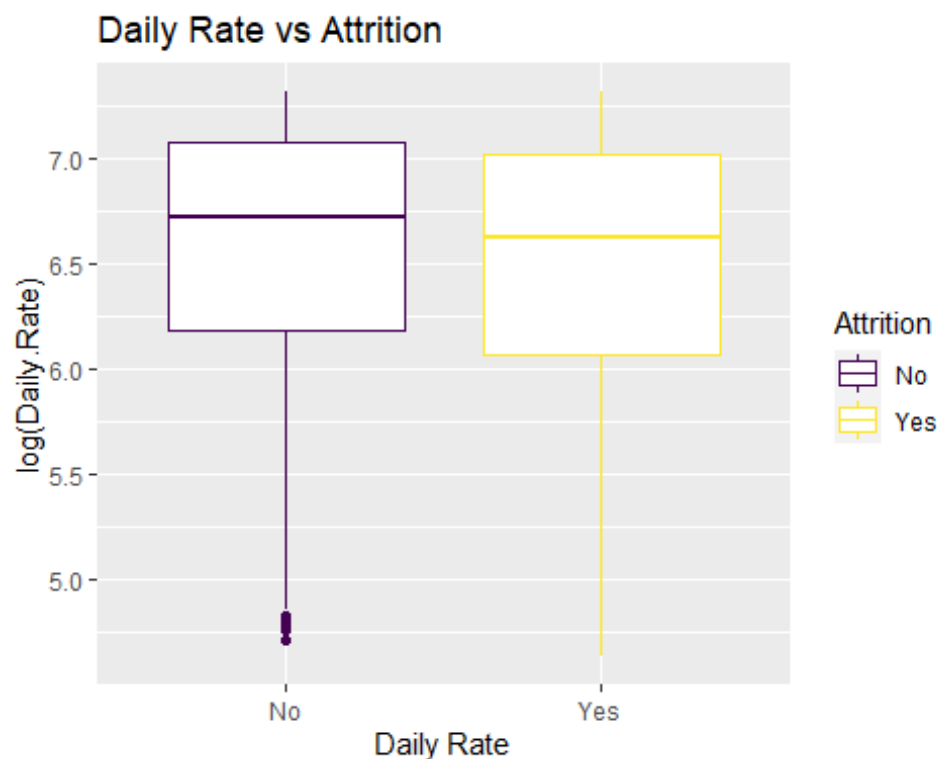
```
t(aggregate(Daily.Rate~Attrition,data=Empl,summary))
```

```
##           [,1]      [,2]
## Attrition "No"      "Yes"
## Daily.Rate.Min.  " 111.0000" " 103.0000"
## Daily.Rate.1st Qu. " 483.7500" " 428.7500"
## Daily.Rate.Median  " 828.5000" " 751.0000"
## Daily.Rate.Mean    " 821.1603" " 784.2929"
## Daily.Rate.3rd Qu. "1178.2500" "1110.7500"
## Daily.Rate.Max.    "1499.0000" "1496.0000"
```

```

Emp1 %>%
  ggplot(aes(x=Attrition, y=log(Daily.Rate), color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Daily Rate vs Attrition") +
  xlab("Daily Rate")

```



*#The Attrition rate is higher for Employees with comparatively Lower daily rates*

*# Department vs Attrition*

```
prop.table(table(Emp1$Attrition, Emp1$Department), 2)
```

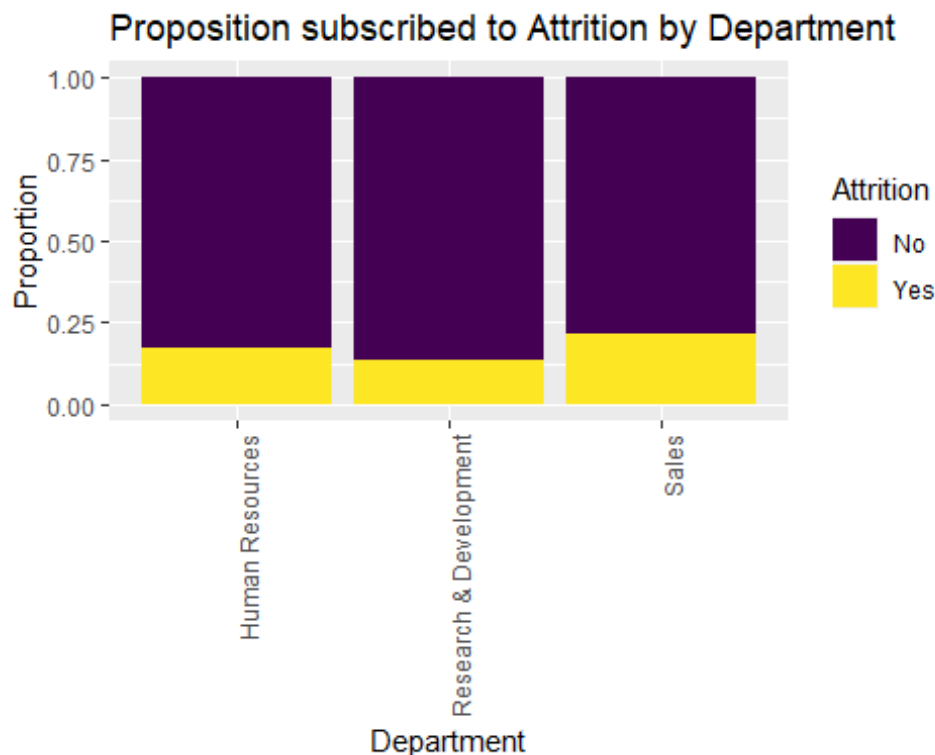
```
##
##      Human Resources Research & Development      Sales
##  No      0.8285714      0.8665480 0.7838828
##  Yes      0.1714286      0.1334520 0.2161172
```

```

Emp1 %>%
  ggplot(aes(x=Department, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Department") +
  ggtitle("Proportion subscribed to Attrition by Department") + theme(axis.text.x = element_text(angle=90, hjust=1))

```





*#Attrition Rate seems to be higher for Sales than Human Resources and Research & Development.*

*#Research & Development has lower attrition rate.*

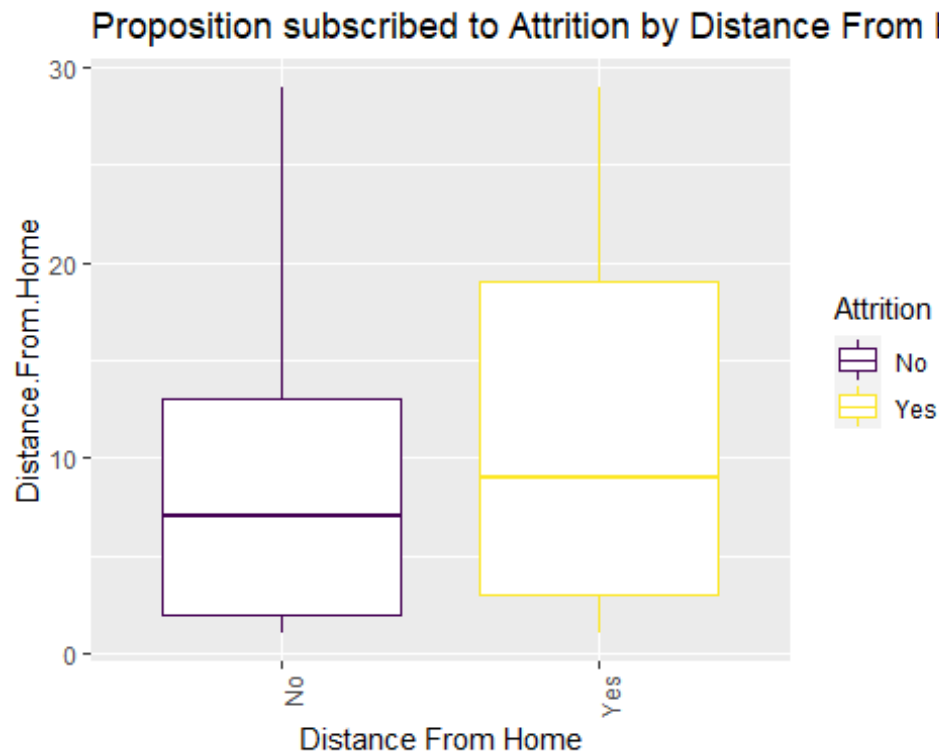
*# Distance From Home vs Attrition*

```
t(aggregate(Distance.From.Home~Attrition,data=Empl,summary))
```

	[,1]	[,2]
Attrition	"No"	"Yes"
Distance.From.Home.Min.	" 1.000000"	" 1.000000"
Distance.From.Home.1st Qu.	" 2.000000"	" 3.000000"
Distance.From.Home.Median	" 7.000000"	" 9.000000"
Distance.From.Home.Mean	" 9.028767"	"10.957143"
Distance.From.Home.3rd Qu.	"13.000000"	"19.000000"
Distance.From.Home.Max.	"29.000000"	"29.000000"

```
Empl %>%
```

```
  ggplot(aes(x=Attrition, y=Distance.From.Home, color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Distance From Home vs Attrition") +
  xlab("Distance From Home")+
  ggtitle("Proportion subscribed to Attrition by Distance From Home")+ theme
(axis.text.x = element_text(angle=90, hjust=1))
```



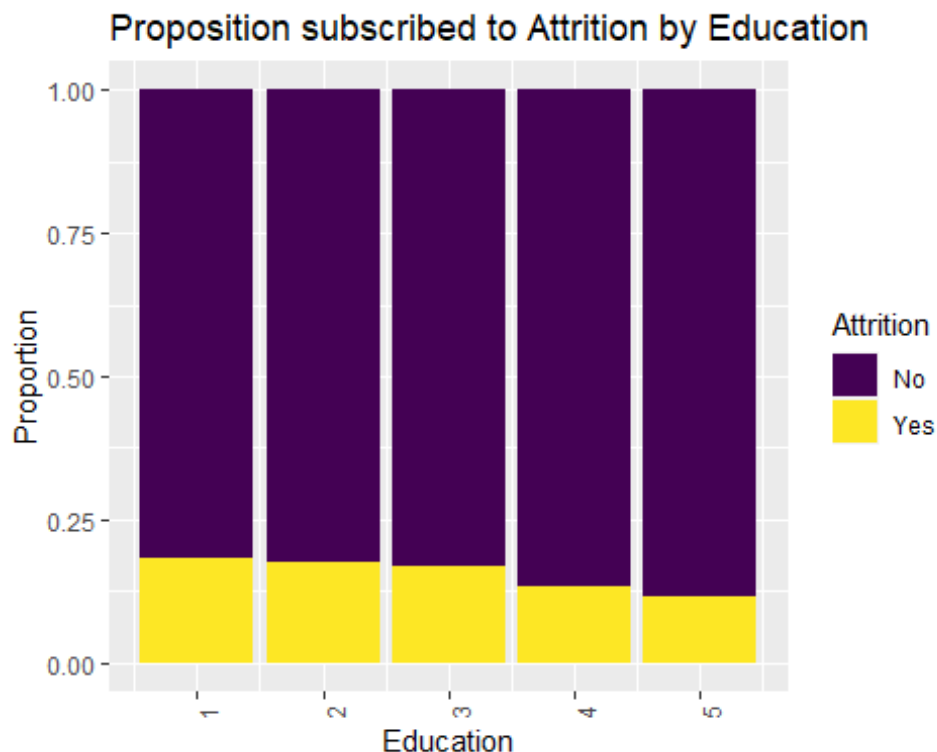
*#The Attrition rate is high for Employees who traveled Longer distance to work*

*# Education vs Attrition*

```
prop.table(table(Empl$Attrition,Empl$Education),2)
```

```
##
##           1           2           3           4           5
##  No  0.8163265 0.8241758 0.8302469 0.8666667 0.8846154
##  Yes 0.1836735 0.1758242 0.1697531 0.1333333 0.1153846
```

```
Empl %>%
  ggplot(aes(x=Education, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Education") +
  ggtitle("Proposition subscribed to Attrition by Education") + theme(axis.text.x = element_text(angle=90, hjust=1))
```



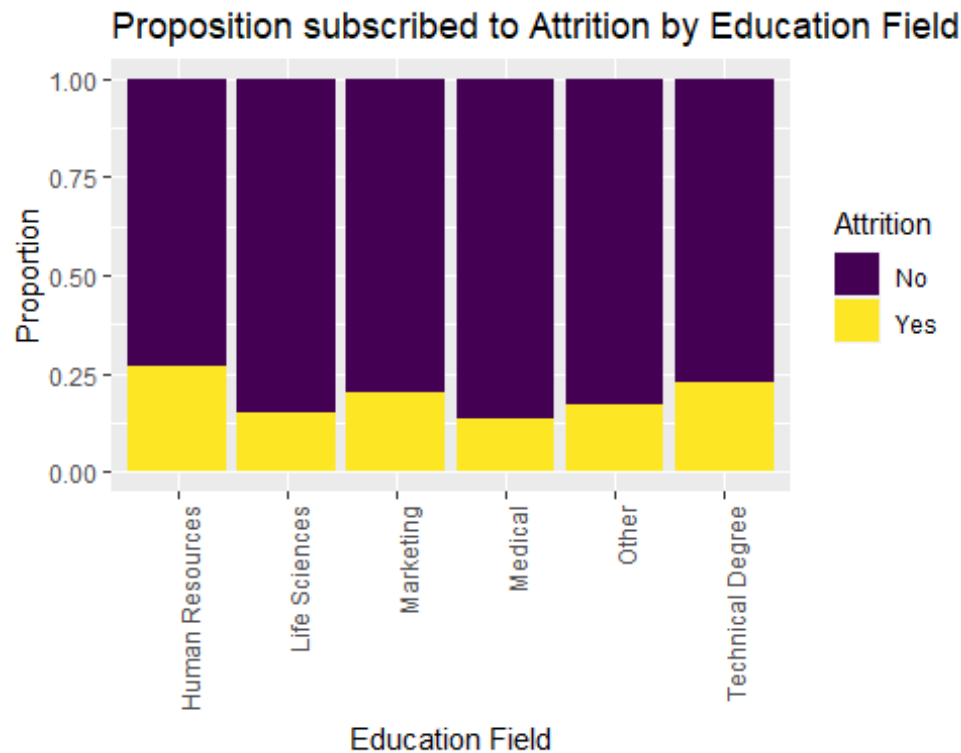
*#Attrition Rate is high at Education Level 1,2 and 3 than 4 and 5*

*# Education Field vs Attrition*

```
prop.table(table(Empl$Attrition,Empl$EducationField),2)
```

```
##
##      Human Resources Life Sciences Marketing Medical Other
## No      0.7333333      0.8519553 0.8000000 0.8629630 0.8269231
## Yes      0.2666667      0.1480447 0.2000000 0.1370370 0.1730769
##
##      Technical Degree
## No      0.7733333
## Yes      0.2266667
```

```
Empl %>%
  ggplot(aes(x=EducationField, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Education Field") +
  ggtitle("Proposition subscribed to Attrition by Education Field") + theme(ax
is.text.x = element_text(angle=90, hjust=1))
```



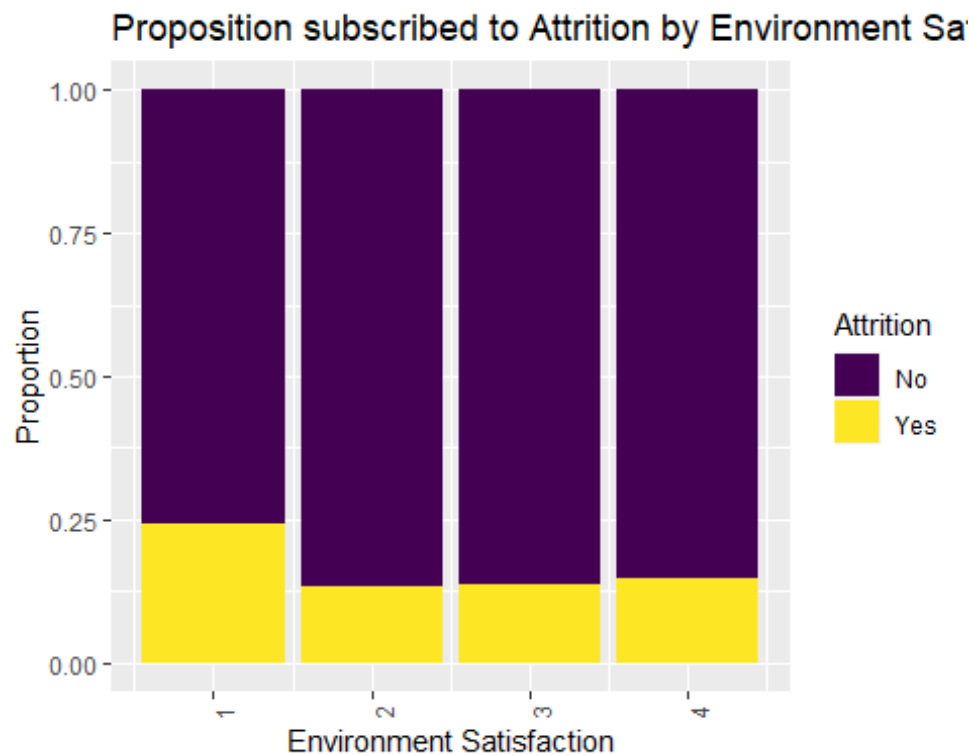
*#Attrition Rate seems to be higher for Human Resource, Technical Degree and Marketing. The employees in Education Filed Life science, Medical and other are more content.*

*#Environment Satisfaction Vs Attrition*

```
prop.table(table(Empl$Environment.Satisfaction, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  1 0.1780822 0.3000000
##  2 0.2109589 0.1714286
##  3 0.3054795 0.2500000
##  4 0.3054795 0.2785714
```

```
Empl %>%
  ggplot(aes(x=Environment.Satisfaction, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Environment Satisfaction") +
  ggtitle("Proposition subscribed to Attrition by Environment Satisfaction") +
  theme(axis.text.x = element_text(angle=90, hjust=1))
```



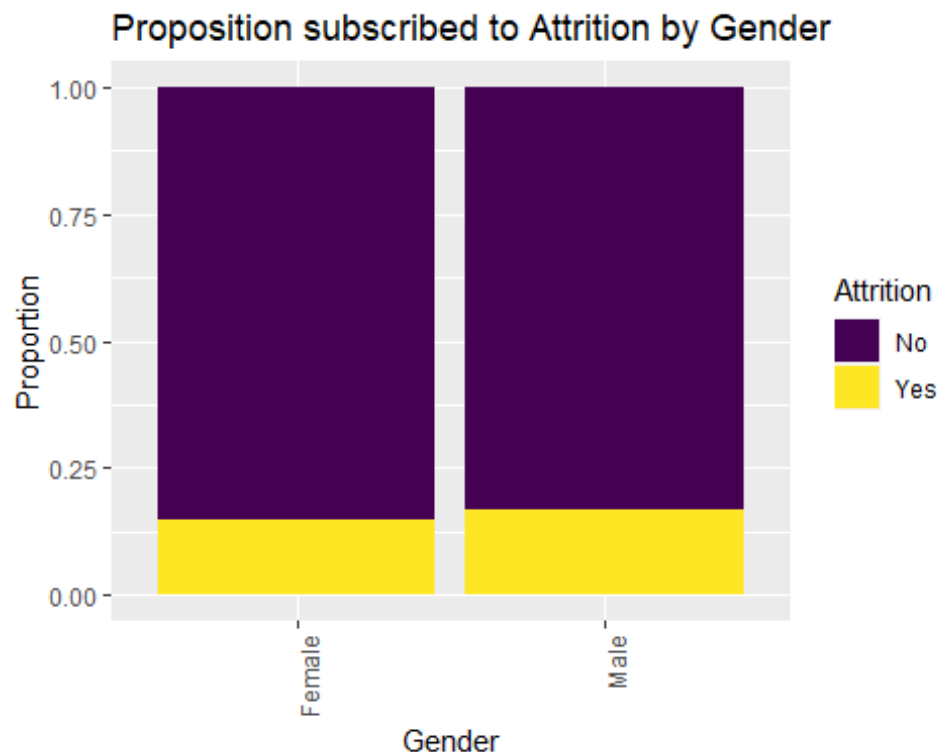
*#Attrition Rate seems to be high for Environment Satisfaction Level 1 than 2, 3 and 4*

*#Gender Vs Attrition*

```
prop.table(table(Empl$Gender, Empl$Attrition), 2)
```

```
##
##           No           Yes
## Female 0.4123288 0.3785714
## Male   0.5876712 0.6214286
```

```
Empl %>%
  ggplot(aes(x=Gender, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Gender") +
  ggtitle("Proposition subscribed to Attrition by Gender") + theme(axis.text.x
= element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be high for Male than Female*

*# Hourly Rate vs Attrition*

```
t(aggregate(Hourly.Rate~Attrition,data=Empl,summary))
```

```
##           [,1]      [,2]
## Attrition   "No"      "Yes"
## Hourly.Rate.Min.   " 30.00000" " 32.00000"
## Hourly.Rate.1st Qu. " 48.00000" " 51.00000"
## Hourly.Rate.Median " 64.50000" " 68.50000"
## Hourly.Rate.Mean   " 65.29178" " 67.29286"
## Hourly.Rate.3rd Qu. " 82.75000" " 84.00000"
## Hourly.Rate.Max.   "100.00000" "100.00000"
```

```
Empl %>%
  ggplot(aes(x=Attrition, y=log(Hourly.Rate), color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Hourly.Rate vs Attrition") +
  xlab("Hourly Rate")+
  ggtitle("Proportion subscribed to Attrition by Hourly Rate")+ theme(axis.t
ext.x = element_text(angle=90, hjust=1))
```



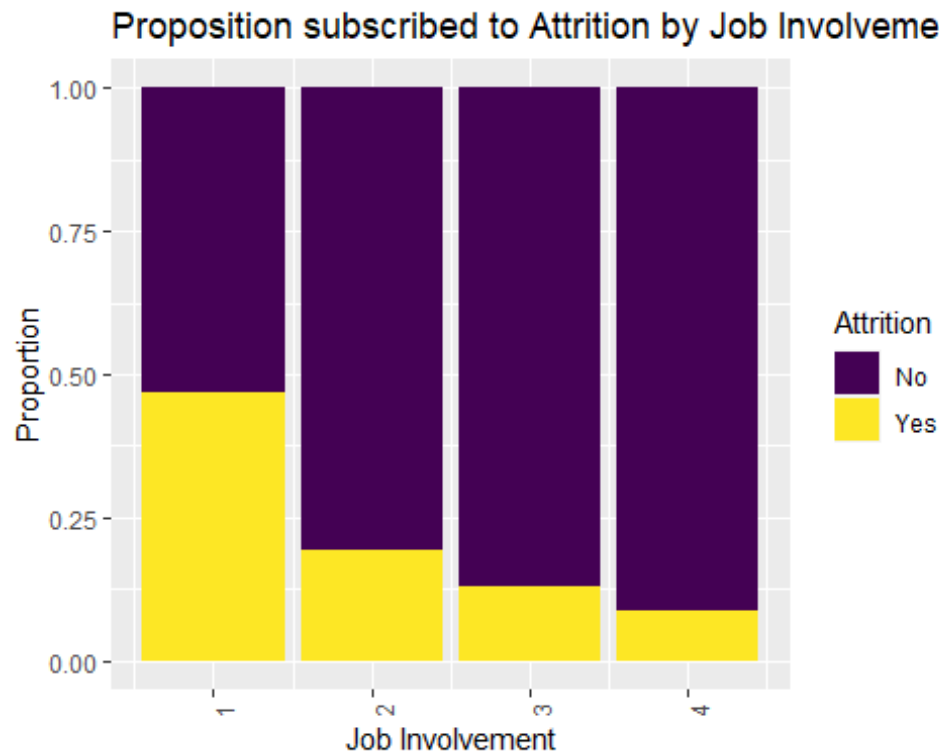
*#The Attrition rate is high for Employees who had comparatively higher hourly rate*

*#Job Involvement Vs Attrition*

```
prop.table(table(Empl$Job.Involvement,Empl$Attrition),2)
```

```
##
##           No           Yes
##  1 0.03424658 0.15714286
##  2 0.25205479 0.31428571
##  3 0.61232877 0.47857143
##  4 0.10136986 0.05000000
```

```
Empl %>%
  ggplot(aes(x=Job.Involvement, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Job Involvement") +
  ggtitle("Proposition subscribed to Attrition by Job Involvement") + theme(axis.text.x = element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be high for Job Involvement 1. Job Involvement Level 4 has the Least attrition rate.*

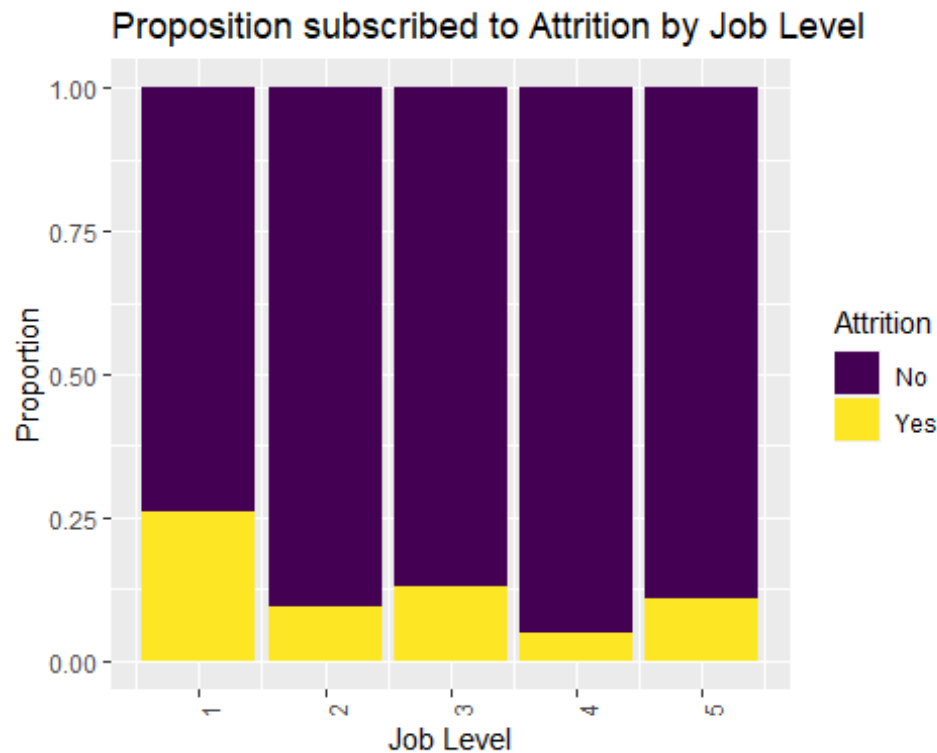
*#Job Level Vs Attrition*

```
prop.table(table(Empl$Job.Level, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  1 0.33287671 0.61428571
##  2 0.38630137 0.21428571
##  3 0.15753425 0.12142857
##  4 0.07808219 0.02142857
##  5 0.04520548 0.02857143
```

```
Empl %>%
  ggplot(aes(x=Job.Level, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Job Level") +
  ggtitle("Proposition subscribed to Attrition by Job Level") + theme(axis.tex
t.x = element_text(angle=90, hjust=1))
```





*#Attrition Rate seems to be high for Job Level 1. Job Level 4 has the lower attrition.*

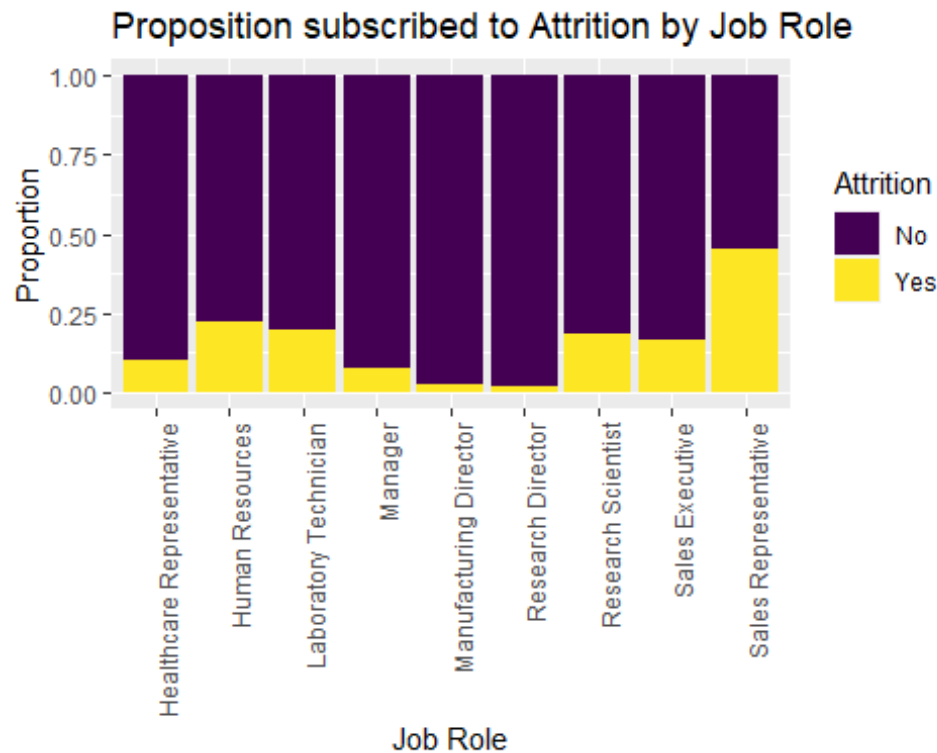
*#Job Role Vs Attrition*

```
prop.table(table(Empl$Job.Role, Empl$Attrition), 2)
```

```
##
##               No      Yes
## Healthcare Representative 0.093150685 0.057142857
## Human Resources          0.028767123 0.042857143
## Laboratory Technician     0.168493151 0.214285714
## Manager                  0.064383562 0.028571429
## Manufacturing Director    0.116438356 0.014285714
## Research Director         0.068493151 0.007142857
## Research Scientist        0.191780822 0.228571429
## Sales Executive           0.228767123 0.235714286
## Sales Representative       0.039726027 0.171428571
```

```
Empl %>%
```

```
  ggplot(aes(x=Job.Role, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Job Role") +
  ggtitle("Proportion subscribed to Attrition by Job Role") + theme(axis.text
.x = element_text(angle=90, hjust=1))
```



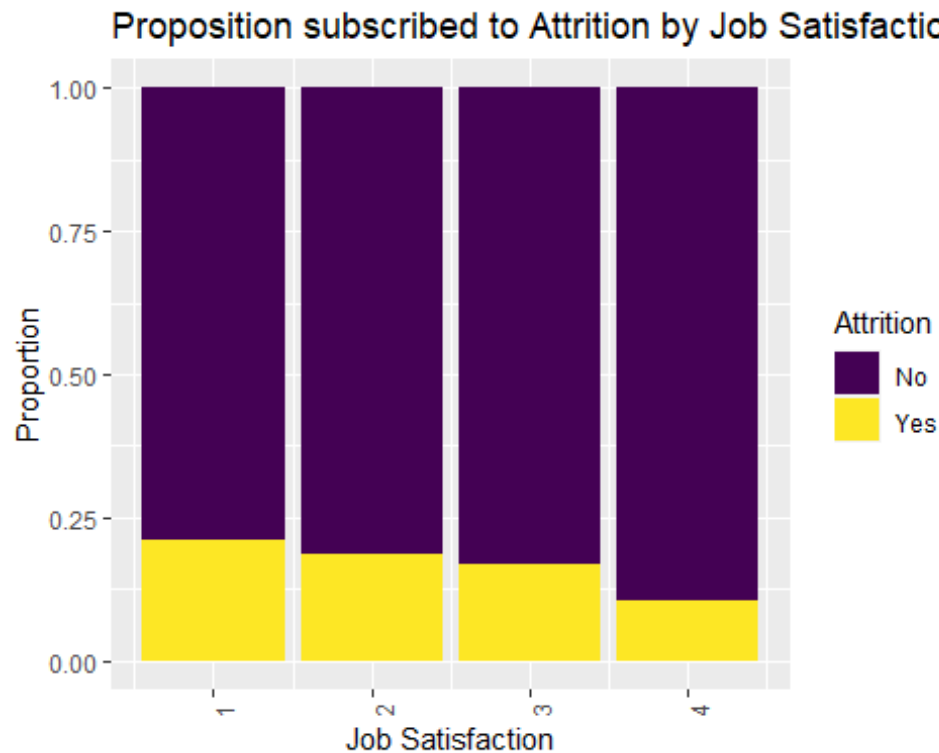
*#Attrition Rate seems to be high for Sales Rep and Human Resource. Laboratory Technician, Research Scientist and sales executive are the next in row for attrition. Manufacturing Director & Research Director are more content with their job.*

*#Job Satisfaction Vs Attrition*

```
prop.table(table(Empl$Job.Satisfaction, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  1 0.1931507 0.2714286
##  2 0.1849315 0.2214286
##  3 0.2890411 0.3071429
##  4 0.3328767 0.2000000
```

```
Empl %>%
  ggplot(aes(x=Job.Satisfaction, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Job Satisfaction") +
  ggtitle("Proposition subscribed to Attrition by Job Satisfaction") + theme(a
  xis.text.x = element_text(angle=90, hjust=1))
```



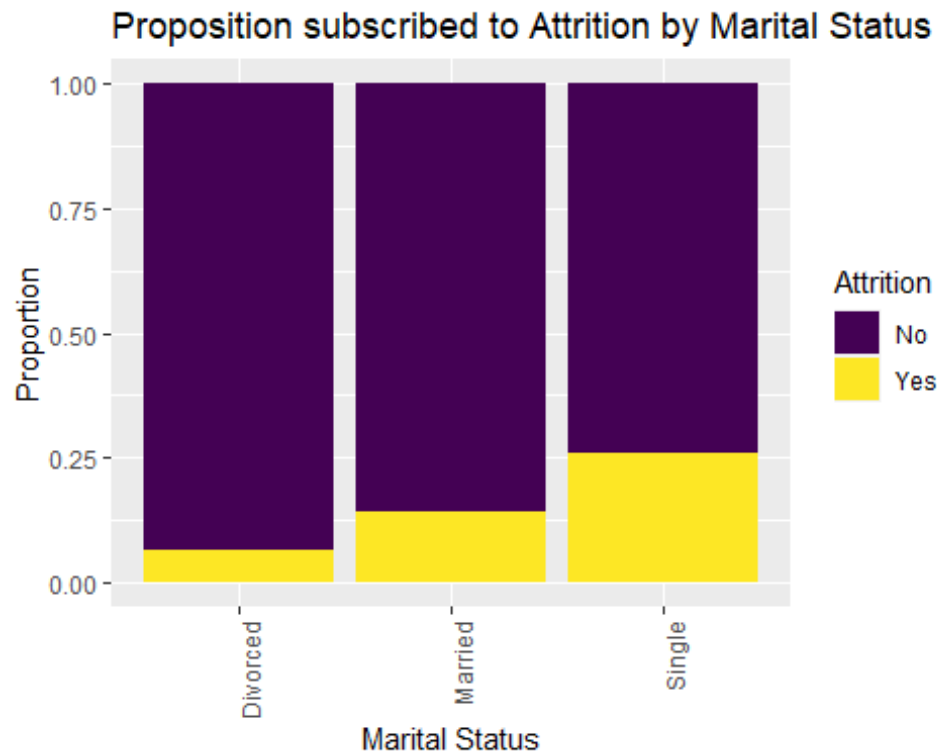
*#Attrition Rate seems to be high for Job Satisfaction 1. Job Satisfaction 4 has lowest attrition.*

*#Marital Status Vs Attrition*

```
prop.table(table(Empl$Marital.Status, Empl$Attrition), 2)
```

```
##
##              No              Yes
## Divorced 0.24520548 0.08571429
## Married  0.48219178 0.41428571
## Single   0.27260274 0.50000000
```

```
Empl %>%
  ggplot(aes(x=Marital.Status, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Marital Status") +
  ggtitle("Proposition subscribed to Attrition by Marital Status") + theme(axis
s.text.x = element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be high with Singles*

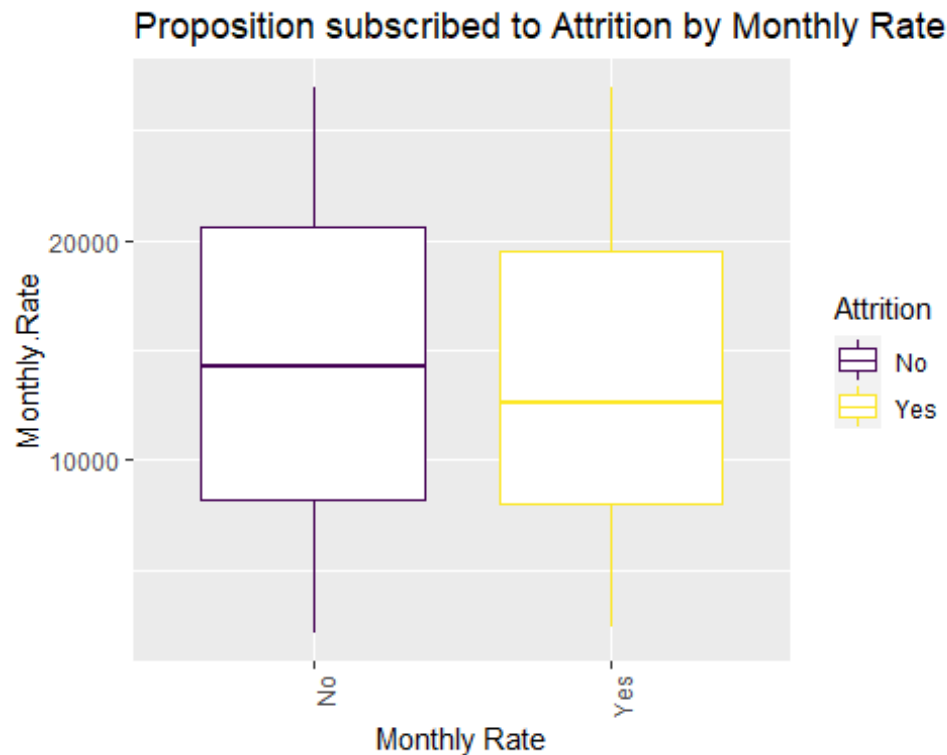
*# Monthly Income vs Attrition*

```
t(aggregate(Monthly.Income~Attrition,data=Empl,summary))
```

```
##           [,1]      [,2]
## Attrition   "No"      "Yes"
## Monthly.Income.Min.   " 1129.000" " 1081.000"
## Monthly.Income.1st Qu. " 3162.000" " 2341.500"
## Monthly.Income.Median " 5208.500" " 3171.000"
## Monthly.Income.Mean   " 6702.000" " 4764.786"
## Monthly.Income.3rd Qu. " 8736.500" " 5838.750"
## Monthly.Income.Max.   "19999.000" "19859.000"
```

```
Empl %>%
  ggplot(aes(x=Attrition, y=Monthly.Income, color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Monthly Income vs Attrition") +
  xlab("Monthly Income")+
  ggtitle("Proportion subscribed to Attrition by Monthly Income")+ theme(axi
s.text.x = element_text(angle=90, hjust=1))
```





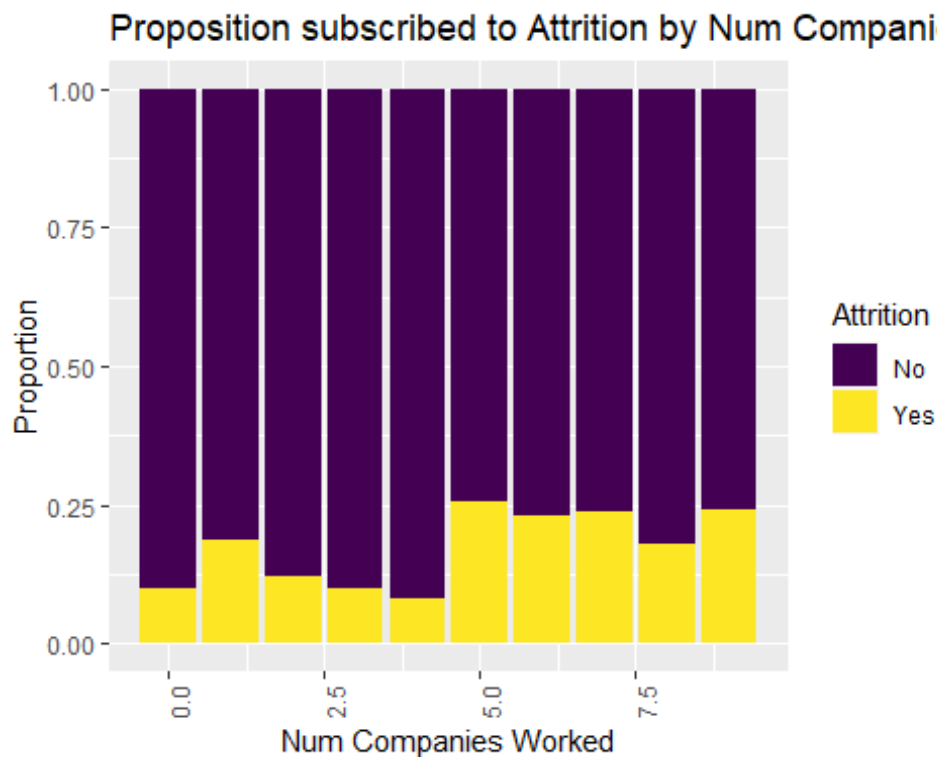
*#The Attrition rate is higher for Employees who had comparatively lower monthly rates*

*#Num Companies Worked Vs Attrition*

```
prop.table(table(Empl$Num.Companies.Worked, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  0 0.13698630 0.07857143
##  1 0.35616438 0.42857143
##  2 0.08904110 0.06428571
##  3 0.11232877 0.06428571
##  4 0.10684932 0.05000000
##  5 0.04383562 0.07857143
##  6 0.04109589 0.06428571
##  7 0.04794521 0.07857143
##  8 0.03150685 0.03571429
##  9 0.03424658 0.05714286
```

```
Empl %>%
  ggplot(aes(x=Num.Companies.Worked, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Num Companies Worked") +
  ggtitle("Proposition subscribed to Attrition by Num Companies Worked") +
  theme(axis.text.x = element_text(angle=90, hjust=1))
```



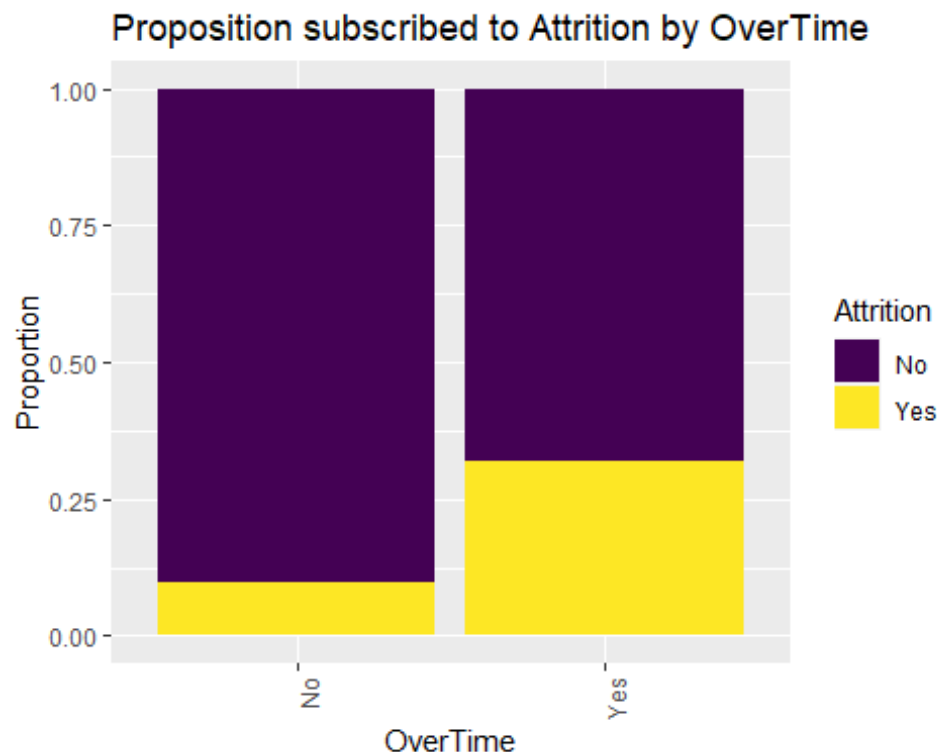
*#Attrition Rate seems to be higher for Employees who had worked in 5 or more companies.*

*#OverTime Worked Vs Attrition*

```
prop.table(table(Empl$OverTime, Empl$Attrition), 2)
```

```
##
##           No           Yes
## No  0.7643836 0.4285714
## Yes 0.2356164 0.5714286
```

```
Empl %>%
  ggplot(aes(x=OverTime, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("OverTime") +
  ggtitle("Proposition subscribed to Attrition by OverTime") + theme(axis.text
.x = element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be higher for Employees who worked overtime*

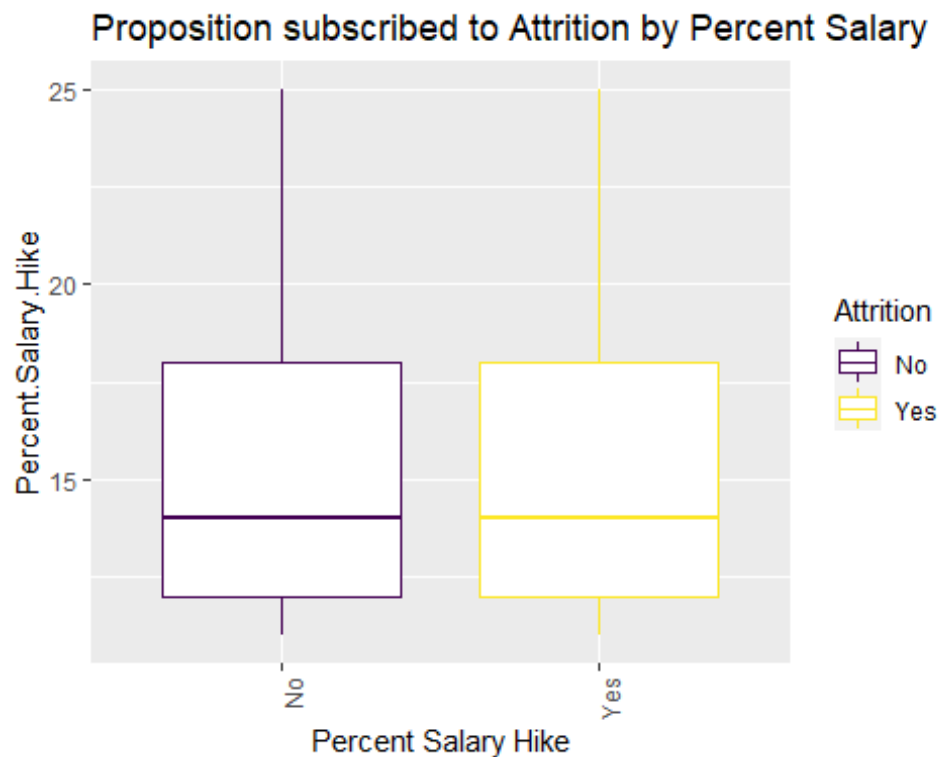
*# Percent Salary vs Attrition*

```
t(aggregate(Percent.Salary.Hike~Attrition,data=Empl,summary))
```

```
##           [,1]      [,2]
## Attrition    "No"      "Yes"
## Percent.Salary.Hike.Min.  "11.00000" "11.00000"
## Percent.Salary.Hike.1st Qu. "12.00000" "12.00000"
## Percent.Salary.Hike.Median "14.00000" "14.00000"
## Percent.Salary.Hike.Mean   "15.17534" "15.32857"
## Percent.Salary.Hike.3rd Qu. "18.00000" "18.00000"
## Percent.Salary.Hike.Max.   "25.00000" "25.00000"
```

```
Empl %>%
  ggplot(aes(x=Attrition, y=Percent.Salary.Hike, color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Percent Salary Hike vs Attrition") +
  xlab("Percent Salary Hike")+
  ggtitle("Proposition subscribed to Attrition by Percent Salary Hike")+ theme
e(axis.text.x = element_text(angle=90, hjust=1))
```





*#Not much difference on the attrition rate*

*# Performance Rating vs Attrition*

```
prop.table(table(Empl$Performance.Rating, Empl$Attrition), 2)
```

```
##
```

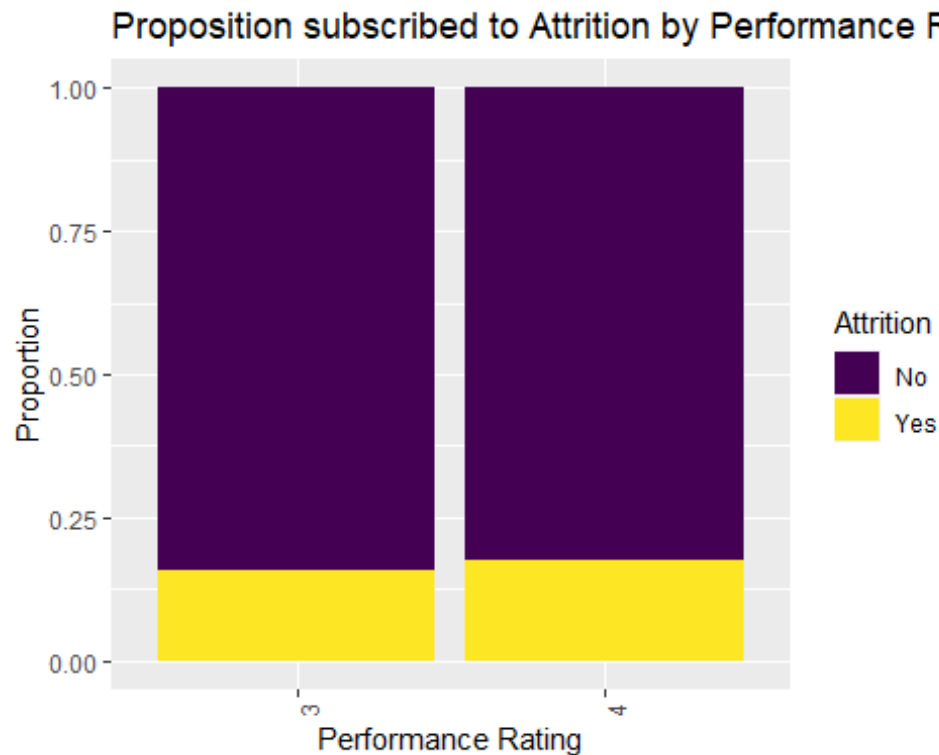
```
##           No           Yes
```

```
##  3 0.8506849 0.8357143
```

```
##  4 0.1493151 0.1642857
```

```
Empl %>%
```

```
ggplot(aes(x=as.factor(Performance.Rating), fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Performance Rating") +
  ggtitle("Proposition subscribed to Attrition by Performance Rating") + theme
(axis.text.x = element_text(angle=90, hjust=1))
```



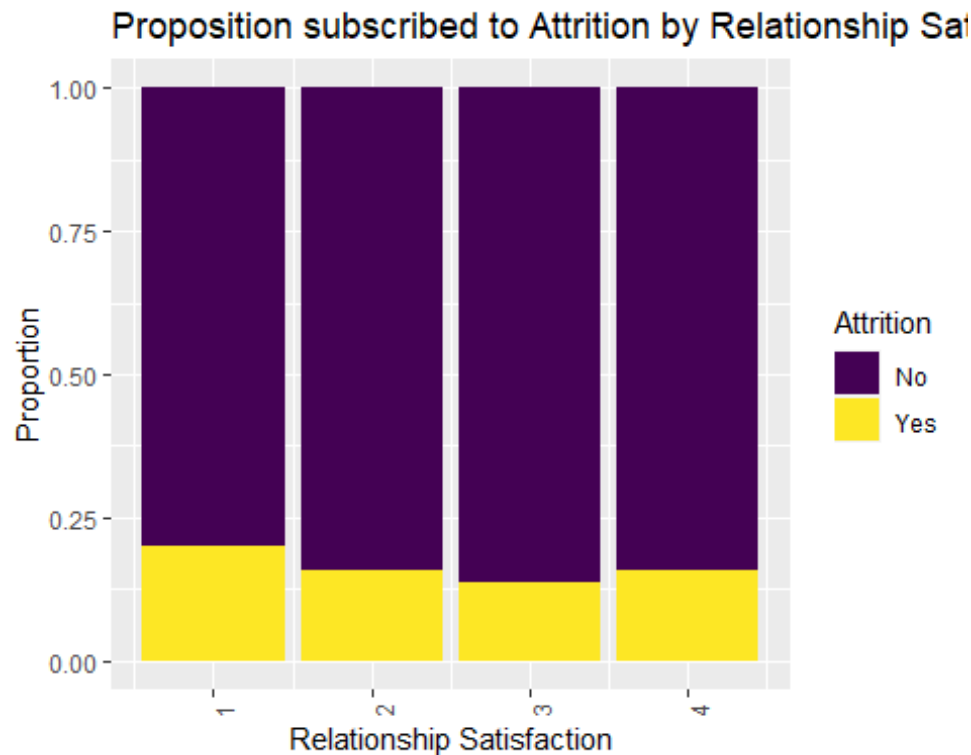
*#The Attrition rate is high for Employees who have performance rating 4*

*#Relationship Satisfaction Vs Attrition*

```
prop.table(table(Empl$Relationship.Satisfaction,Empl$Attrition),2)
```

```
##
##           No           Yes
## 1 0.1904110 0.2500000
## 2 0.1972603 0.1928571
## 3 0.3082192 0.2571429
## 4 0.3041096 0.3000000
```

```
Empl %>%
  ggplot(aes(x=Relationship.Satisfaction, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Relationship Satisfaction") +
  ggtitle("Proposition subscribed to Attrition by Relationship Satisfaction")
+ theme(axis.text.x = element_text(angle=90, hjust=1))
```



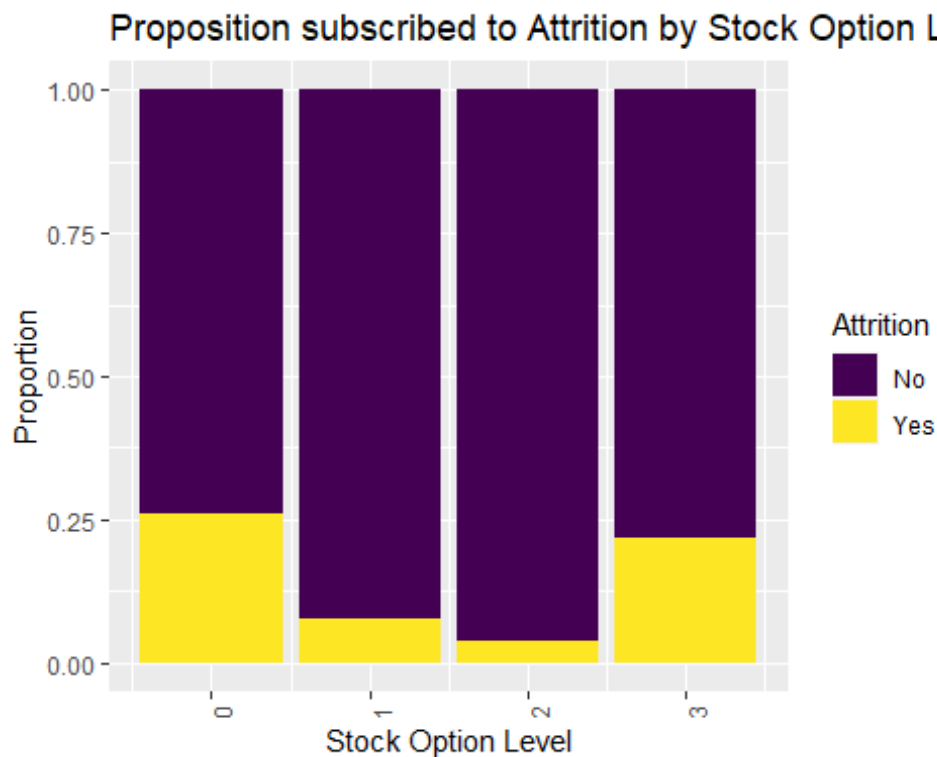
*#Attrition Rate seems to be high for Employees who had relationship satisfaction 1*

*#Stock Option Level Vs Attrition*

```
prop.table(table(Empl$Stock.Option.Level, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  0 0.38493151 0.70000000
##  1 0.44931507 0.19285714
##  2 0.10684932 0.02142857
##  3 0.05890411 0.08571429
```

```
Empl %>%
  ggplot(aes(x=Stock.Option.Level, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Stock Option Level") +
  ggtitle("Proposition subscribed to Attrition by Stock Option Level") + theme
(axis.text.x = element_text(angle=90, hjust=1))
```



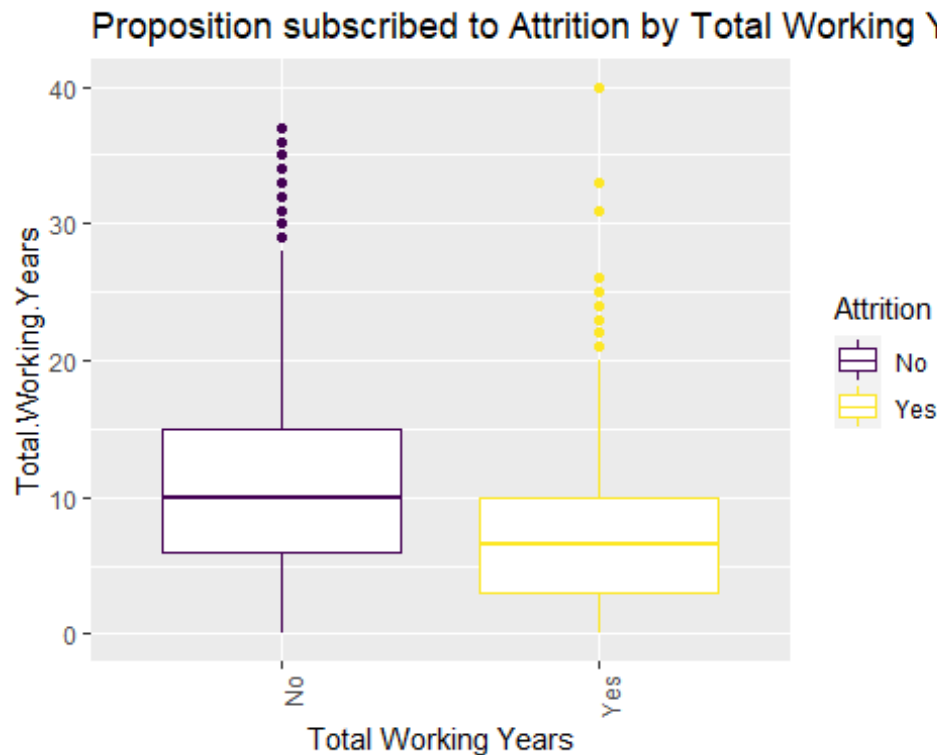
*#Attrition Rate seems to be high for Employees who have stock option 0 and 3*

*# Total Working Years vs Attrition*

```
t(aggregate(Total.Working.Years~Attrition,data=Empl,summar))
```

```
##           [,1]      [,2]
## Attrition   "No"      "Yes"
## Total.Working.Years.Min.  " 0.000000" " 0.000000"
## Total.Working.Years.1st Qu.  " 6.000000" " 3.000000"
## Total.Working.Years.Median  "10.000000" " 6.500000"
## Total.Working.Years.Mean    "11.602740" " 8.185714"
## Total.Working.Years.3rd Qu. "15.000000" "10.000000"
## Total.Working.Years.Max.   "37.000000" "40.000000"
```

```
Empl %>%
  ggplot(aes(x=Attrition, y=Total.Working.Years, color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Total Working Years vs Attrition") +
  xlab("Total Working Years")+
  ggtitle("Proposition subscribed to Attrition by Total Working Years")+ theme
e(axis.text.x = element_text(angle=90, hjust=1))
```



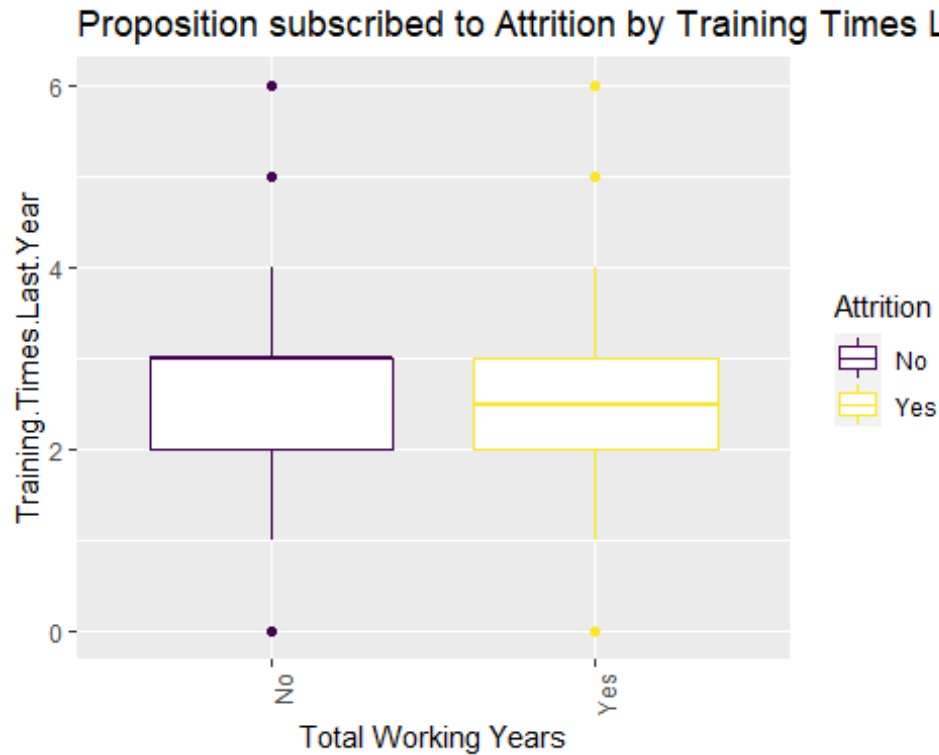
*#The Attrition rate is higher for Employees who had Less working years. There is an outlier at Total Working Years 40.*

*# Training Times Last Year vs Attrition*

```
t(aggregate(Training.Times.Last.Year~Attrition,data=Empl,summary))
```

	[,1]	[,2]
Attrition	"No"	"Yes"
Training.Times.Last.Year.Min.	"0.000000"	"0.000000"
Training.Times.Last.Year.1st Qu.	"2.000000"	"2.000000"
Training.Times.Last.Year.Median	"3.000000"	"2.500000"
Training.Times.Last.Year.Mean	"2.867123"	"2.650000"
Training.Times.Last.Year.3rd Qu.	"3.000000"	"3.000000"
Training.Times.Last.Year.Max.	"6.000000"	"6.000000"

```
Empl %>%
  ggplot(aes(x=Attrition, y=Training.Times.Last.Year, color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Training Times Last Year vs Attrition") +
  xlab("Total Working Years")+
  ggtitle("Proposition subscribed to Attrition by Training Times Last Year")+
  theme(axis.text.x = element_text(angle=90, hjust=1))
```



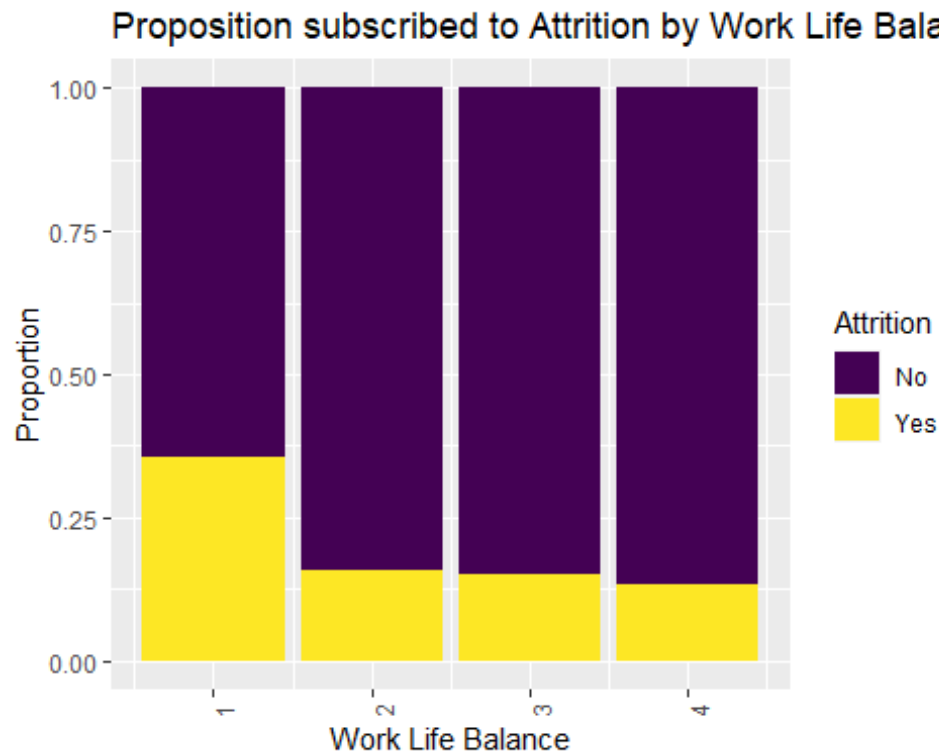
*#Not much impact*

*# Work Life Balance vs Attrition*

```
prop.table(table(Empl$Work.Life.Balance, Empl$Attrition), 2)
```

```
##
##           No           Yes
##  1 0.04246575 0.12142857
##  2 0.22191781 0.21428571
##  3 0.61917808 0.57142857
##  4 0.11643836 0.09285714
```

```
Empl %>%
  ggplot(aes(x=Work.Life.Balance, fill=Attrition)) +
  geom_bar(position="fill") +
  scale_fill_viridis_d() +
  ylab("Proportion") + xlab("Work Life Balance") +
  ggtitle("Proposition subscribed to Attrition by Work Life Balance") + theme(
    axis.text.x = element_text(angle=90, hjust=1))
```



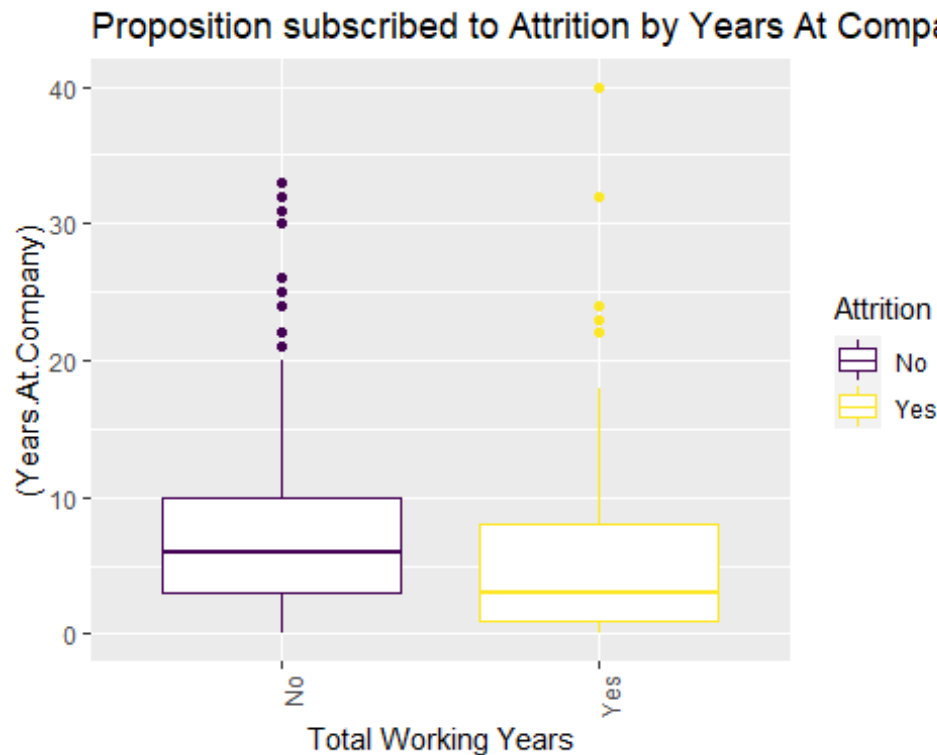
*#Attrition Rate seems to be higher for Employees who have work life balance 1*

*# Years At Company vs Attrition*

```
t(aggregate(Years.At.Company~Attrition,data=Empl,summary))
```

```
##           [,1]      [,2]
## Attrition    "No"      "Yes"
## Years.At.Company.Min.  " 0.000000" " 0.000000"
## Years.At.Company.1st Qu. " 3.000000" " 1.000000"
## Years.At.Company.Median " 6.000000" " 3.000000"
## Years.At.Company.Mean   " 7.301370" " 5.192857"
## Years.At.Company.3rd Qu. "10.000000" " 8.000000"
## Years.At.Company.Max.   "33.000000" "40.000000"
```

```
Empl %>%
  ggplot(aes(x=Attrition, y=(Years.At.Company), color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Years At Company vs Attrition") +
  xlab("Total Working Years")+
  ggtitle("Proposition subscribed to Attrition by Years At Company")+ theme(a
  xis.text.x = element_text(angle=90, hjust=1))
```



*#Attrition Rate seems to be more for Employees who worked Less years in the company. There is an outlier at Years At Company=40.  
 #The employees who worked for longer years in a company are more content and satisfied.*

*# Years In Current Role vs Attrition*

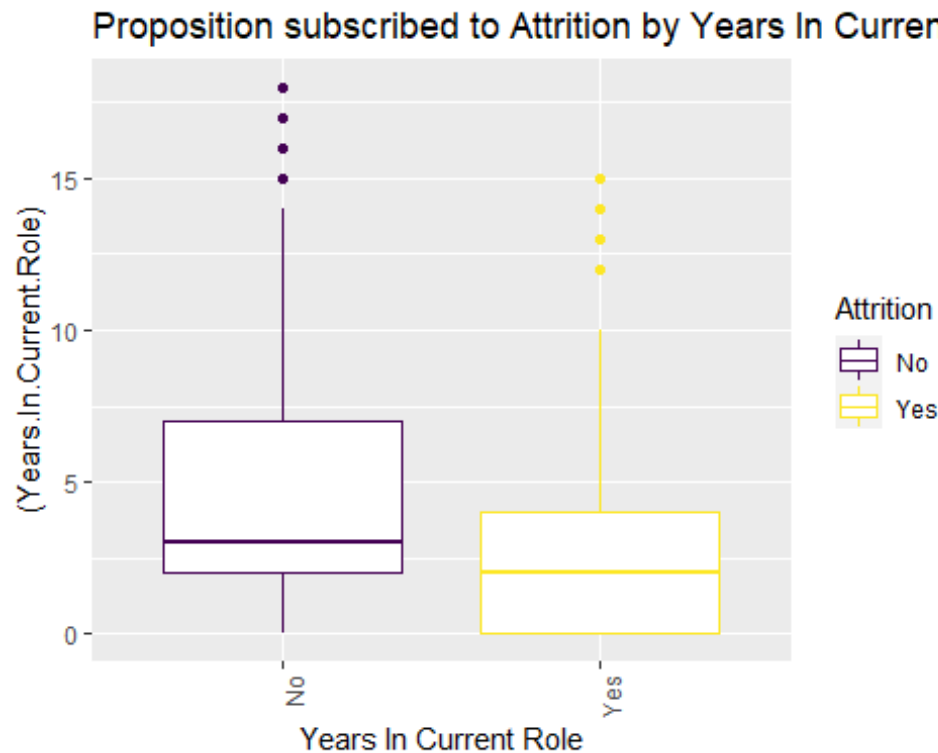
```
t(aggregate(Years.In.Current.Role~Attrition,data=Empl,summary))
```

```
##              [,1]      [,2]
## Attrition    "No"      "Yes"
## Years.In.Current.Role.Min. " 0.000000" " 0.000000"
## Years.In.Current.Role.1st Qu. " 2.000000" " 0.000000"
## Years.In.Current.Role.Median " 3.000000" " 2.000000"
## Years.In.Current.Role.Mean   " 4.453425" " 2.907143"
## Years.In.Current.Role.3rd Qu. " 7.000000" " 4.000000"
## Years.In.Current.Role.Max.   "18.000000" "15.000000"
```

```
Empl %>%
```

```
  ggplot(aes(x=Attrition, y=(Years.In.Current.Role), color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Years In Current Role vs Attrition") +
  xlab("Years In Current Role")+
  ggtitle("Proposition subscribed to Attrition by Years In Current Role")+ th
  eme(axis.text.x = element_text(angle=90, hjust=1))
```





*#Attrition Rate seems to be high for Employees who were in the current role for less years*

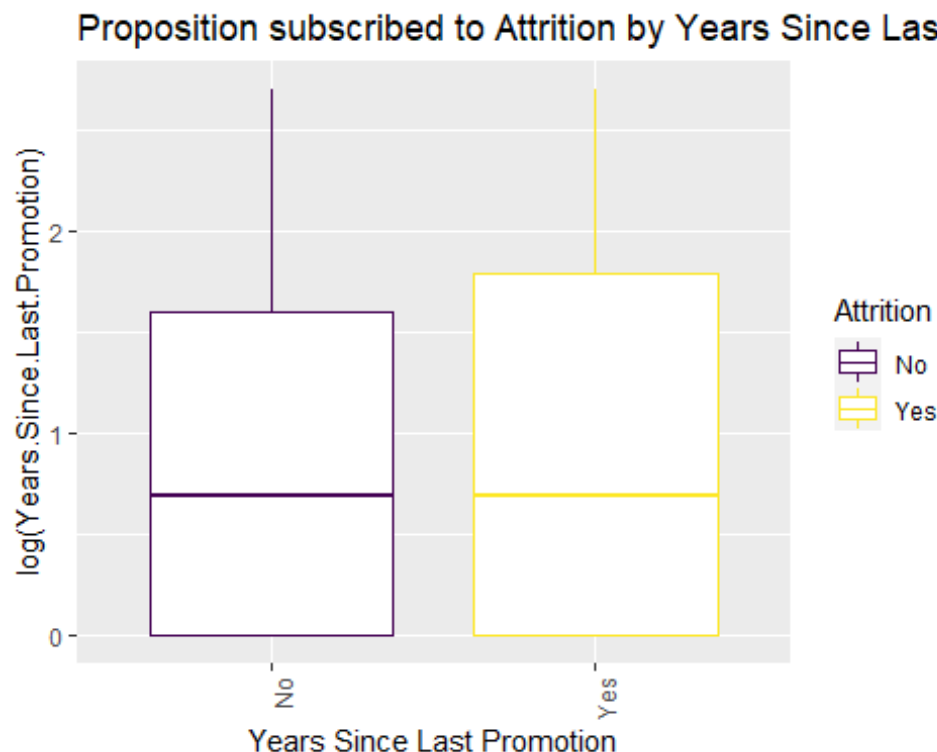
*# Years Since Last Promotion vs Attrition*

```
t(aggregate(Years.Since.Last.Promotion~Attrition,data=Empl,summary))
```

	[,1]	[,2]
Attrition	"No"	"Yes"
Years.Since.Last.Promotion.Min.	" 0.000000"	" 0.000000"
Years.Since.Last.Promotion.1st Qu.	" 0.000000"	" 0.000000"
Years.Since.Last.Promotion.Median	" 1.000000"	" 1.000000"
Years.Since.Last.Promotion.Mean	" 2.175342"	" 2.135714"
Years.Since.Last.Promotion.3rd Qu.	" 3.000000"	" 2.000000"
Years.Since.Last.Promotion.Max.	"15.000000"	"15.000000"

```
Empl %>%
  ggplot(aes(x=Attrition,y=log(Years.Since.Last.Promotion),color=Attrition))
+
  geom_boxplot() +
  scale_color_viridis_d() +
  ggtitle("Years Since Last Promotion vs Attrition") +
  xlab("Years Since Last Promotion")+
  ggtitle("Proposition subscribed to Attrition by Years Since Last Promotion")
+ theme(axis.text.x = element_text(angle=90, hjust=1))
```

```
## Warning: Removed 342 rows containing non-finite values (stat_boxplot).
```



*#Attrition Rate seems to be high for Employees who were in the company for Less years after promotion*

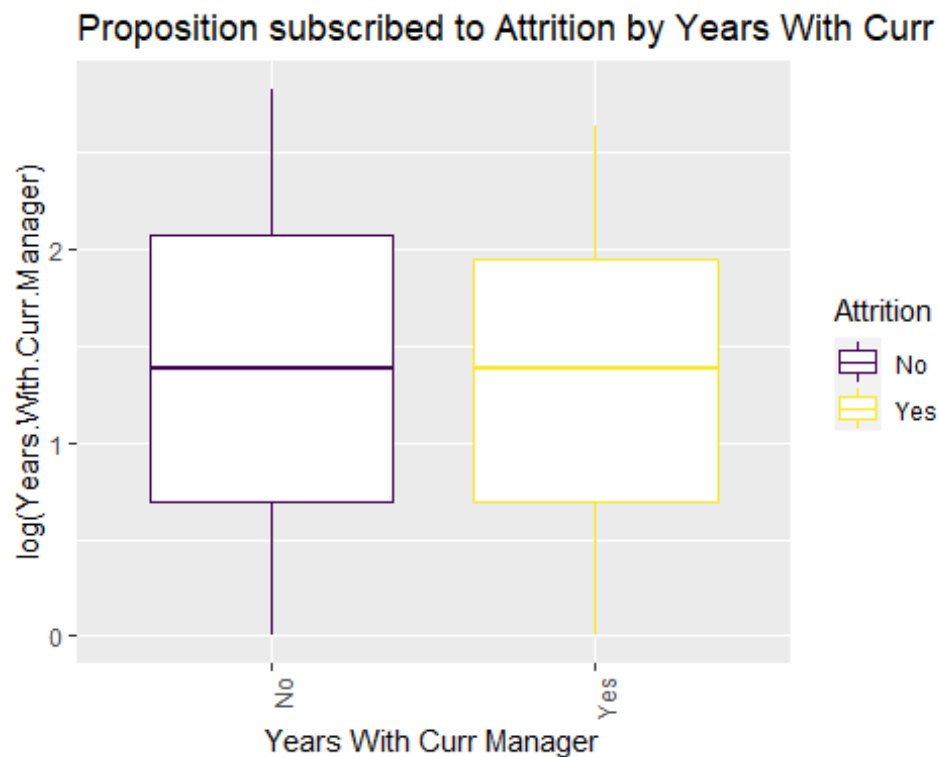
*# Years With Current Manager vs Attrition*

```
t(aggregate(Years.With.Curr.Manager~Attrition,data=Empl,summary))
```

	[,1]	[,2]
Attrition	"No"	"Yes"
Years.With.Curr.Manager.Min.	" 0.000000"	" 0.000000"
Years.With.Curr.Manager.1st Qu.	" 2.000000"	" 0.000000"
Years.With.Curr.Manager.Median	" 3.000000"	" 2.000000"
Years.With.Curr.Manager.Mean	" 4.369863"	" 2.942857"
Years.With.Curr.Manager.3rd Qu.	" 7.000000"	" 6.000000"
Years.With.Curr.Manager.Max.	"17.000000"	"14.000000"

```
Empl %>%
  ggplot(aes(x=Attrition,y=log(Years.With.Curr.Manager),color=Attrition)) +
  geom_boxplot() +
  scale_color_viridis_d()+
  ggtitle("Years With Curr Manager vs Attrition") +
  xlab("Years With Curr Manager")+
  ggtitle("Proposition subscribed to Attrition by Years With Curr Manager")+
  theme(axis.text.x = element_text(angle=90, hjust=1))
```

```
## Warning: Removed 166 rows containing non-finite values (stat_boxplot).
```



*#Attrition Rate seems to be high for Employees who with their current manager for less years comparatively. There is an outlier at Attrition="No" and Years with current Manager > 15.*

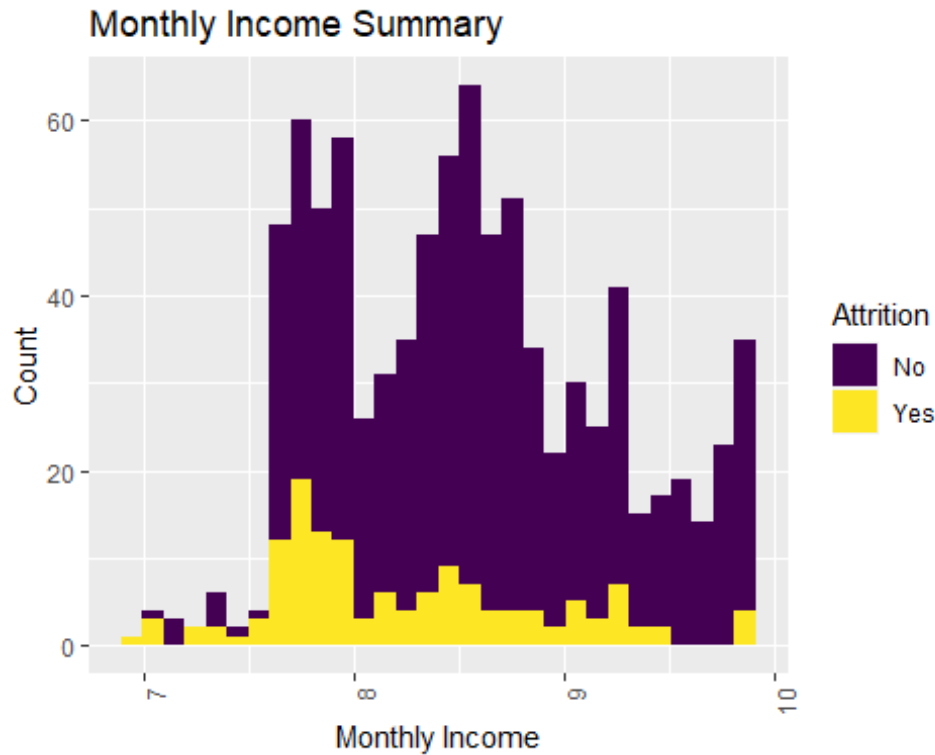
*#With Monthly Income(Salary) as Response*

*#Monthly Income as Response*

Empl%>%

```
ggplot(aes(x=log(Monthly.Income),fill=Attrition)) +
  geom_histogram() +
  ylab("Count") +xlab("Monthly Income")+scale_fill_viridis_d()+
  ggtitle("Monthly Income Summary")+ theme(axis.text.x = element_text(angle=90, hjust=1))
```

## `stat\_bin()` using `bins = 30`. Pick better value with `binwidth`.

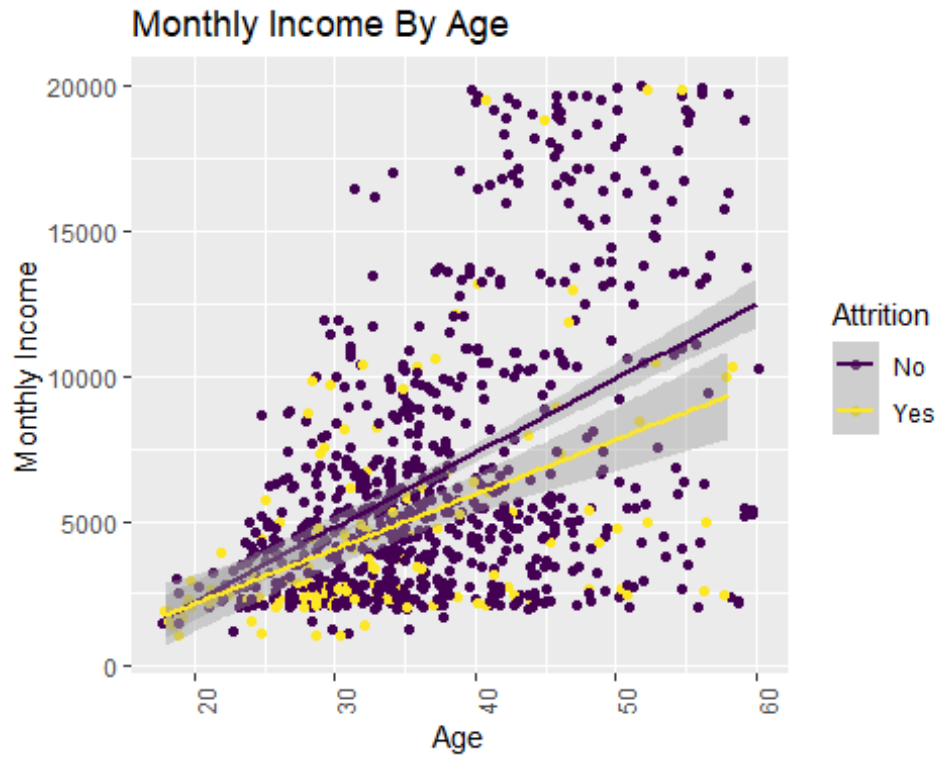


*#The Monthly Income is skewed. With the number of observations in the dataset, this should not be a problem based on the central limit theorem. Log transform looks better*

*#Monthly Income Vs Age*

```
Empl %>%
  ggplot(aes(x=(Age), y=(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Age") +
  ggtitle("Monthly Income by Age") + ggtitle("Monthly Income By Age") + theme(axis.text.x = element_text(angle=90, hjust=1))

## `geom_smooth()` using formula 'y ~ x'
```

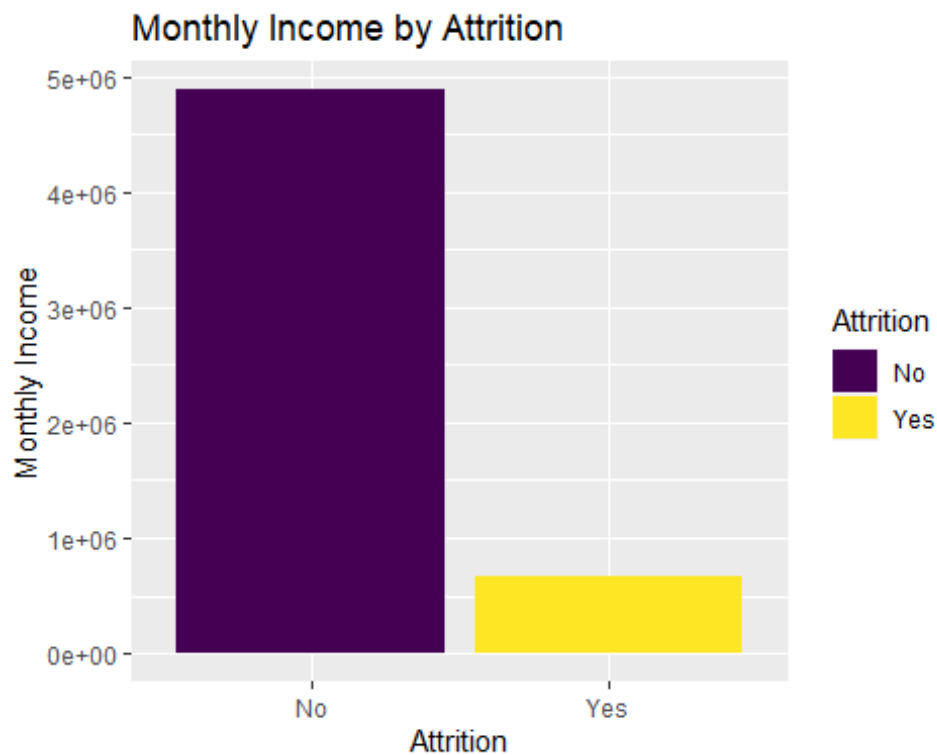


*#Age and Monthly Income seems to be linearly correlated*

*#Monthly Income Vs Attrition*

Empl %>%

```
ggplot(aes(x=Attrition,y=Monthly.Income,fill=Attrition )) +  
  geom_col() +  
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Attrition")+  
  ggtitle("Monthly Income by Attrition")
```

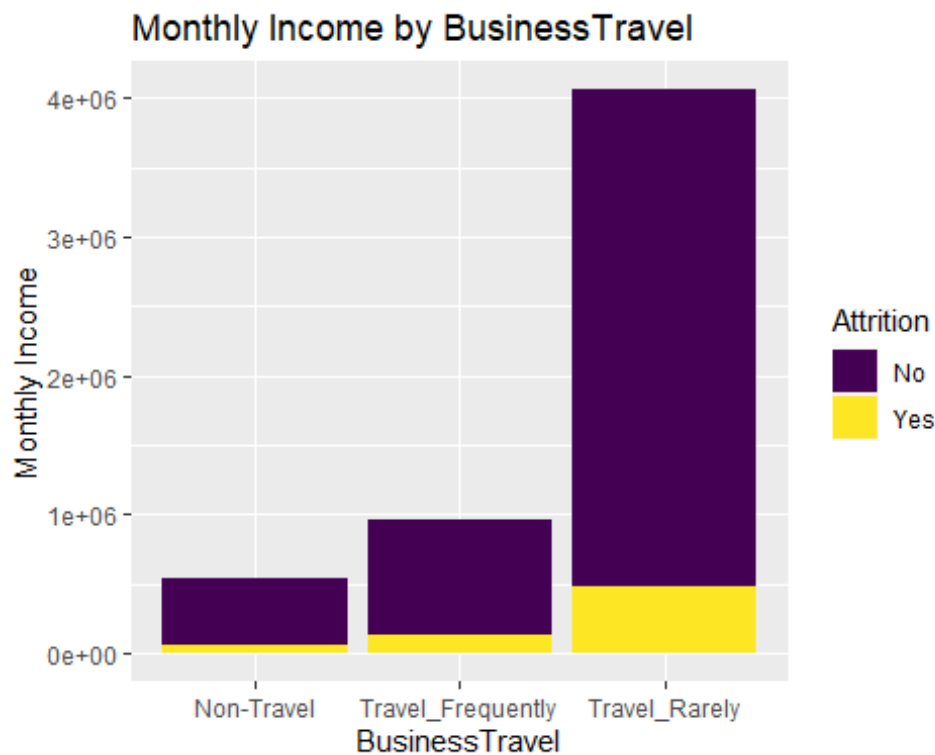


*#Attrition is higher for employees with Lower monthly income/Salary*

*#Monthly Income Vs Business Travel*

Emp1 %>%

```
ggplot(aes(x=BusinessTravel,y=Monthly.Income,fill=Attrition )) +  
geom_col() +  
scale_fill_viridis_d()+ylab("Monthly Income") +xlab("BusinessTravel")+  
ggtitle("Monthly Income by BusinessTravel")
```

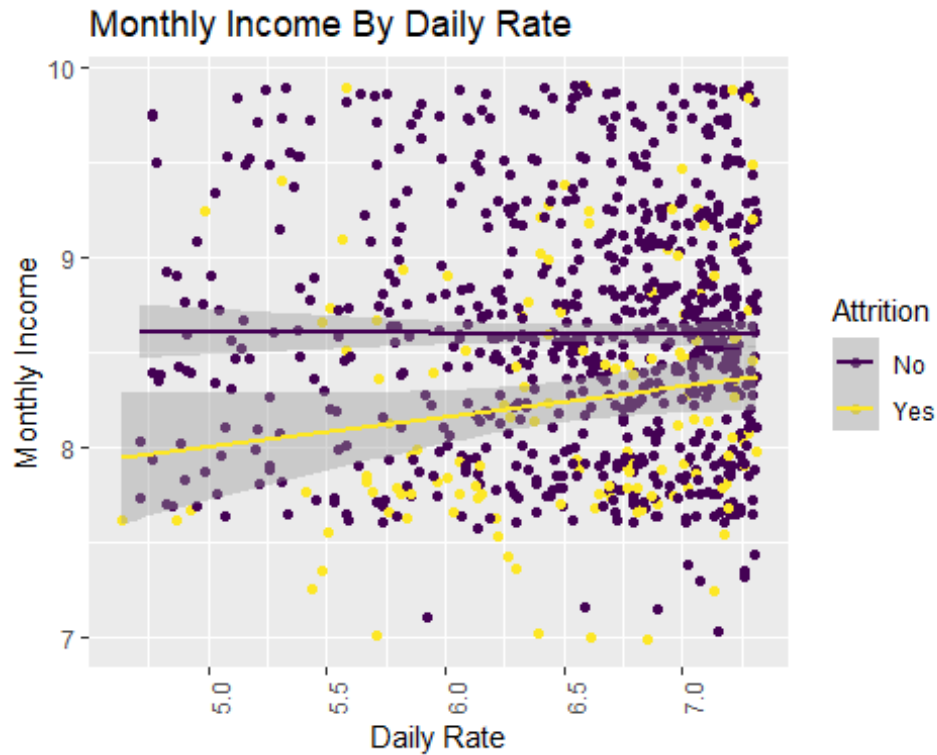


*#Monthly Income is higher for Travel-Rarely job. But the attrition rate is more for frequently travel jobs.*

*#Monthly Income Vs Daily Rate*

```
Emp1 %>%
  ggplot(aes(x=log(Daily.Rate), y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Daily Rate") +
  ggtitle("Monthly Income by Daily Rate") + ggtitle("Monthly Income By Daily Rate") +
  theme(axis.text.x = element_text(angle=90, hjust=1))

## `geom_smooth()` using formula 'y ~ x'
```



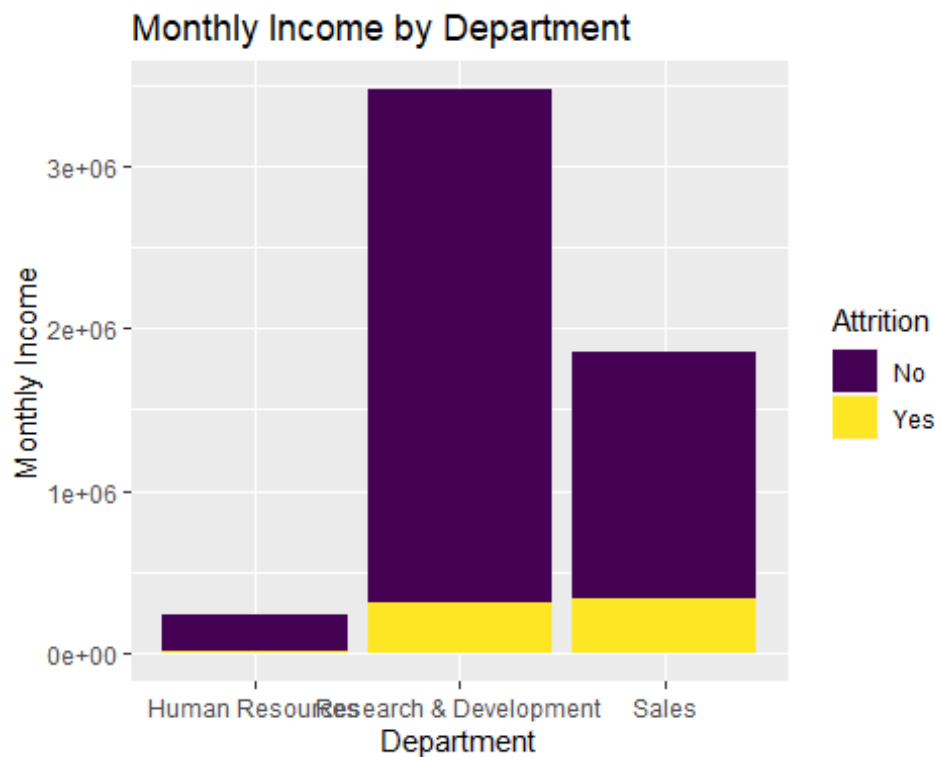
*#Monthly Income and daily rate are not co-related to each other*

*#Monthly Income Vs Department*

Emp1 %>%

```
ggplot(aes(x=Department,y=Monthly.Income,fill=Attrition )) +  
geom_col() +  
scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Department")+  
ggtitle("Monthly Income by Department")
```



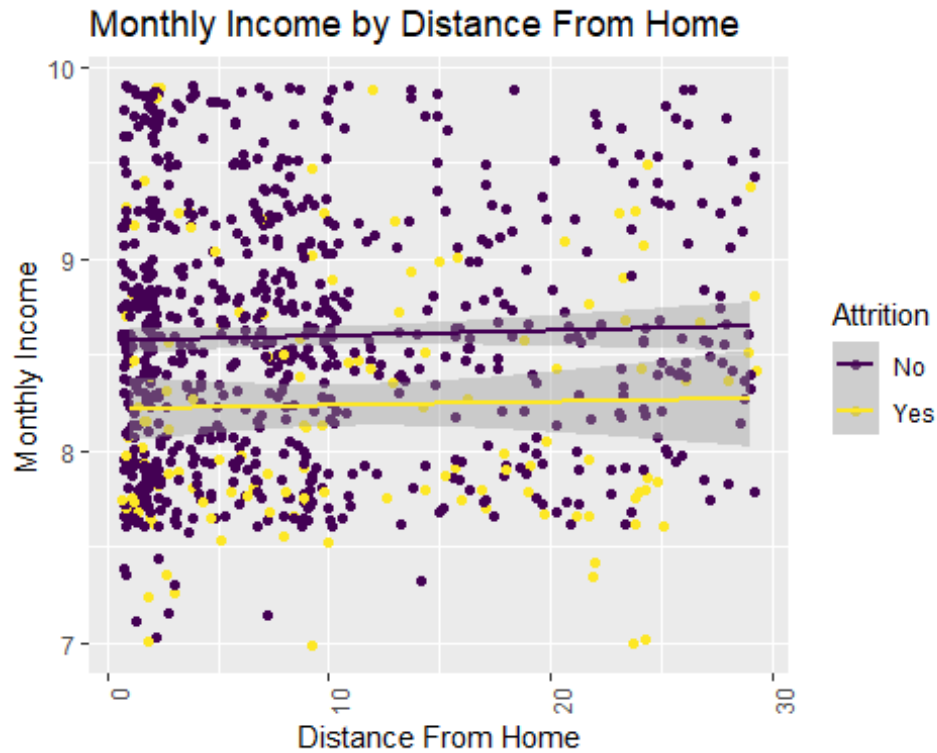


*#Monthly Income is the highest for Research & Development and Least for Human Resources. Attrition is highest for Human resources and Sales than Research & Development.*

*##Monthly Income Vs Distance From Home*

```
Empl %>%
  ggplot(aes(x=Distance.From.Home, y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Distance From Home") +
  ggtitle("Monthly Income by Distance From Home") + theme(axis.text.x = element_text(angle=90, hjust=1))

## `geom_smooth()` using formula 'y ~ x'
```

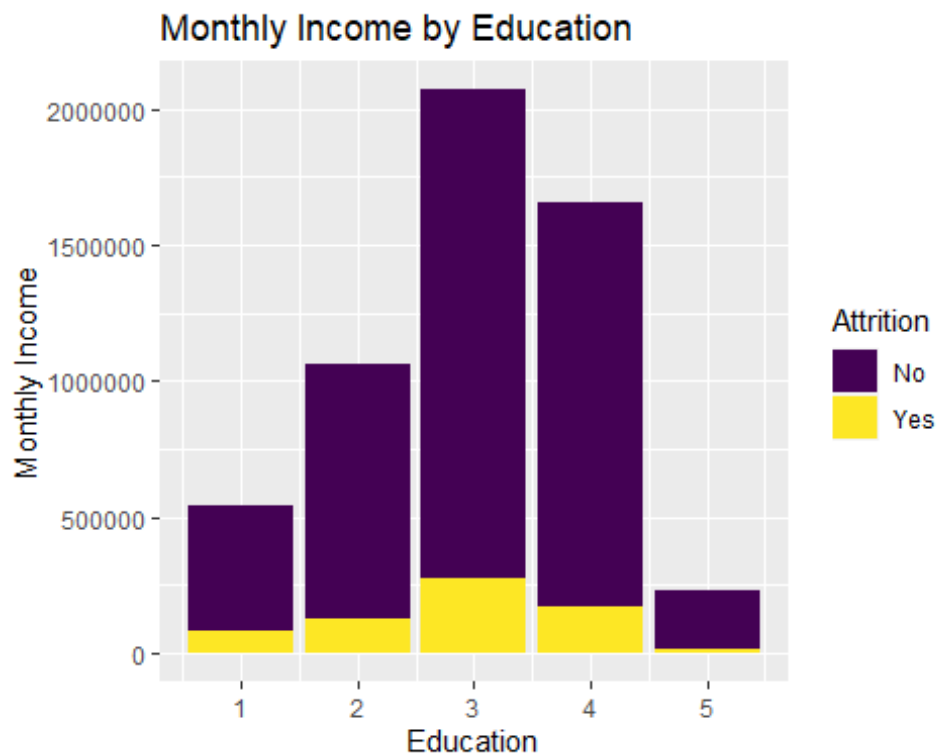


*#Nothing interesting seen here*

*#Monthly Income Vs Education*

Emp1 %>%

```
ggplot(aes(x=Education,y=Monthly.Income,fill=Attrition )) +  
  geom_col() +  
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Education")+  
  ggtitle("Monthly Income by Education")
```

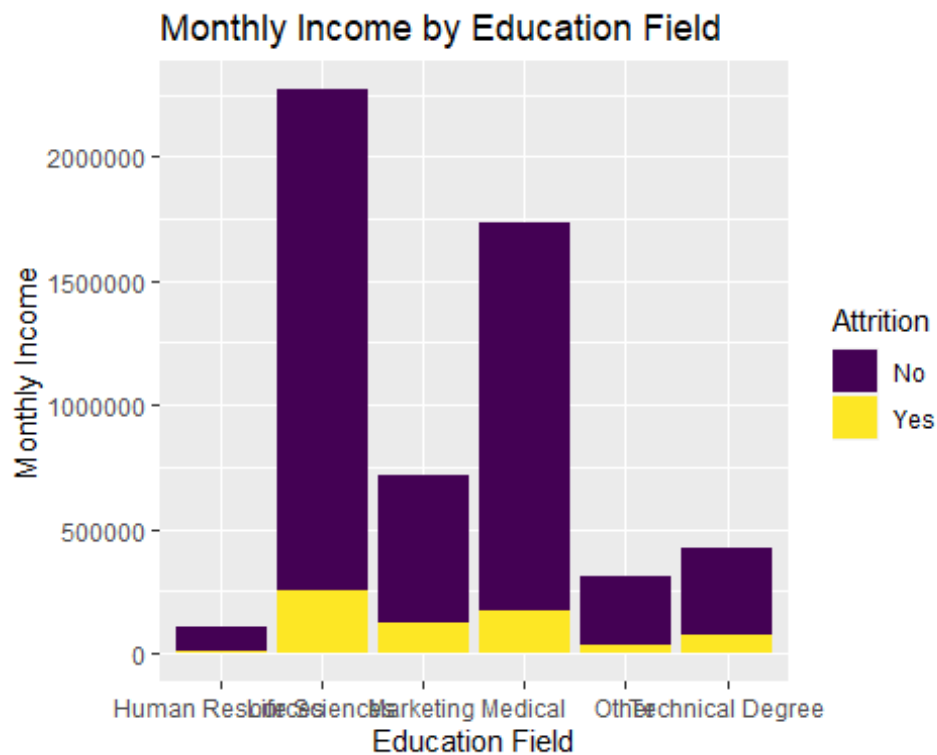


*#Monthly Income is the highest for Education Level 3&4 and Least for 5.*

*#Monthly Income Vs Education Field*

Emp1 %>%

```
ggplot(aes(x=EducationField,y=Monthly.Income,fill=Attrition )) +  
  geom_col() +  
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Education Field")+  
  ggtitle("Monthly Income by Education Field")
```



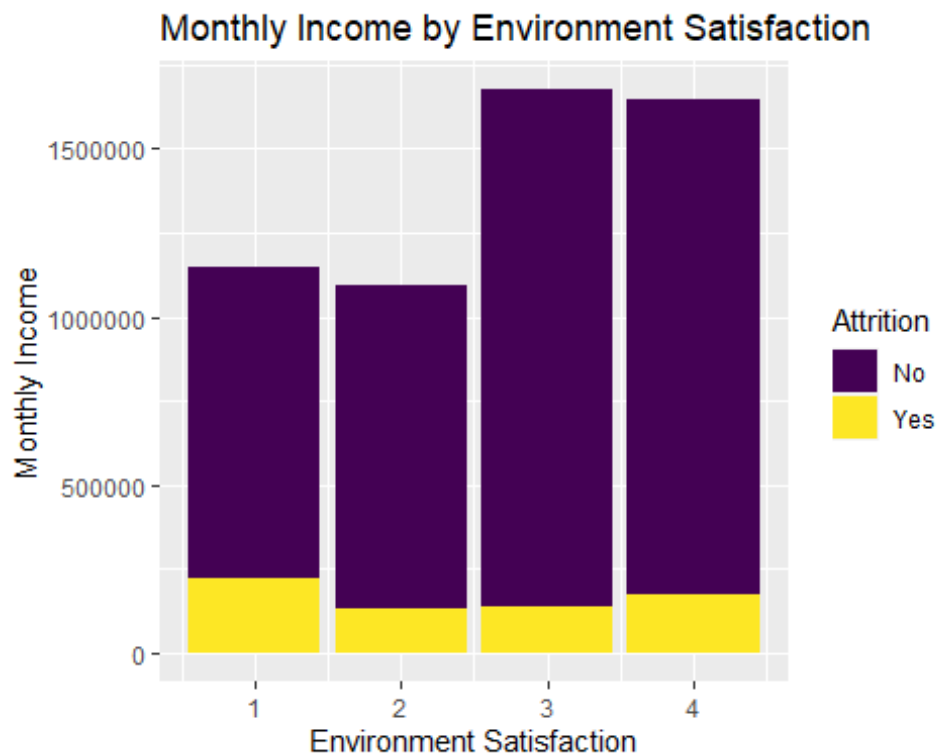
*#Monthly Income is the highest for Life sciences & Medical and Human resource s is the least.*

*#Monthly Income Vs Environment Satisfaction*

```

Emp1 %>%
  ggplot(aes(x=Environment.Satisfaction,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Environment Satisfacti
on")+
  ggtitle("Monthly Income by Environment Satisfaction")

```

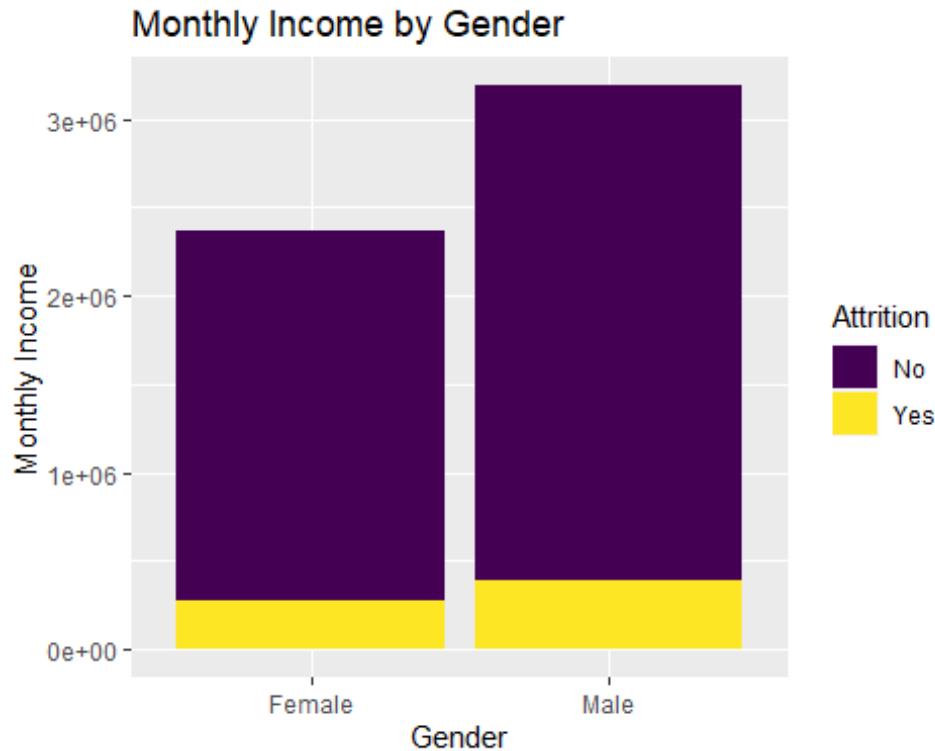


*#Monthly Income is the highest for Environment Satisfaction is 3 & 4*

*#Monthly Income Vs Gender*

Emp1 %>%

```
ggplot(aes(x=Gender,y=Monthly.Income,fill=Attrition )) +  
geom_col() +  
scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Gender")+  
ggtitle("Monthly Income by Gender")
```



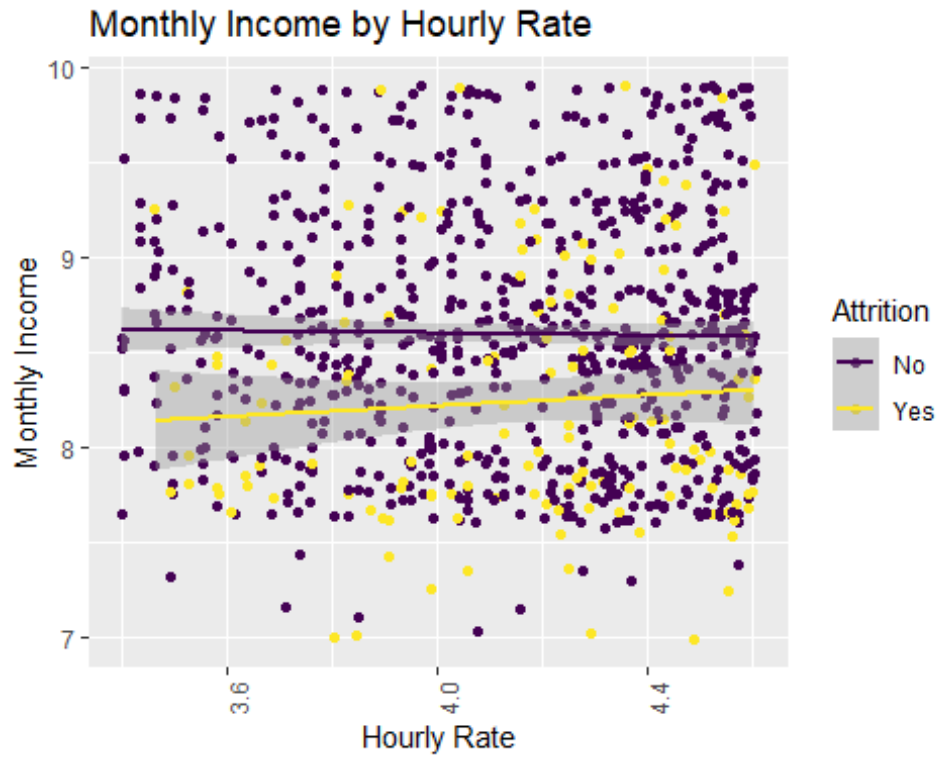
*#Monthly Income is the higher for Male than Female*

*#Monthly Income Vs Hourly Rate*

Emp1 %>%

```
ggplot(aes(x=log(Hourly.Rate), y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = 'lm') + ylab("Monthly Income")
+ xlab("Hourly Rate") +
  ggtitle("Monthly Income by Hourly Rate") + theme(axis.text.x = element_text(
angle=90, hjust=1))
```

## `geom\_smooth()` using formula 'y ~ x'

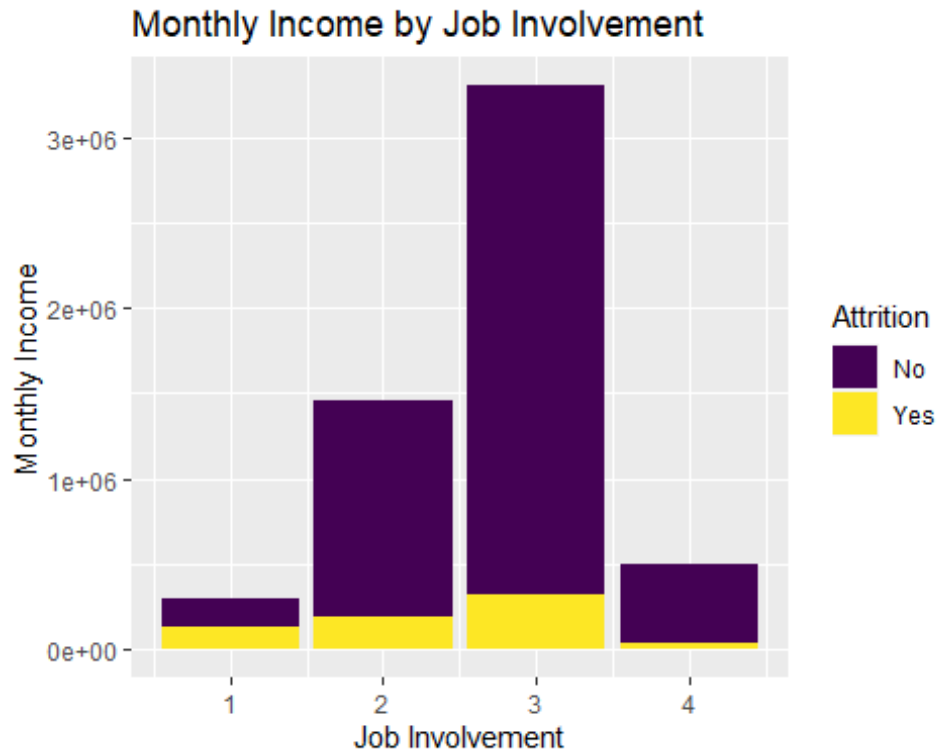


*#Monthly Income and Hourly rate are not co-related to each other*

*#Monthly Income Vs Job Involvement*

Emp1 %>%

```
ggplot(aes(x=Job.Involvement,y=Monthly.Income,fill=Attrition )) +  
geom_col() +  
scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Job Involvement")+  
ggtitle("Monthly Income by Job Involvement")
```

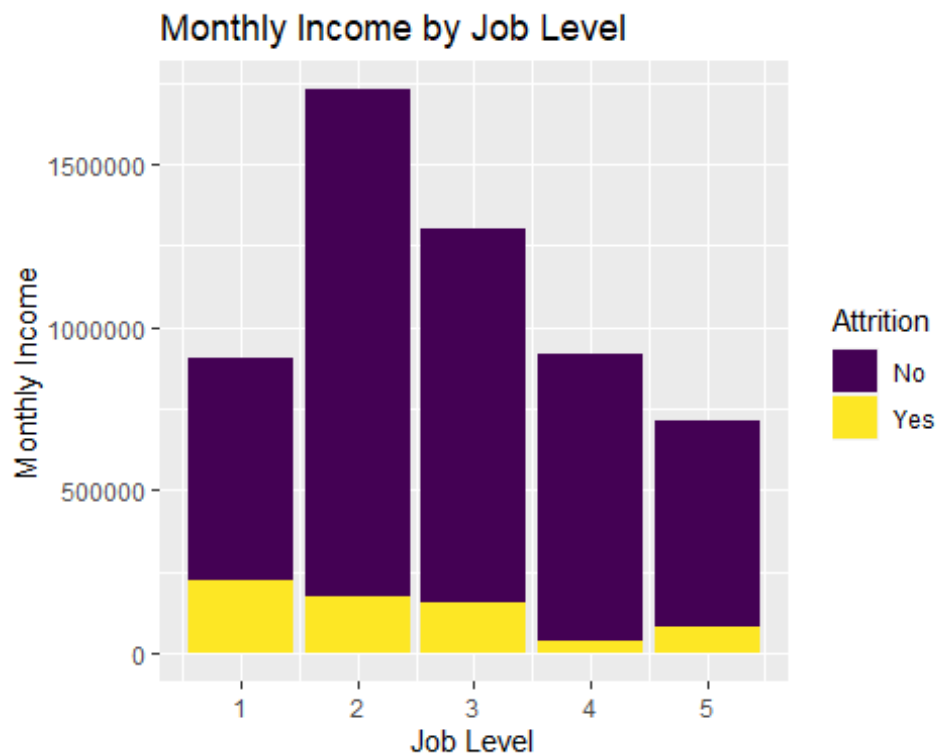


*#Monthly Income is the highest for Job involvement 3 and Least for job involvement 1. Job attrition rate is highest for Job involvement for 1.*

*#Monthly Income Vs Job Level*

```
Emp1 %>%
  ggplot(aes(x=Job.Level,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Job Level")+
  ggtitle("Monthly Income by Job Level")
```

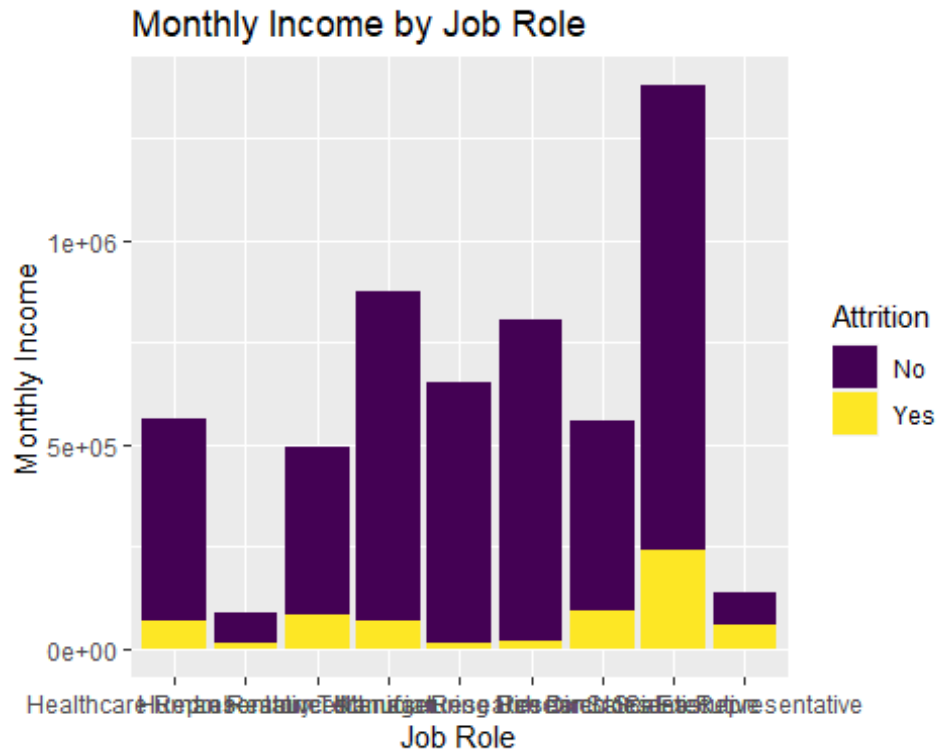




*#Monthly Income is the highest for Job Level 2&3 and Least for job Level 5. Job level attrition rate is highest for Job Level 1.*

*#Monthly Income Vs Job Role*

```
Empl %>%
  ggplot(aes(x=Job.Role,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Job Role")+
  ggtitle("Monthly Income by Job Role")
```

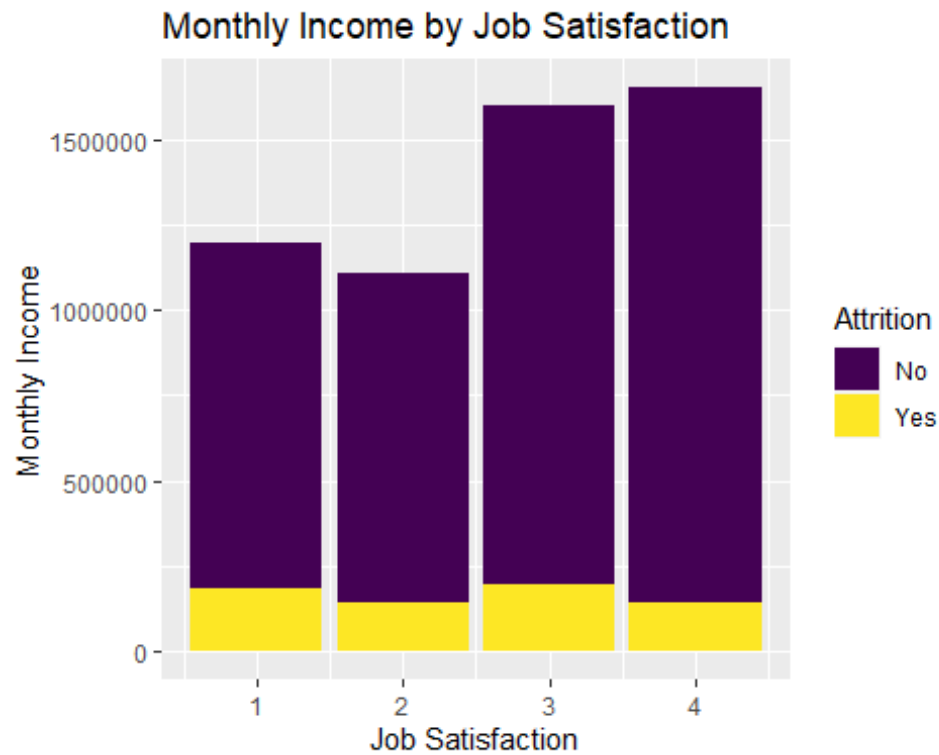


*#Monthly Income is the highest for Sales Executive, Manager and Research Director and Least for Human resource and Sales Rep. We understand that the attrition rate is highest for Human resources and Sales Rep.*

*#Monthly Income Vs Job Satisfaction*

Empl %>%

```
ggplot(aes(x=Job.Satisfaction,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Job Satisfaction")+
  ggtitle("Monthly Income by Job Satisfaction")
```

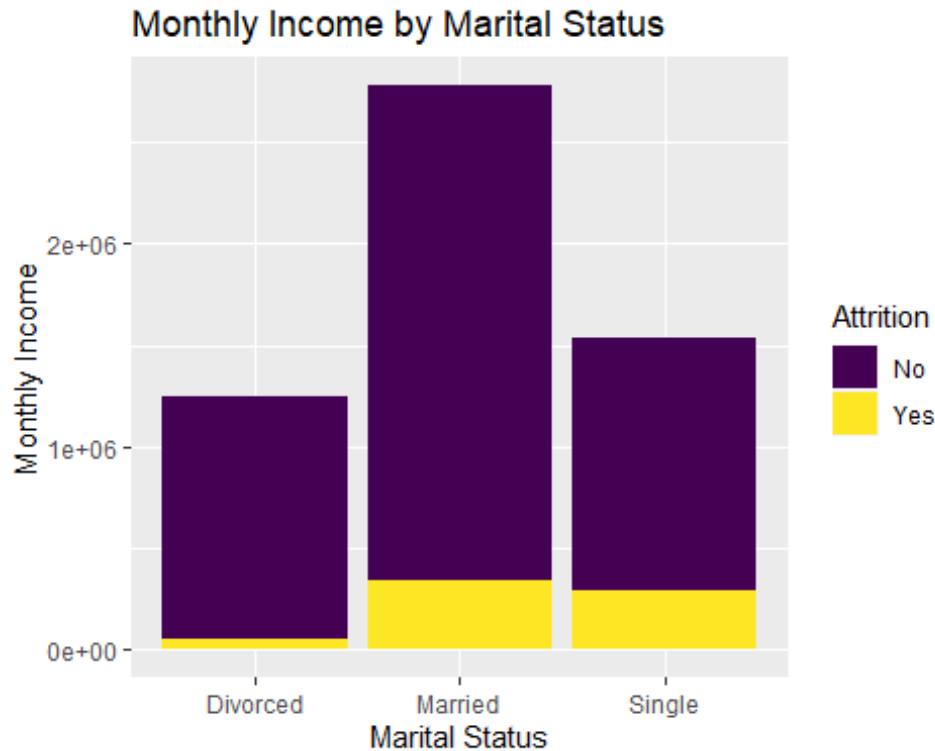


*#Monthly Income is the highest for Job Satisfaction 3 & 4*

*#Monthly Income Vs Marital Status*

Emp1 %>%

```
ggplot(aes(x=Marital.Status,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Marital Status")+
  ggtitle("Monthly Income by Marital Status")
```



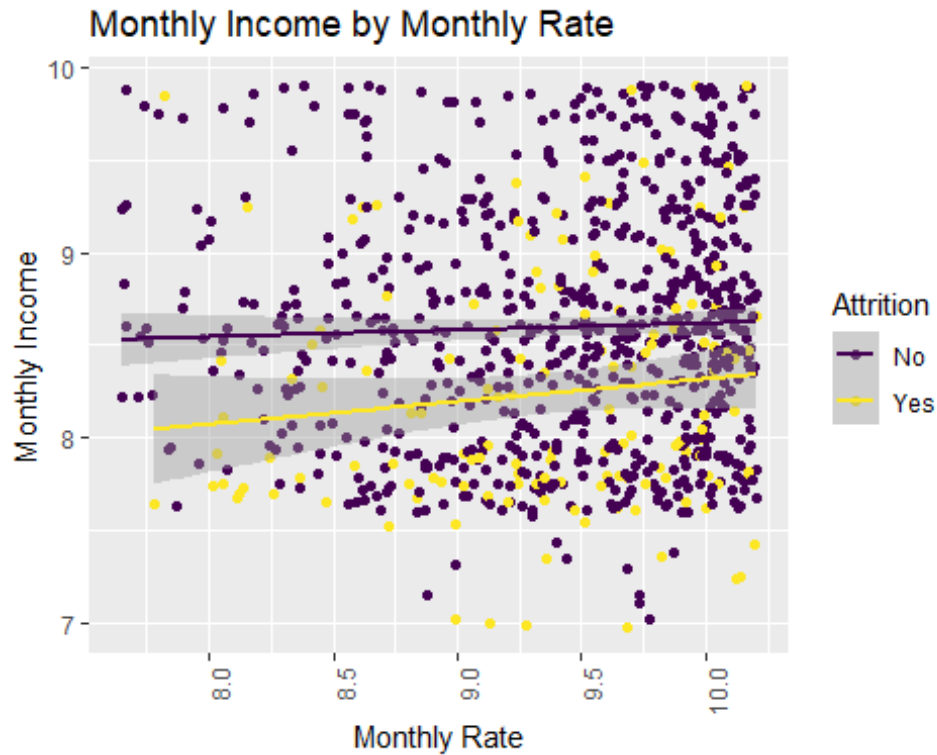
*#Monthly Income is the higher for Married and Least for divorced.*

*#Monthly Income Vs Monthly Rate*

Emp1 %>%

```
ggplot(aes(x=log(Monthly.Rate), y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = 'lm') + ylab("Monthly Income")
+ xlab("Monthly Rate") +
  ggtitle("Monthly Income by Monthly Rate") + theme(axis.text.x = element_text
(angle=90, hjust=1))
```

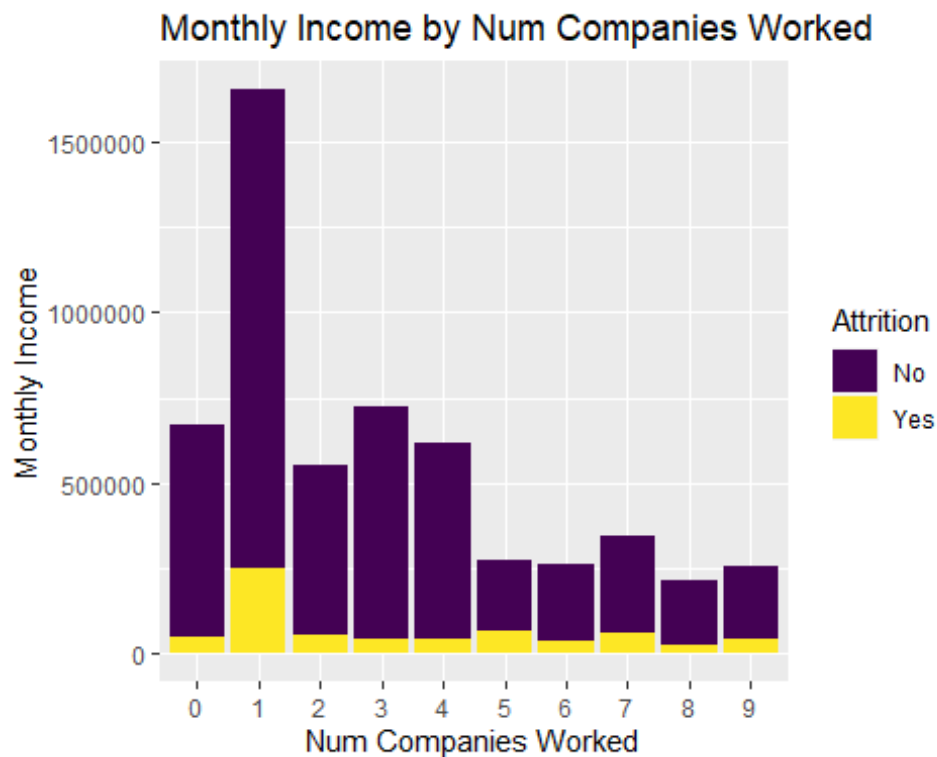
## `geom\_smooth()` using formula 'y ~ x'



*#Monthly Income and Hourly rate are not co-related to each other*

*#Monthly Income Vs Num Companies Worked*

```
Emp1 %>%
  ggplot(aes(x=as.factor(Num.Companies.Worked),y=Monthly.Income,fill=Attrition)) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Num Companies Worked")
+
  ggtitle("Monthly Income by Num Companies Worked")
```

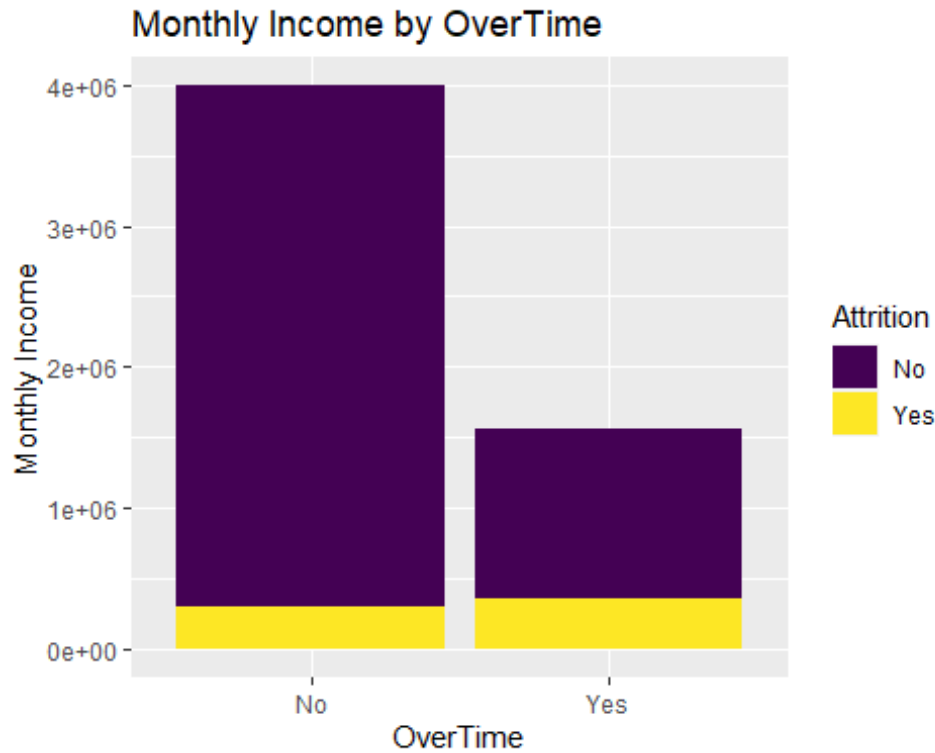


*#Monthly Income is the highest for those who worked in 1 company*

*#Monthly Income Vs OverTime*

Emp1 %>%

```
ggplot(aes(x=OverTime,y=Monthly.Income,fill=Attrition )) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("OverTime")+
  ggtitle("Monthly Income by OverTime")
```



*#Monthly Income is the higher for those who worked overtime.*

*#Monthly Income Vs Percent Salary Hike*

Emp1 %>%

```
ggplot(aes(x=log(Percent.Salary.Hike), y=log(Monthly.Income), color=Attrition)) +
```

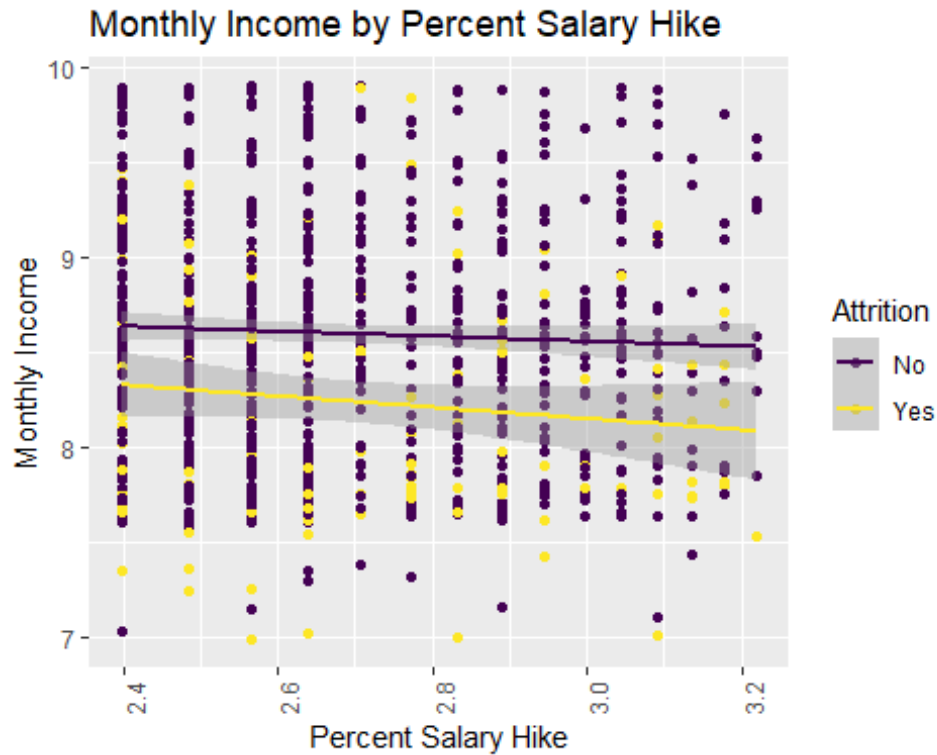
```
  geom_point() +
```

```
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
```

```
+ xlab("Percent Salary Hike") +
```

```
  ggtitle("Monthly Income by Percent Salary Hike") + theme(axis.text.x = element_text(angle=90, hjust=1))
```

```
## `geom_smooth()` using formula 'y ~ x'
```



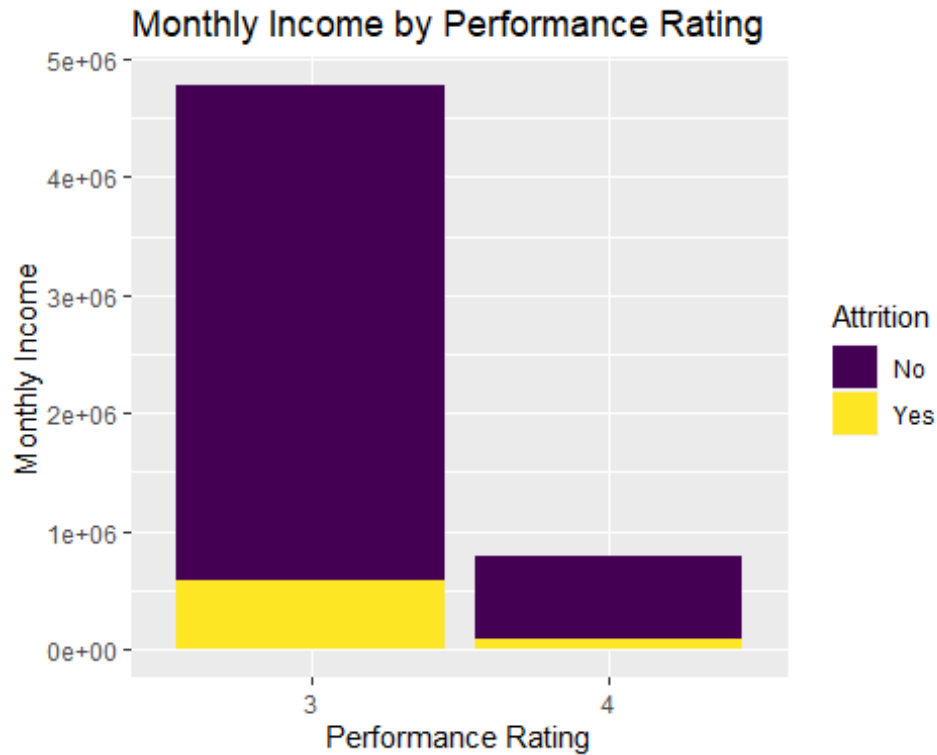
*#Monthly Income and Percent Salary Hike are not co-related to each other*

*#Monthly Income Vs Performance Rating*

Emp1 %>%

```
ggplot(aes(x=as.factor(Performance.Rating),y=Monthly.Income,fill=Attrition)) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Performance Rating")+
  ggtitle("Monthly Income by Performance Rating")
```

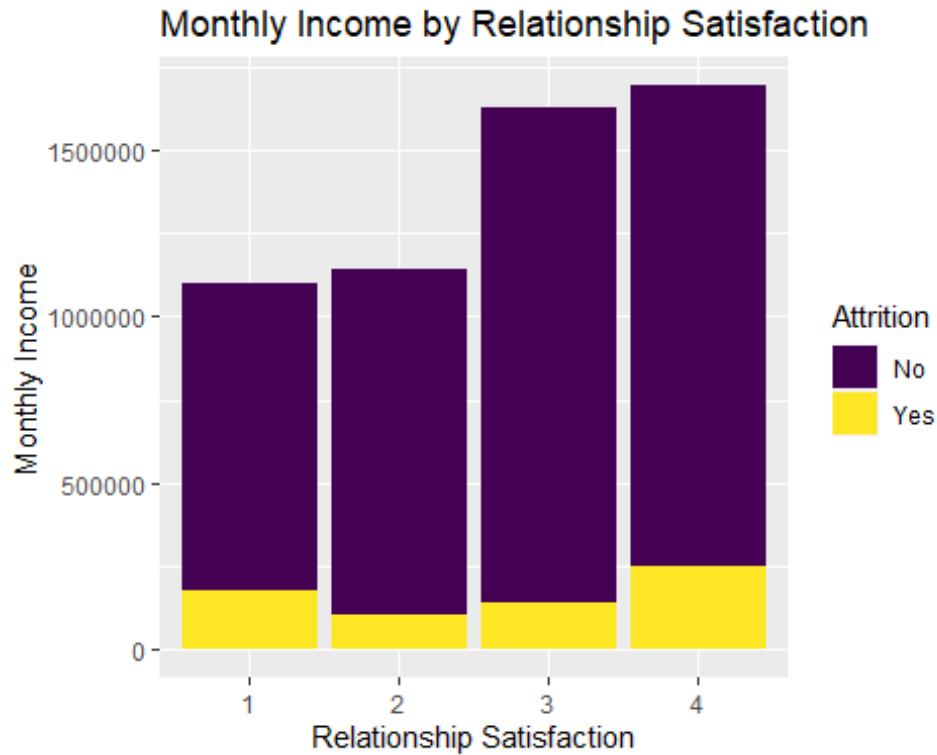




*#Monthly Income is the highest for those who have a performance rating 3.*

*#Monthly Income Vs Relationship Satisfaction*

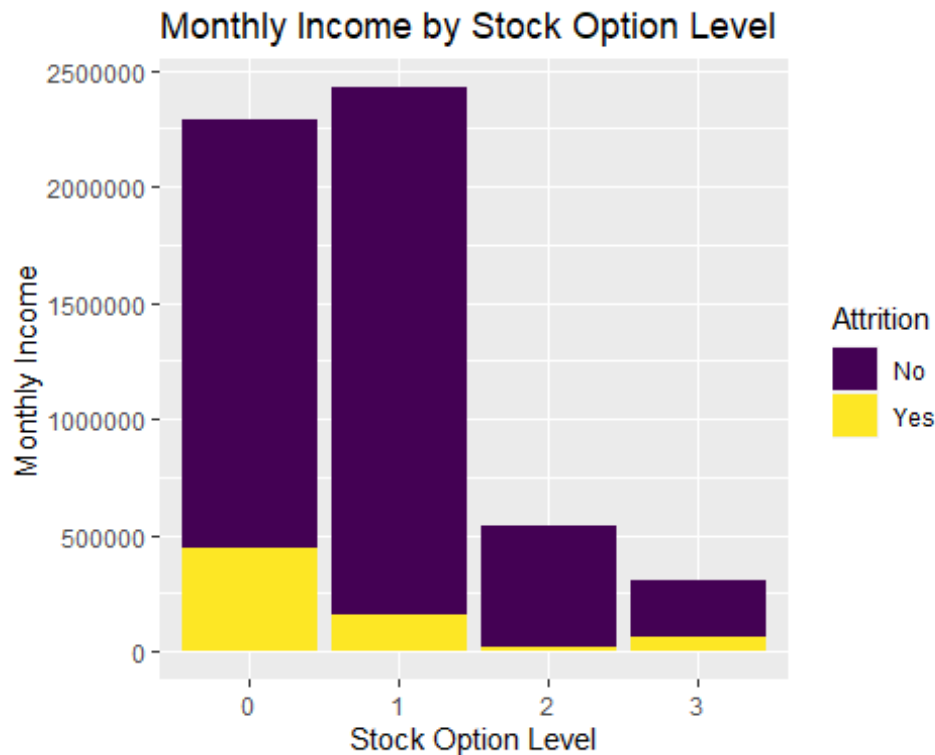
```
Emp1 %>%
  ggplot(aes(x=as.factor(Relationship.Satisfaction),y=Monthly.Income,fill=Attrition)) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Relationship Satisfaction")+
  ggtitle("Monthly Income by Relationship Satisfaction")
```



*#Monthly Income is the highest for those who have a Relationship Satisfaction 3&4.*

*#Monthly Income Vs Stock Option Level*

```
Emp1 %>%
  ggplot(aes(x=as.factor(Stock.Option.Level),y=Monthly.Income,fill=Attrition
)) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Stock Option Level")+
  ggtitle("Monthly Income by Stock Option Level")
```



*#Monthly Income is the highest for those who have a Stock Option Level 0 & 1.*

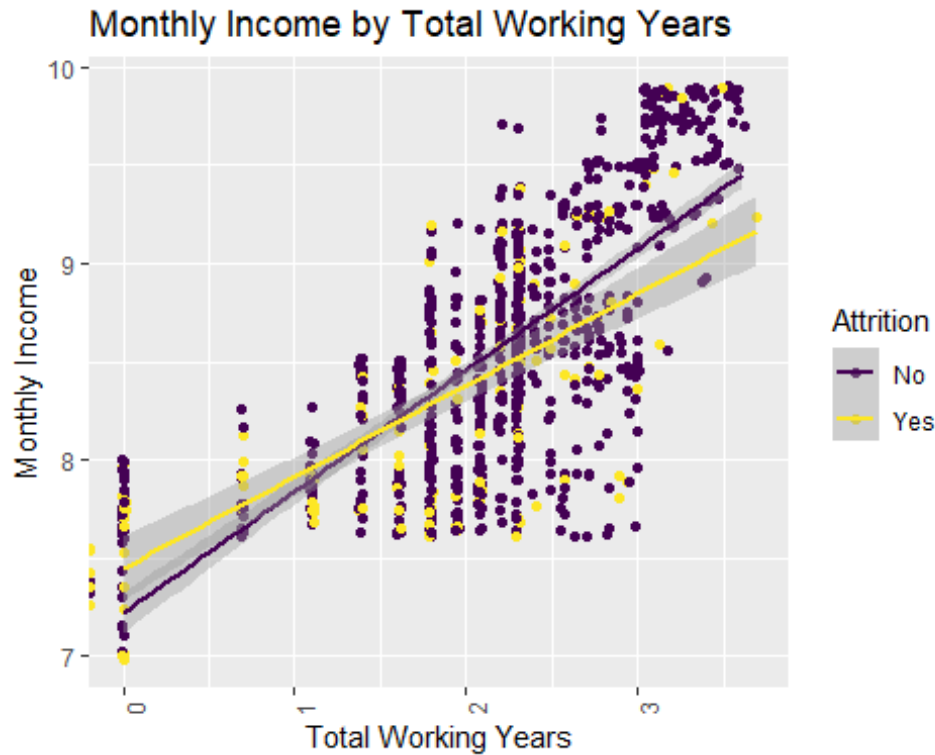
*#Monthly Income Vs Total Working Years*

Emp1 %>%

```
ggplot(aes(x=log(Total.Working.Years), y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Total Working Years") +
  ggtitle("Monthly Income by Total Working Years") + theme(axis.text.x = element_text(angle=90, hjust=1))
```

## `geom\_smooth()` using formula 'y ~ x'

## Warning: Removed 7 rows containing non-finite values (stat\_smooth).



*#Monthly Income and Total Working Years are linearly co-related to each other*

*#Monthly Income Vs Training Times Last Year*

Empl %>%

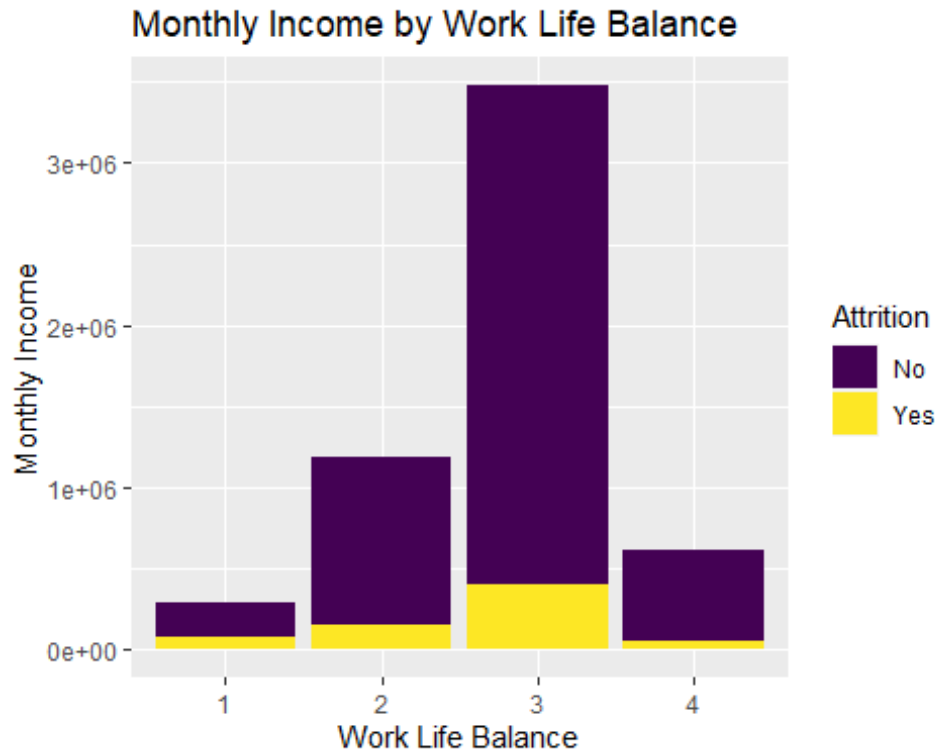
```
ggplot(aes(x=as.factor(Training.Times.Last.Year),y=Monthly.Income,fill=Attrition)) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Training Times Last Year")+
  ggtitle("Monthly Income by Training Times Last Year")
```



*#Monthly Income is the highest for those who have a Training Times Last Year 2&3.*

*#Monthly Income Vs Work Life Balance*

```
Emp1 %>%
  ggplot(aes(x=as.factor(Work.Life.Balance),y=Monthly.Income,fill=Attrition ))
) +
  geom_col() +
  scale_fill_viridis_d()+ylab("Monthly Income") +xlab("Work Life Balance")+
  ggtitle("Monthly Income by Work Life Balance")
```



*#Monthly Income is the higher for those who have a Work Life Balance 3.*

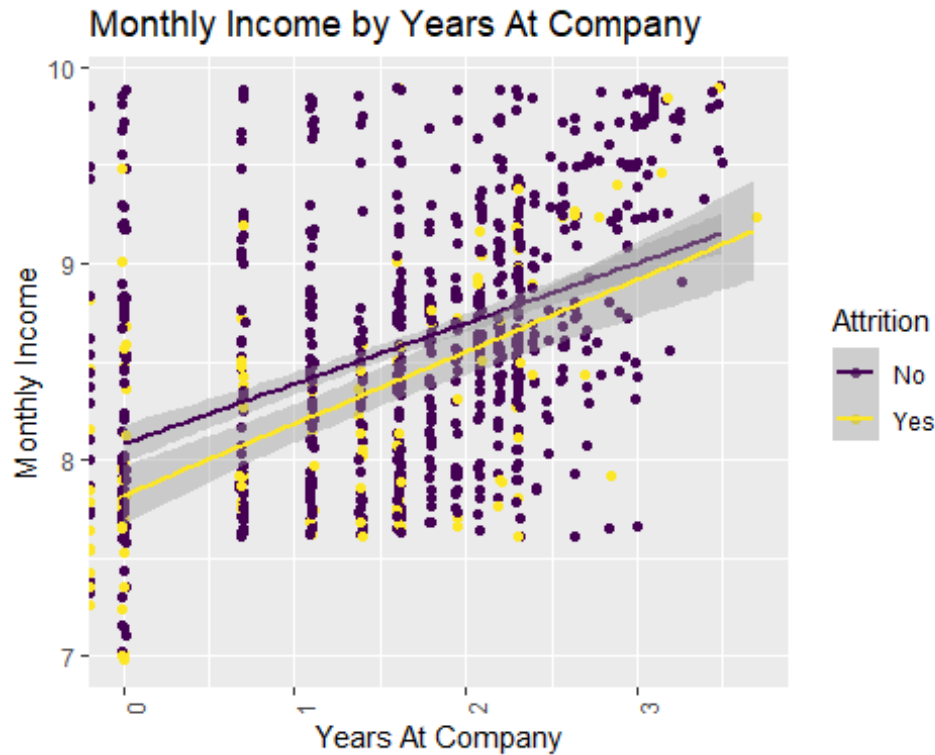
*#Monthly Income Vs Years At Company*

Emp1 %>%

```
ggplot(aes(x=log(Years.At.Company), y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Years At Company") +
  ggtitle("Monthly Income by Years At Company") + theme(axis.text.x = element_
text(angle=90, hjust=1))
```

## `geom\_smooth()` using formula 'y ~ x'

## Warning: Removed 28 rows containing non-finite values (stat\_smooth).



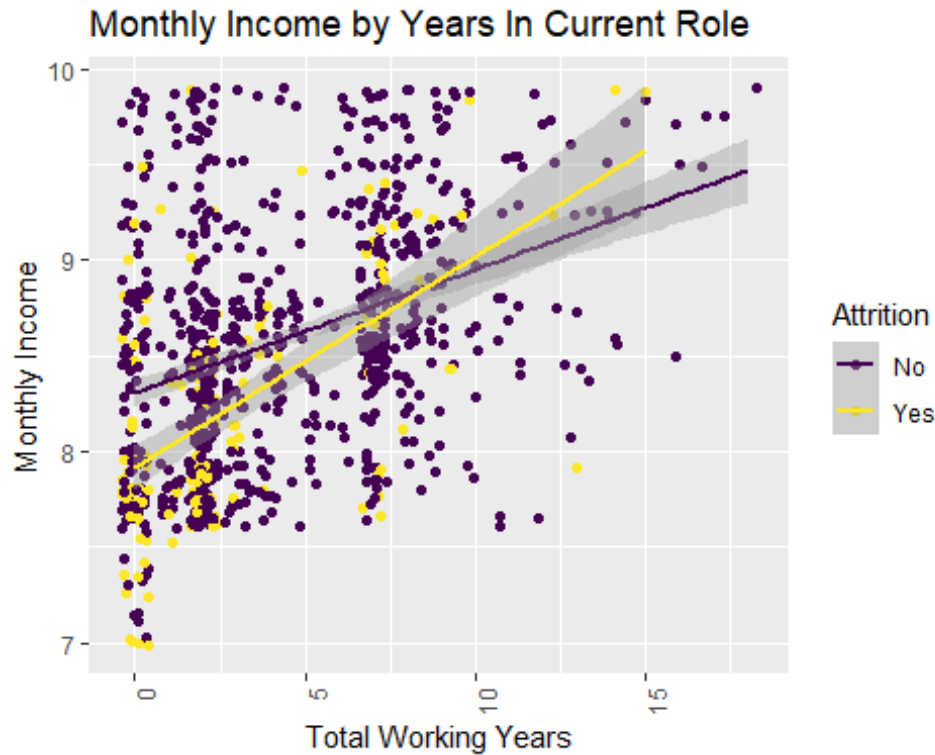
*#Monthly Income and Total Working Years are linearly co-related to each other*

*#Monthly Income Vs Years In Current Role*

Emp1 %>%

```
ggplot(aes(x=Years.In.Current.Role, y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Total Working Years") +
  ggtitle("Monthly Income by Years In Current Role") + theme(axis.text.x = element_text(angle=90, hjust=1))
```

## `geom\_smooth()` using formula 'y ~ x'



*#Monthly Income and Years In Current Role are linearly co-related to each other*

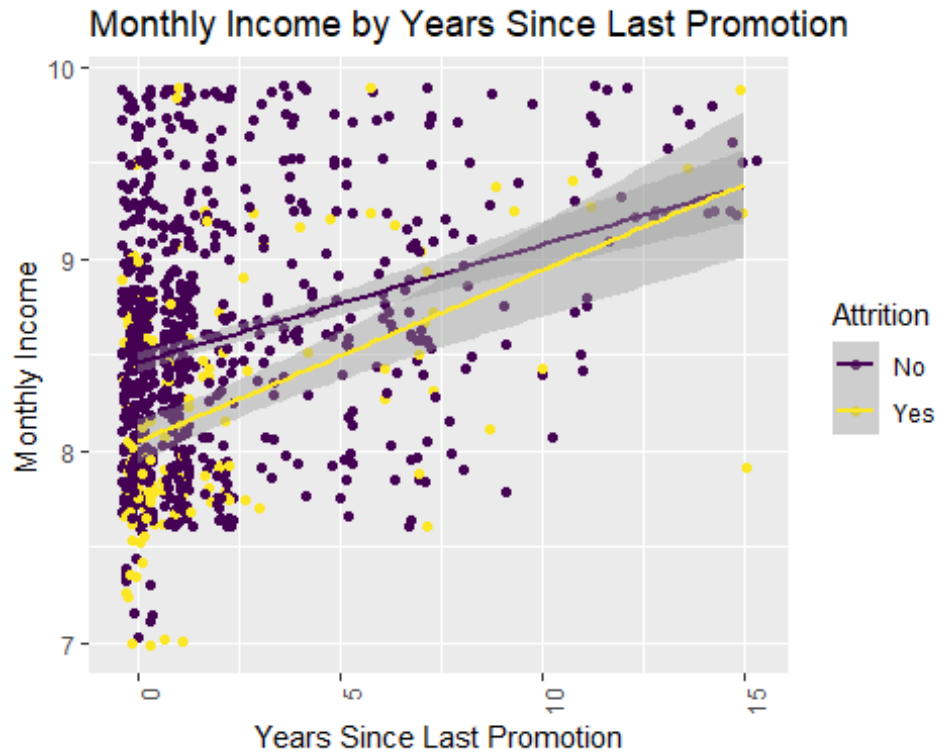
*#Monthly Income Vs Years Since Last Promotion*

Empl %>%

```
ggplot(aes(x=Years.Since.Last.Promotion, y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Years Since Last Promotion") +
  ggtitle("Monthly Income by Years Since Last Promotion") + theme(axis.text.x
= element_text(angle=90, hjust=1))
```

## `geom\_smooth()` using formula 'y ~ x'



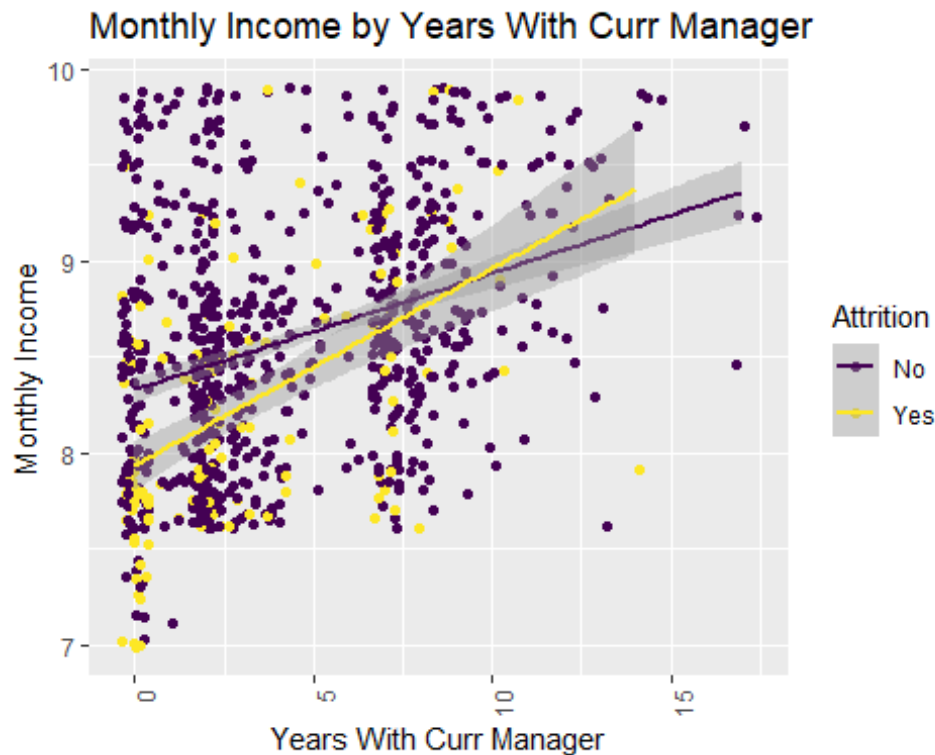


*#Monthly Income and Years Since Last Promotion are linearly co-related to each other*

*#Monthly Income Vs Years With Curr Manager*

```
Emp1 %>%
  ggplot(aes(x=Years.With.Curr.Manager, y=log(Monthly.Income), color=Attrition)) +
  geom_point(position="jitter") +
  scale_color_viridis_d() + geom_smooth(method = "lm") + ylab("Monthly Income")
+ xlab("Years With Curr Manager") +
  ggtitle("Monthly Income by Years With Curr Manager") + theme(axis.text.x = element_text(angle=90, hjust=1))

## `geom_smooth()` using formula 'y ~ x'
```



*#Monthly Income and Years With Current Manager are linearly co-related to each other*

Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.

*#The outlier seen is at working years = 40. Removing the outlier.*

```
Empl = subset(Empl, Total.Working.Years != 40)
```

```
str(Empl)
```

```
## 'data.frame': 869 obs. of 36 variables:
## $ ID : int 1 2 3 4 5 6 7 8 9 10 ...
## $ Age : int 32 40 35 32 24 27 41 37 34 34 ...
## $ Attrition : chr "No" "No" "No" "No" ...
## $ BusinessTravel : chr "Travel_Rarely" "Travel_Rarely" "Travel_Frequently" "Travel_Rarely" ...
## $ Daily.Rate : int 117 1308 200 801 567 294 1283 309 1333 653 ...
## $ Department : chr "Sales" "Research & Development" "Research & Development" "Sales" ...
## $ Distance.From.Home : int 13 14 18 1 2 10 5 10 10 10 ...
## $ Education : int 4 3 2 4 1 2 5 4 4 4 ...
## $ EducationField : chr "Life Sciences" "Medical" "Life Sciences" "Marketing" ...
## $ Employee.Count : int 1 1 1 1 1 1 1 1 1 1 ...
## $ Employee.Number : int 859 1128 1412 2016 1646 733 1448 1105 1055 1597 ...
```

```
## $ Environment.Satisfaction : int 2 3 3 3 1 4 2 4 3 4 ...
## $ Gender                  : chr  "Male" "Male" "Male" "Female" ...
## $ Hourly.Rate             : int  73 44 60 48 32 32 90 88 87 92 ...
## $ Job.Involvement         : int  3 2 3 3 3 3 4 2 3 2 ...
## $ Job.Level               : int  2 5 3 3 1 3 1 2 1 2 ...
## $ Job.Role                : chr  "Sales Executive" "Research Director"
"Manufacturing Director" "Sales Executive" ...
## $ Job.Satisfaction        : int  4 3 4 4 4 1 3 4 3 3 ...
## $ Marital.Status          : chr  "Divorced" "Single" "Single" "Married"
...
## $ Monthly.Income         : int  4403 19626 9362 10422 3760 8793 2127 6
694 2220 5063 ...
## $ Monthly.Rate           : int  9250 17544 19944 24032 17218 4809 5561
24223 18410 15332 ...
## $ Num.Companies.Worked   : int  2 1 2 1 1 1 2 2 1 1 ...
## $ Over18                 : chr  "Y" "Y" "Y" "Y" ...
## $ OverTime               : chr  "No" "No" "No" "No" ...
## $ Percent.Salary.Hike    : int  11 14 11 19 13 21 12 14 19 14 ...
## $ Performance.Rating     : int  3 3 3 3 3 4 3 3 3 3 ...
## $ Relationship.Satisfaction : int  3 1 3 3 3 3 1 3 4 2 ...
## $ Standard.Hours         : int  80 80 80 80 80 80 80 80 80 80 ...
## $ Stock.Option.Level     : int  1 0 0 2 0 2 0 3 1 1 ...
## $ Total.Working.Years     : int  8 21 10 14 6 9 7 8 1 8 ...
## $ Training.Times.Last.Year : int  3 2 2 3 2 4 5 5 2 3 ...
## $ Work.Life.Balance       : int  2 4 3 3 3 2 2 3 3 2 ...
## $ Years.At.Company        : int  5 20 2 14 6 9 4 1 1 8 ...
## $ Years.In.Current.Role   : int  2 7 2 10 3 7 2 0 1 2 ...
## $ Years.Since.Last.Promotion: int  0 4 2 5 1 1 0 0 0 7 ...
## $ Years.With.Curr.Manager : int  3 9 2 7 3 7 3 0 0 7 ...
```

```
# Correlations between continuous variable
```

```
# Exploring multicollinearity
```

```
#str(Emp1)
```

```
#pairs(Emp1[,c(2,5,7,8,10,11,12,14,15,16,18,20,21,22,25,26,27,28,29,30,31,32,
33,34,35)])
```

```
#my.cor<-cor(Emp1[,c(2,5,7,8,10,11,12,14,15,16,18,20,21,22,25,26,27,28,29,30,
31,32,33,34,35)])
```

```
#my.cor
```

```
#ggcorrplot(my.cor, type = "lower",
```

```
#      lab = TRUE, lab_size = 3, method = "circle",
```

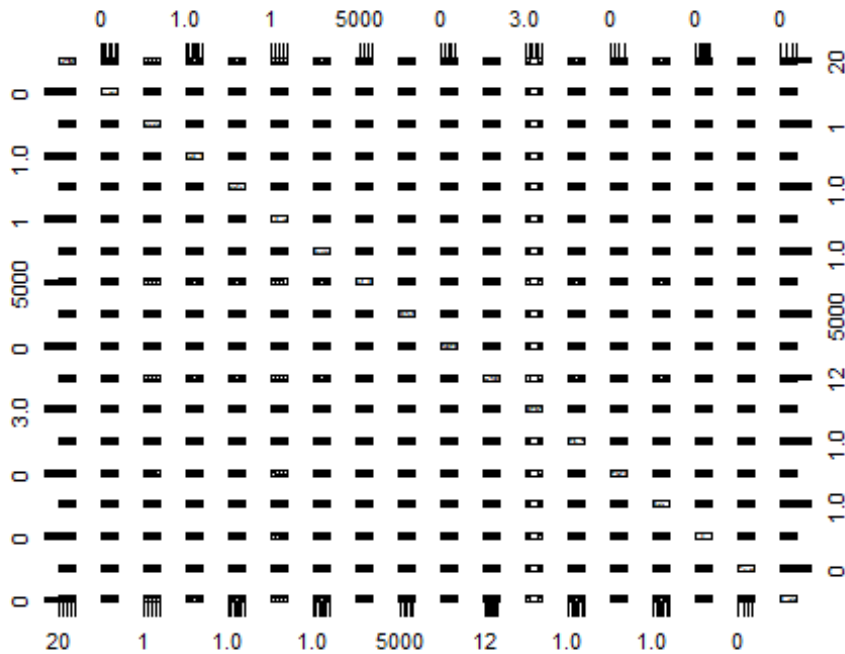
```
#      colors = c("tomato2", "white", "springgreen3"),
```

```
#      title = "Correlations of all relevant variables",
```

```
#      ggtheme = theme_bw())
```

```
#Selecting certain predictors to look at it more closely
```

```
pairs(Emp1[,c(2,7,8,12,15,16,18,20,21,22,25,26,27,30,32,33,34,35)])
```



```
my.cor<-cor(Emp1[,c(2,7,8,12,15,16,18,20,21,22,25,26,27,30,32,33,34,35)])
my.cor
```

```
##              Age Distance.From.Home      Education
## Age          1.000000000      0.002069392  0.215196241
## Distance.From.Home 0.002069392      1.000000000  0.047544174
## Education         0.215196241      0.047544174  1.000000000
## Environment.Satisfaction -0.010721660     -0.041085710 -0.038045747
## Job.Involvement    0.015047697     -0.005047646  0.031792042
## Job.Level         0.478782583      0.020063616  0.129439074
## Job.Satisfaction   -0.025631156     -0.023515027  0.011694707
## Monthly.Income     0.483729748     -0.008334054  0.126212656
## Monthly.Rate       0.076265691     -0.004898324 -0.018330046
## Num.Companies.Worked 0.296437055     -0.047673812  0.161917633
## Percent.Salary.Hike -0.028530119      0.056093340 -0.001311187
## Performance.Rating -0.040063842      0.034066750 -0.027549219
## Relationship.Satisfaction -0.008580424      0.034048088 -0.027208799
## Total.Working.Years  0.649755831     -0.003299314  0.142595553
## Work.Life.Balance   -0.009266554     -0.011724058  0.011197978
## Years.At.Company    0.280343918     -0.032055486  0.056204592
## Years.In.Current.Role 0.204962168     -0.011523497  0.059537610
## Years.Since.Last.Promotion 0.208818063     -0.024656956  0.063989027
##
##              Environment.Satisfaction Job.Involvement
## Age          -0.0107216602      1.504770e-02
## Distance.From.Home -0.0410857098     -5.047646e-03
## Education      -0.0380457468      3.179204e-02
## Environment.Satisfaction 1.0000000000     -5.705592e-04
```

## Job.Involvement	-0.0005705592	1.000000e+00
## Job.Level	-0.0010465930	-1.628360e-02
## Job.Satisfaction	-0.0200244595	-5.352090e-02
## Monthly.Income	-0.0180605258	6.053562e-05
## Monthly.Rate	0.0614903603	-1.760747e-02
## Num.Companies.Worked	0.0138936263	-5.304873e-03
## Percent.Salary.Hike	0.0023270860	1.473049e-02
## Performance.Rating	-0.0039531099	1.188263e-02
## Relationship.Satisfaction	0.0029589609	1.633697e-02
## Total.Working.Years	-0.0254390502	-1.587147e-02
## Work.Life.Balance	0.0857434936	8.240384e-03
## Years.At.Company	-0.0229894555	-4.487420e-02
## Years.In.Current.Role	0.0203689384	1.246755e-02
## Years.Since.Last.Promotion	0.0037330100	-3.256581e-02
##	Job.Level	Job.Satisfaction
## Age	0.478782583	-0.025631156
## Distance.From.Home	0.020063616	-0.023515027
## Education	0.129439074	0.011694707
## Environment.Satisfaction	-0.001046593	-0.020024460
## Job.Involvement	-0.016283600	-0.053520903
## Job.Level	1.000000000	-0.051545135
## Job.Satisfaction	-0.051545135	1.000000000
## Monthly.Income	0.951598568	-0.054351437
## Monthly.Rate	0.076141925	0.027235397
## Num.Companies.Worked	0.141632633	-0.074917017
## Percent.Salary.Hike	-0.061437303	0.013144833
## Performance.Rating	-0.038288524	-0.004081496
## Relationship.Satisfaction	-0.006019041	-0.035480664
## Total.Working.Years	0.783919103	-0.054935357
## Work.Life.Balance	0.031434618	-0.025042242
## Years.At.Company	0.524417261	0.021433839
## Years.In.Current.Role	0.390432917	-0.005609015
## Years.Since.Last.Promotion	0.329585877	-0.027448148
##	Monthly.Rate	Num.Companies.Worked
## Age	0.0762656905	0.296437055
## Distance.From.Home	-0.0048983236	-0.047673812
## Education	-0.0183300460	0.161917633
## Environment.Satisfaction	0.0614903603	0.013893626
## Job.Involvement	-0.0176074678	-0.005304873
## Job.Level	0.0761419252	0.141632633
## Job.Satisfaction	0.0272353972	-0.074917017
## Monthly.Income	0.0662122975	0.156675952
## Monthly.Rate	1.0000000000	0.015572413
## Num.Companies.Worked	0.0155724126	1.000000000
## Percent.Salary.Hike	0.0001104432	-0.023138141
## Performance.Rating	-0.0040384133	-0.029651500
## Relationship.Satisfaction	-0.0219871151	0.043019573
## Total.Working.Years	0.0653192521	0.263475297
## Work.Life.Balance	0.0045871950	0.020469386
## Years.At.Company	-0.0085418040	-0.140182905

## Years.In.Current.Role	0.0281004602	-0.102734684
## Years.Since.Last.Promotion	0.0147383500	-0.068701405
##	Percent.Salary.Hike	Performance.Rating
## Age	-0.0285301192	-0.040063842
## Distance.From.Home	0.0560933405	0.034066750
## Education	-0.0013111869	-0.027549219
## Environment.Satisfaction	0.0023270860	-0.003953110
## Job.Involvement	0.0147304876	0.011882630
## Job.Level	-0.0614373033	-0.038288524
## Job.Satisfaction	0.0131448327	-0.004081496
## Monthly.Income	-0.0530557658	-0.042737946
## Monthly.Rate	0.0001104432	-0.004038413
## Num.Companies.Worked	-0.0231381410	-0.029651500
## Percent.Salary.Hike	1.0000000000	0.775047506
## Performance.Rating	0.7750475064	1.0000000000
## Relationship.Satisfaction	-0.0445999644	-0.029435279
## Total.Working.Years	-0.0609902470	-0.039847441
## Work.Life.Balance	0.0063818080	0.016713047
## Years.At.Company	-0.0529252300	-0.024374855
## Years.In.Current.Role	-0.0213789386	0.009593141
## Years.Since.Last.Promotion	-0.0706947911	-0.034900362
##	Relationship.Satisfaction	Total.Working.Years
## Age	-0.008580424	0.649755831
## Distance.From.Home	0.034048088	-0.003299314
## Education	-0.027208799	0.142595553
## Environment.Satisfaction	0.002958961	-0.025439050
## Job.Involvement	0.016336970	-0.015871470
## Job.Level	-0.006019041	0.783919103
## Job.Satisfaction	-0.035480664	-0.054935357
## Monthly.Income	-0.005043381	0.781762933
## Monthly.Rate	-0.021987115	0.065319252
## Num.Companies.Worked	0.043019573	0.263475297
## Percent.Salary.Hike	-0.044599964	-0.060990247
## Performance.Rating	-0.029435279	-0.039847441
## Relationship.Satisfaction	1.0000000000	-0.022996683
## Total.Working.Years	-0.022996683	1.0000000000
## Work.Life.Balance	0.038646267	0.023818009
## Years.At.Company	0.000981254	0.628015570
## Years.In.Current.Role	-0.003256904	0.484383538
## Years.Since.Last.Promotion	0.026967646	0.435760094
##	Work.Life.Balance	Years.At.Company
## Age	-0.009266554	0.280343918
## Distance.From.Home	-0.011724058	-0.032055486
## Education	0.011197978	0.056204592
## Environment.Satisfaction	0.085743494	-0.022989455
## Job.Involvement	0.008240384	-0.044874197
## Job.Level	0.031434618	0.524417261
## Job.Satisfaction	-0.025042242	0.021433839
## Monthly.Income	0.021908082	0.494848734
## Monthly.Rate	0.004587195	-0.008541804

## Num.Companies.Worked	0.020469386	-0.140182905
## Percent.Salary.Hike	0.006381808	-0.052925230
## Performance.Rating	0.016713047	-0.024374855
## Relationship.Satisfaction	0.038646267	0.000981254
## Total.Working.Years	0.023818009	0.628015570
## Work.Life.Balance	1.000000000	0.037086536
## Years.At.Company	0.037086536	1.000000000
## Years.In.Current.Role	0.084300660	0.780833009
## Years.Since.Last.Promotion	0.047222638	0.635551862
##	Years.In.Current.Role	Years.Since.Last.Promotion
## Age	0.204962168	0.2088180
## Distance.From.Home	-0.011523497	-0.0246569
## Education	0.059537610	0.0639890
## Environment.Satisfaction	0.020368938	0.0037330
## Job.Involvement	0.012467553	-0.0325658
## Job.Level	0.390432917	0.3295858
## Job.Satisfaction	-0.005609015	-0.0274481
## Monthly.Income	0.360954380	0.3150421
## Monthly.Rate	0.028100460	0.0147383
## Num.Companies.Worked	-0.102734684	-0.0687014
## Percent.Salary.Hike	-0.021378939	-0.0706947
## Performance.Rating	0.009593141	-0.0349003
## Relationship.Satisfaction	-0.003256904	0.0269676
## Total.Working.Years	0.484383538	0.4357600
## Work.Life.Balance	0.084300660	0.0472226
## Years.At.Company	0.780833009	0.6355518
## Years.In.Current.Role	1.000000000	0.5523058
## Years.Since.Last.Promotion	0.552305881	1.0000000

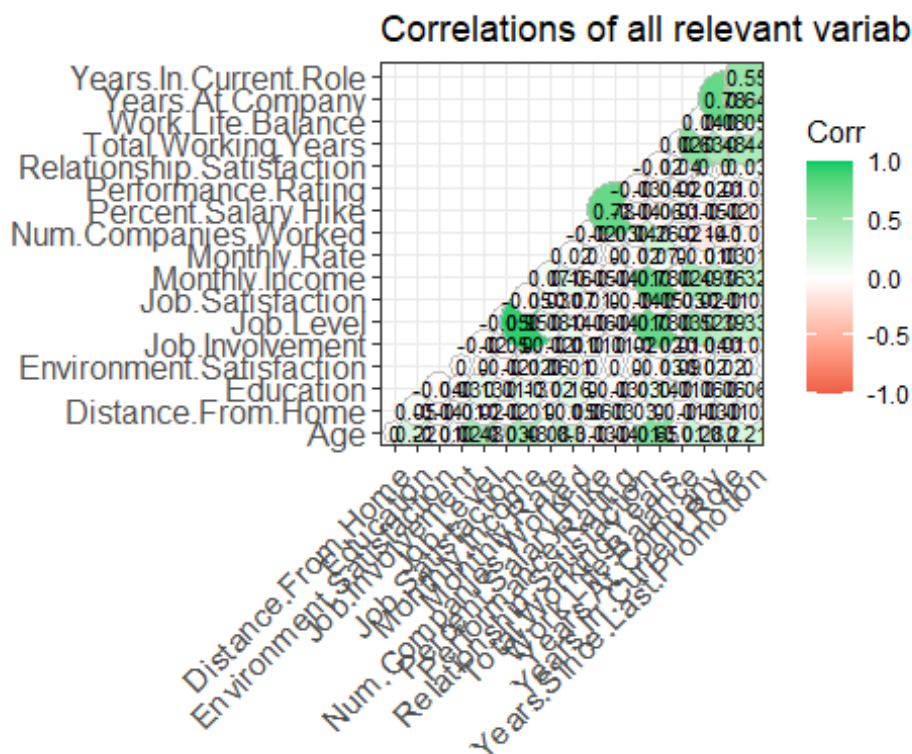
```
ggcorrplot(my.cor, type = "lower",
            lab = TRUE, lab_size = 3, method = "circle",
```



```

colors = c("tomato2", "white", "springgreen3"),
title = "Correlations of all relevant variables",
ggtheme = theme_bw())

```



- #1.Job Level and Monthly Income are highly positively correlated (0.95)
- #2.Percent Salary Hike and Performance Rating are highly positively correlated (0.78)
- #3.Monthly Income and Total Years of working is highly positively correlated (0.78)
- #4.Job Level and Total Years of Working is highly positively correlated (0.78)
- #5.Years at company and Years in current role is highly positively correlated (0.78)
- #6.Age and Total Working Years is positively correlated (0.65)
- #7.Years at company and Years since last promotion is positively correlated (0.64)
- #8.Total working years and years at company is positively correlated (0.63)
- #9.Years in current role and Years since last promotion is positively correlated (0.55)
- #10.Job Level and years at company is positively correlated (0.52)

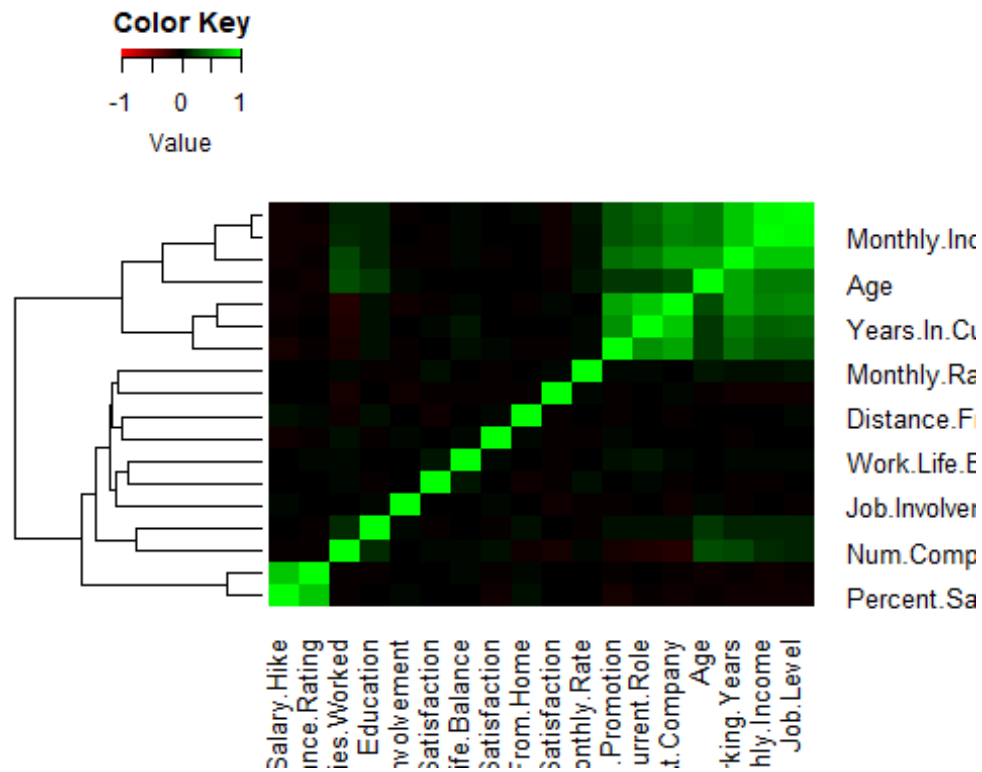
# Heatmap

```

my.cor<-cor(Emp1[,c(2,7,8,12,15,16,18,20,21,22,25,26,27,30,32,33,34,35)])
heatmap.2(my.cor,col=redgreen(75),
density.info="none", trace="none", dendrogram=c("row"),
symm=F,symkey=T,symbreaks=T, scale="none")

```



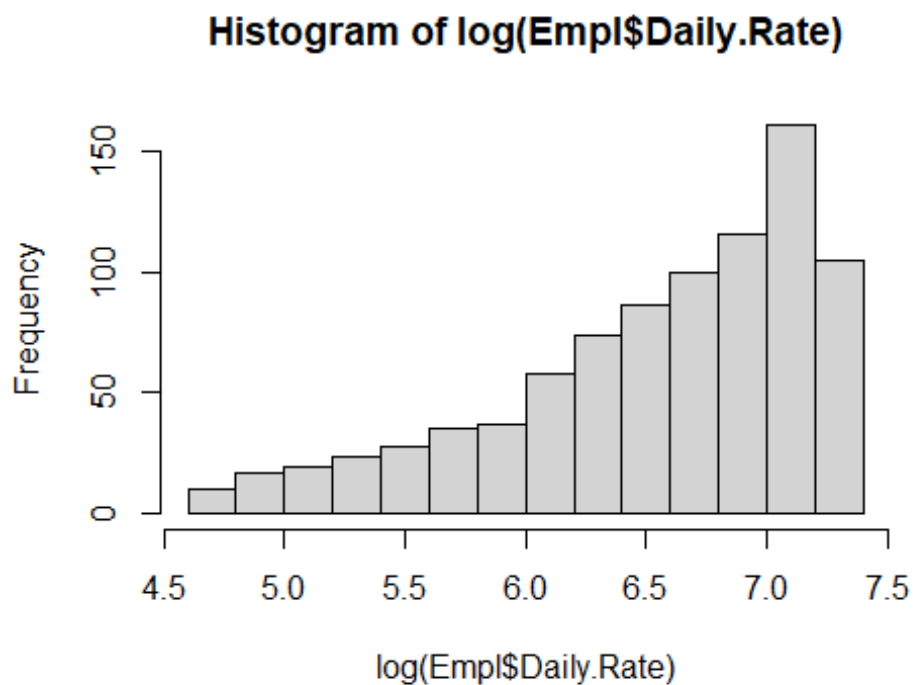


# Normality will be a concern for LDA/QDA:

`hist(Emp1$Age)` #Looks Normal



```
hist(log(Emp1$Daily.Rate)) #Looks good after log transform
```



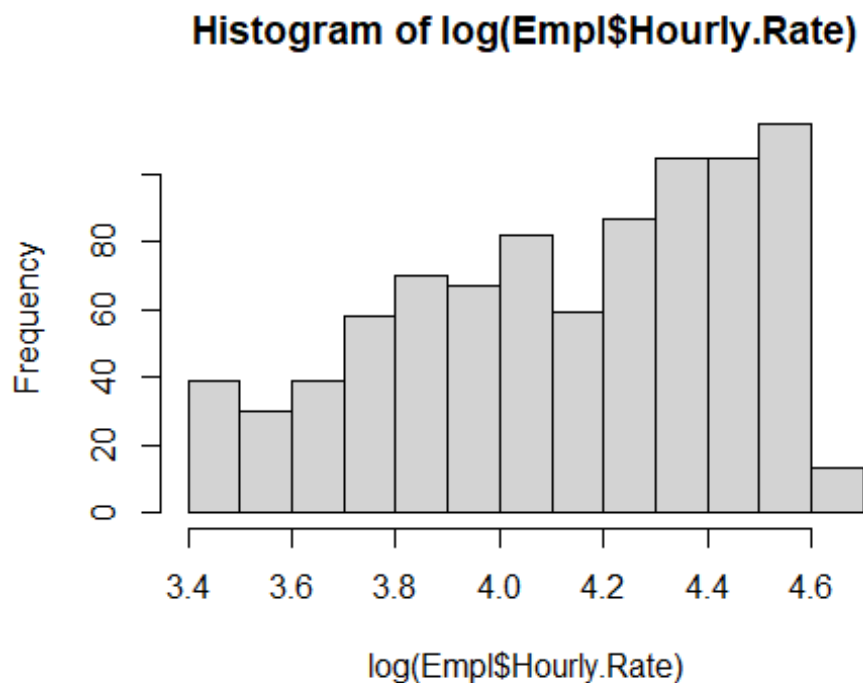
```
hist((Emp1$Distance.From.Home)) #skewed
```



```
hist((Empl$Education)) #Doesnt Look great
```

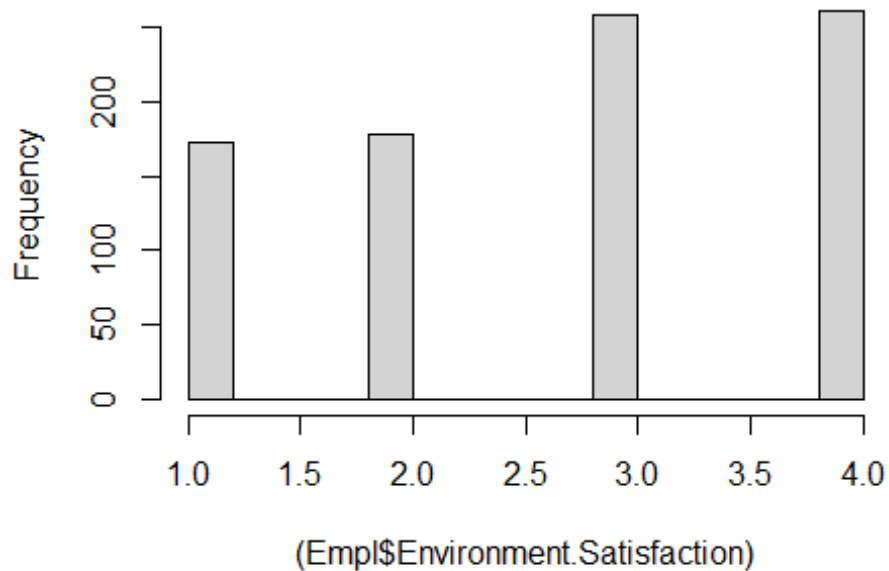


```
hist(log(Empl$Hourly.Rate)) #skewed after log transform
```



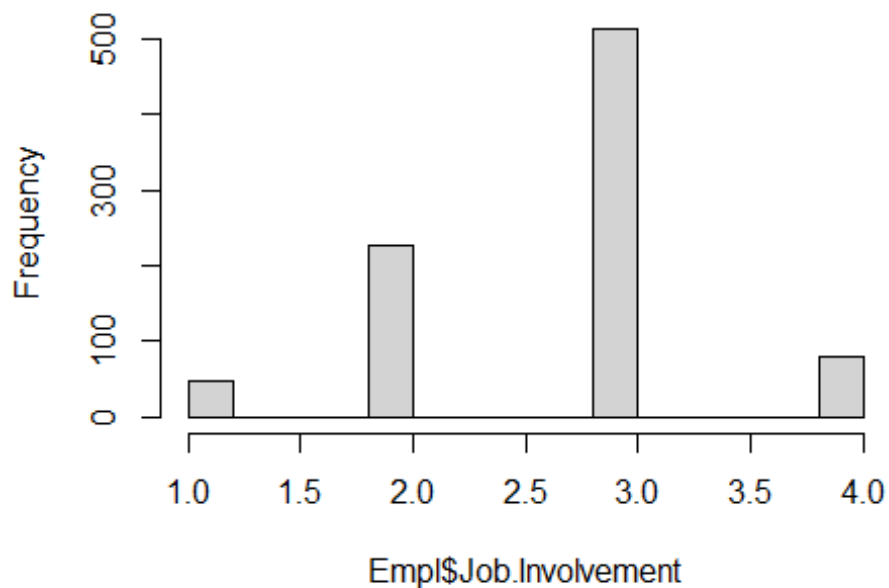
```
hist((Empl$Environment.Satisfaction))#Not good
```

**Histogram of (Empl\$Environment.Satisfaction)**



```
hist(Empl$Job.Involvement) #Not good
```

**Histogram of Empl\$Job.Involvement**



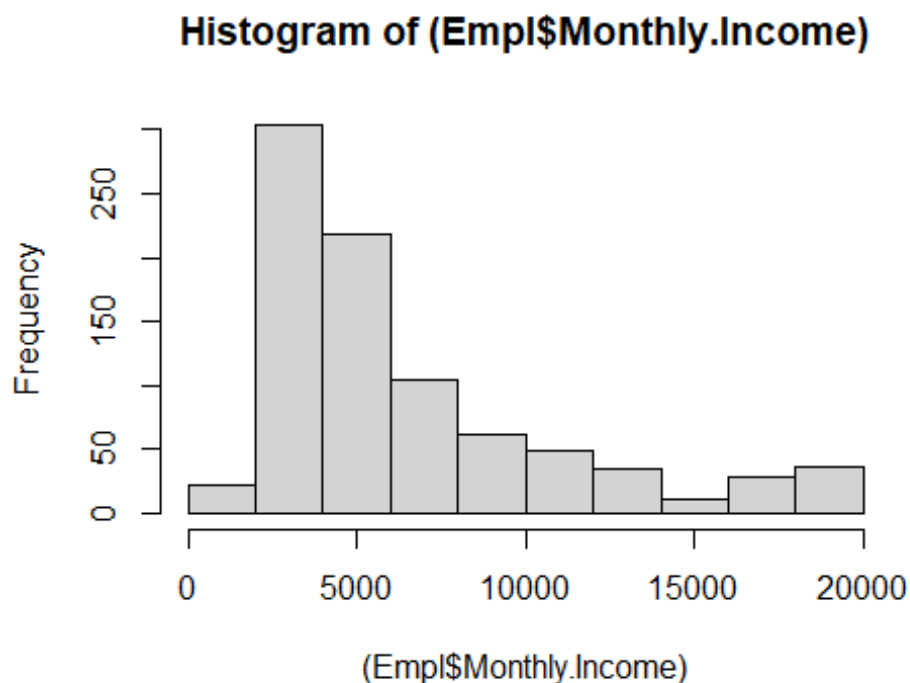
```
hist((Empl$Job.Level)) #Doesnt Look great
```



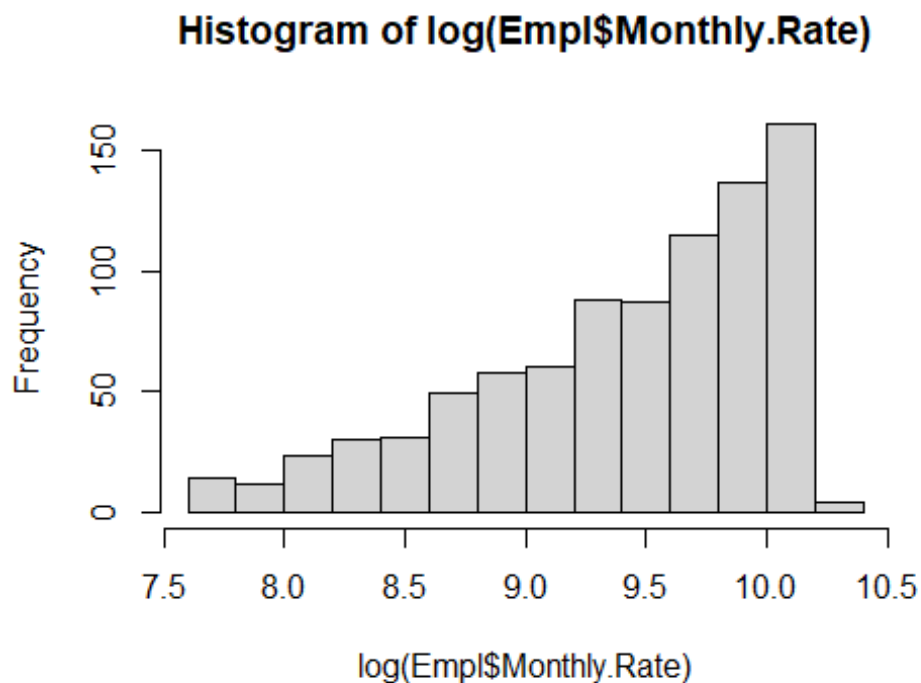
```
hist(Empl$Job.Satisfaction) #Doesnt Look great
```



```
hist((Empl$Monthly.Income))#Normal
```

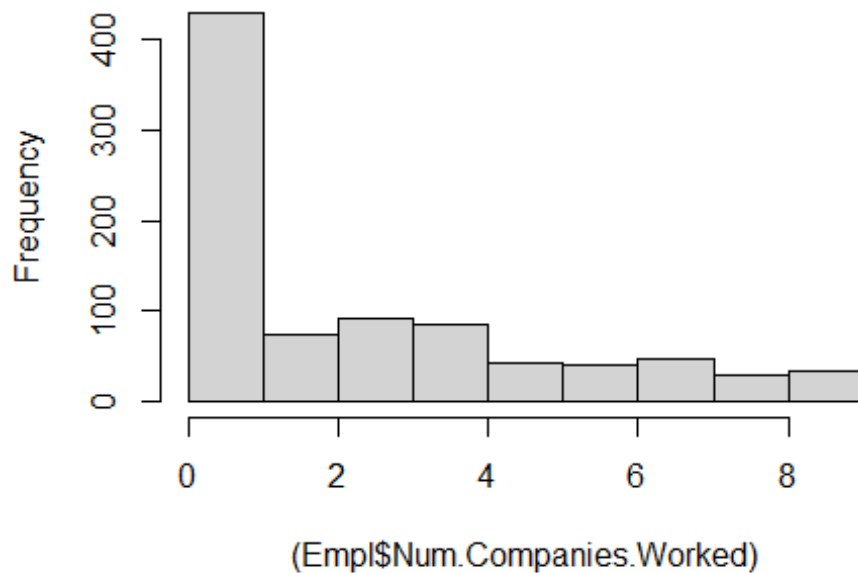


```
hist(log(Empl$Monthly.Rate))#Not Bad
```



```
hist((Empl$Num.Companies.Worked))#Not Bad
```

**Histogram of (Empl\$Num.Companies.Worked)**

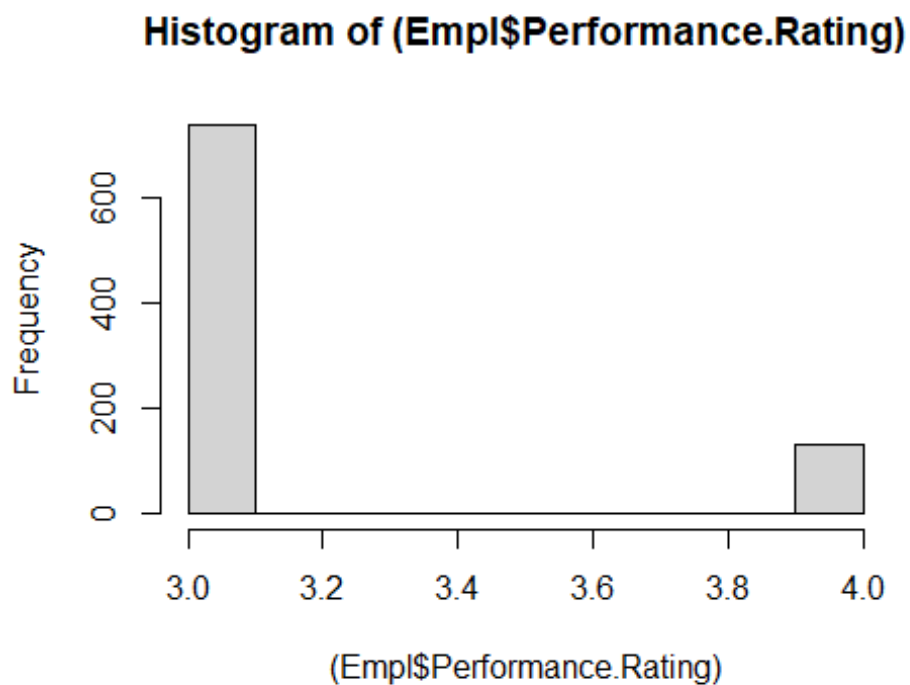


```
hist((Empl$Percent.Salary.Hike))#Not Bad
```

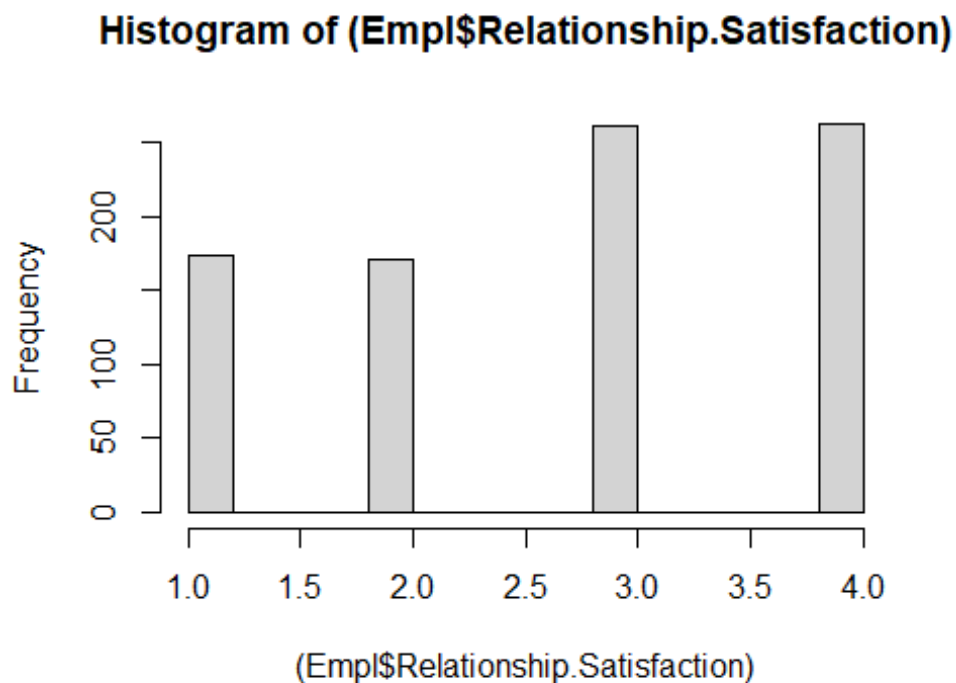
**Histogram of (Empl\$Percent.Salary.Hike)**



```
hist((Empl$Performance.Rating))#Doesnt Look great
```

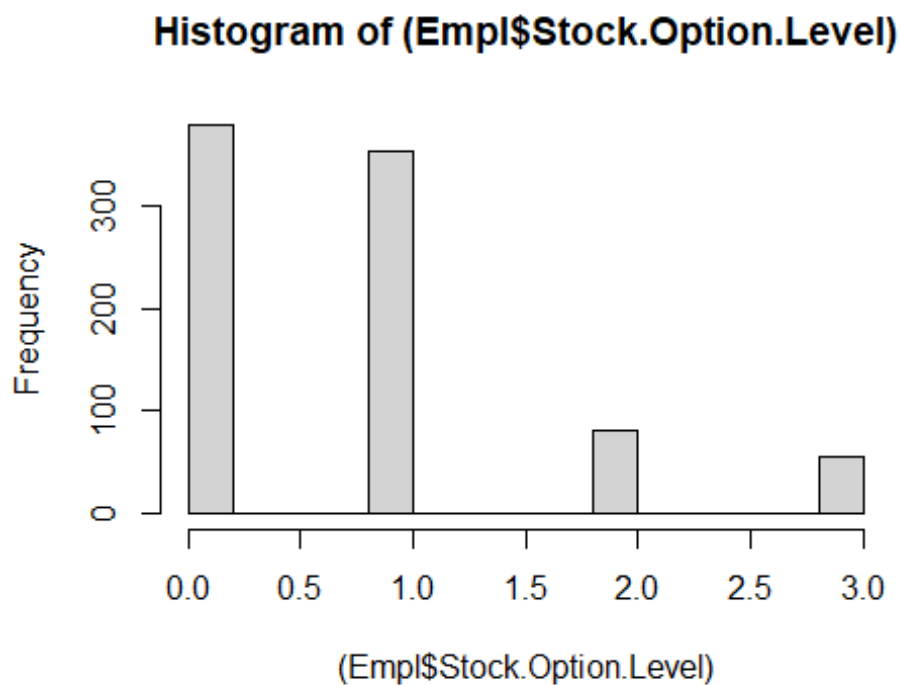


```
hist((Empl$Relationship.Satisfaction))#Doesnt Look great
```

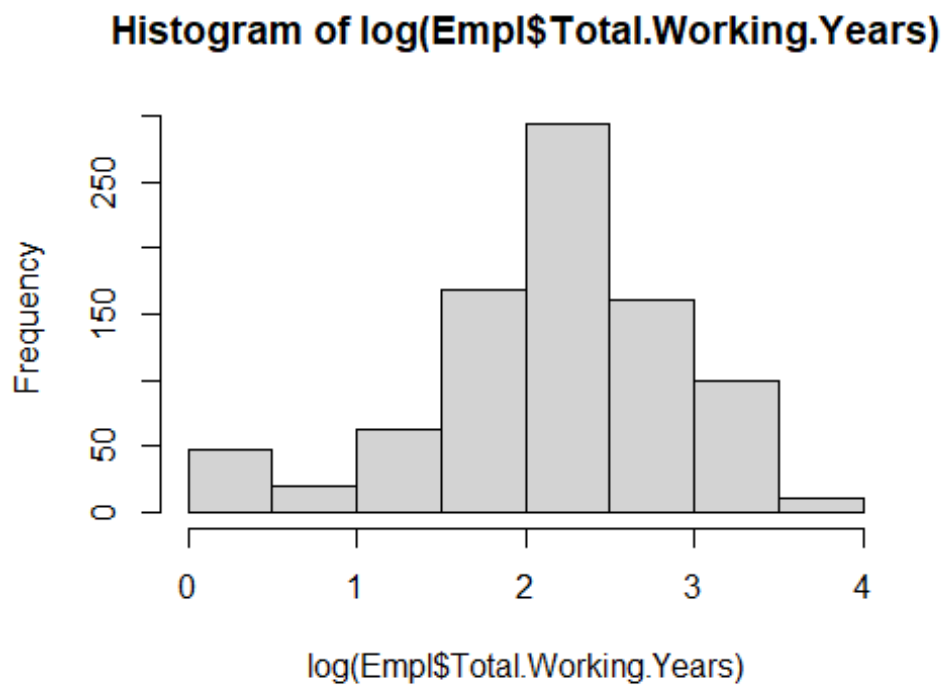




```
hist((Empl$Stock.Option.Level))#Doesnt Look great
```

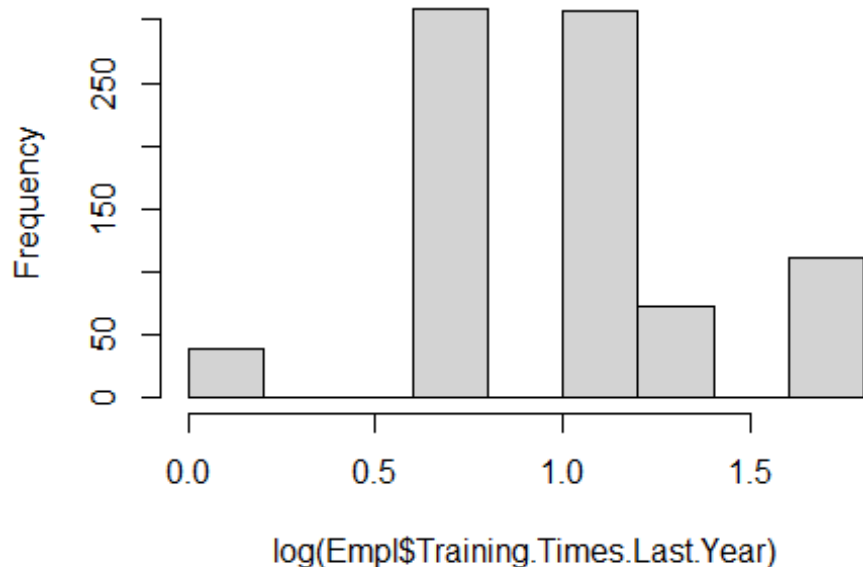


```
hist(log(Empl$Total.Working.Years)) #Normal after taking a Log
```



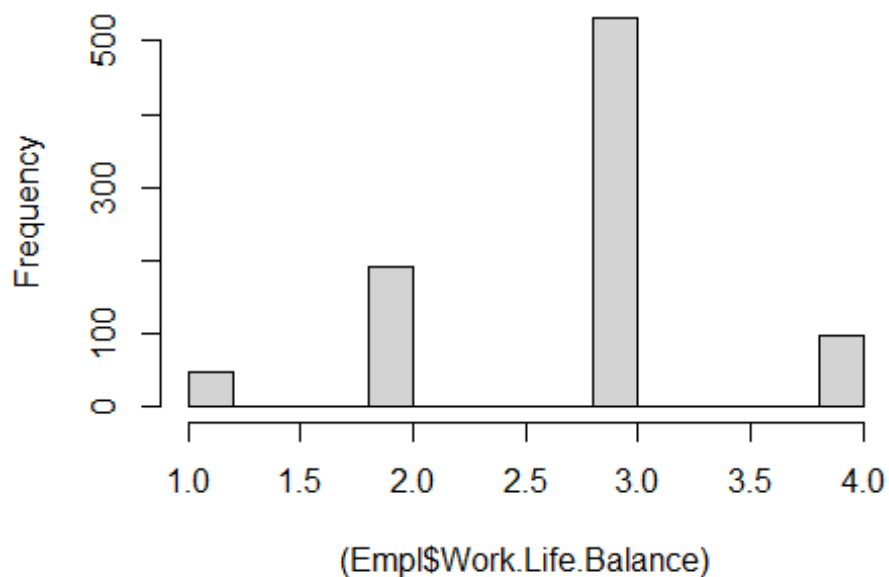
```
hist(log(Emp1$Training.Times.Last.Year))#Doesnt Look great
```

**Histogram of log(Emp1\$Training.Times.Last.Year)**



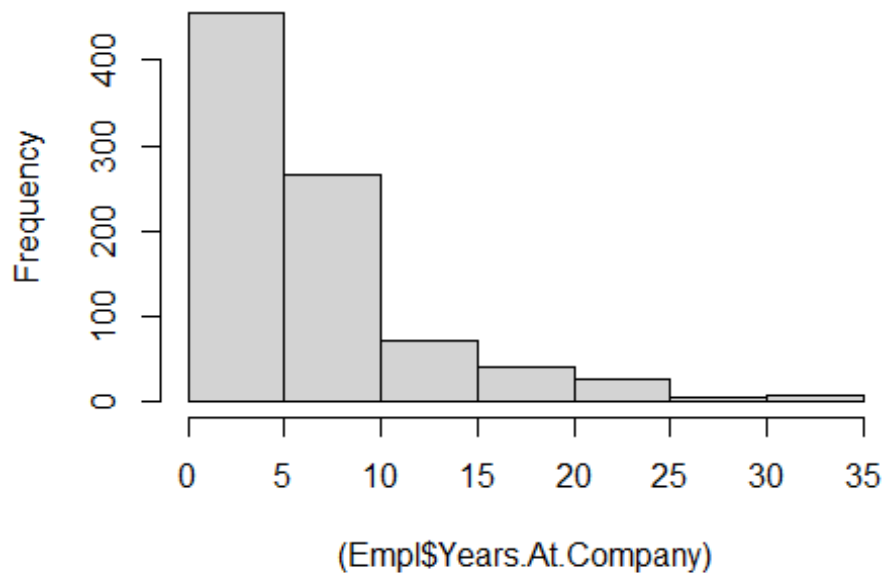
```
hist((Emp1$Work.Life.Balance))#Doesnt Look great
```

**Histogram of (Emp1\$Work.Life.Balance)**



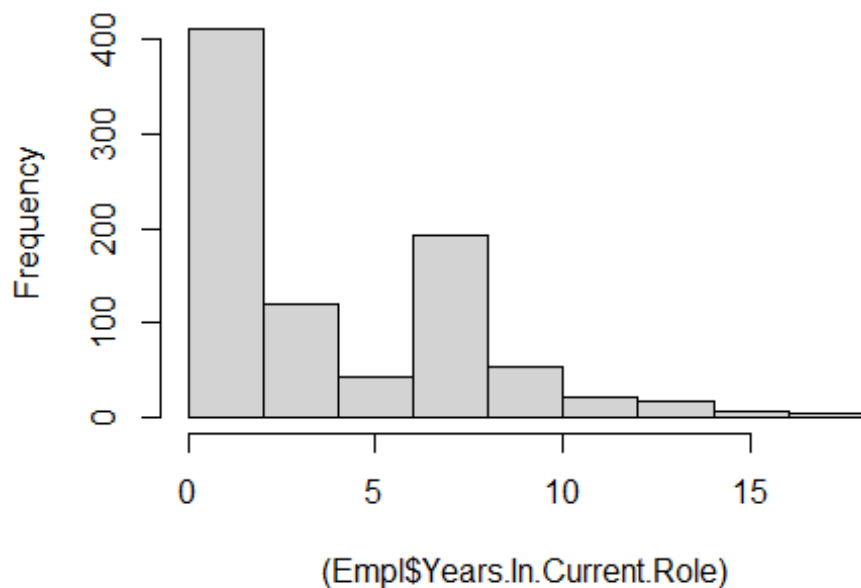
```
hist((Empl$Years.At.Company)) #Skwewd after taking a Log
```

**Histogram of (Empl\$Years.At.Company)**



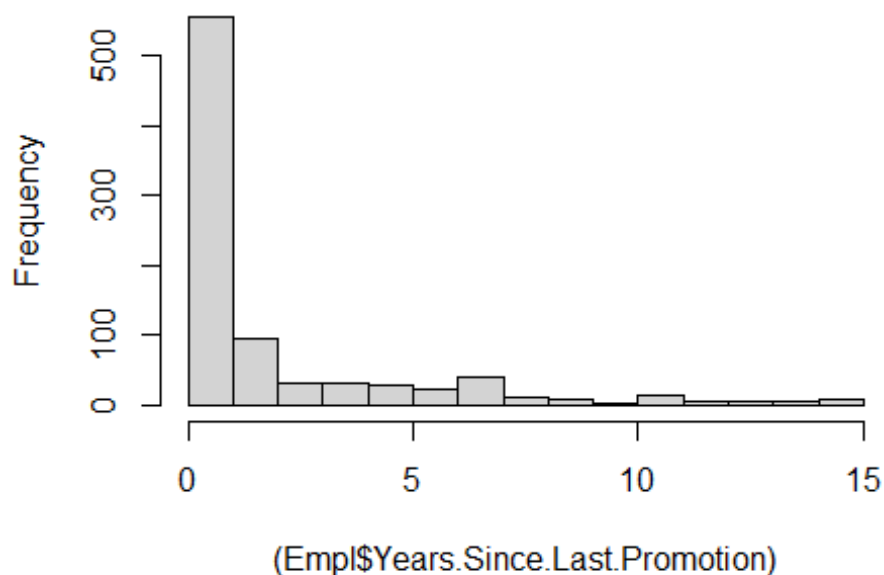
```
hist((Empl$Years.In.Current.Role)) #slightly skewed
```

**Histogram of (Empl\$Years.In.Current.Role)**



```
hist((Empl$Years.Since.Last.Promotion))#skewed
```

**Histogram of (Empl\$Years.Since.Last.Promotion)**



```
hist((Empl$Years.With.Curr.Manager))#skewed
```

**Histogram of (Empl\$Years.With.Curr.Manager)**



```

#Normality Looks good for the below:
#Age
#Log(Daily.Rate)
#Hourly Rate
#Log(Monthly.Income)
#Log(Total.Working.Years)
#Log(Years.At.Company)
#Years.In.Current.Role
#Years.Since.Last.Promotion
#Years.With.Curr.Manager

# train test split
# 80/20 would be: 695:174
set.seed(1234)

sampleSizeTrain  <- floor(.80 * nrow(Empl))
sampleSizeTest  <- floor(.20 * nrow(Empl))

indicesTrain    <- sort(sample(seq_len(nrow(Empl)), size=sampleSizeTrain))
indicesNotTest<- setdiff(seq_len(nrow(Empl)), sampleSizeTrain)
indicesTest<-  sort(sample(seq_len(nrow(Empl)), size=sampleSizeTest))

Train  <- Empl[indicesTrain, ]
Test   <- Empl[indicesTest, ]

dim(Train)

## [1] 695  36

dim(Test)

## [1] 173  36

testASEfwd<-c()
testASEbwd<-c()
testASEstp<-c()
testASEsimp1<-c()
testASEsimp2<-c()

set.seed(1234)
##### NuLL Model #####
EmplTrain<-Train%>%select(Age,Attrition,BusinessTravel,Department,Daily.Rate,
Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(
Hourly.Rate),(Monthly.Income),Job.Involvement,Job.Level,Job.Role,Job.Satisfac
tion,Marital.Status,(Monthly.Rate),Num.Companies.Worked,OverTime,Percent.Sala
ry.Hike,Performance.Rating,Relationship.Satisfaction,Stock.Option.Level,(Tota
l.Working.Years),Training.Times.Last.Year,Work.Life.Balance,(Years.At.Company
),Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)

EmplTest<-Test%>%select(Age,Attrition,BusinessTravel,Department,Daily.Rate,Di
stance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Ho

```

```

urly.Rate),Monthly.Income,Job.Involvement,Job.Level,Job.Role,Job.Satisfaction
,Marital.Status,Monthly.Rate,Num.Companies.Worked,OverTime,Percent.Salary.Hik
e,Performance.Rating,Relationship.Satisfaction,Stock.Option.Level,(Total.Work
ing.Years),Training.Times.Last.Year,Work.Life.Balance,(Years.At.Company),Year
s.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)

```

```
dim(EmplTrain)
```

```
## [1] 695 31
```

```
dim(EmplTest)
```

```
## [1] 173 31
```

```

Model_Null<-lm(log(Monthly.Income)~.,data=EmplTrain) # . means all variable
not mpg
summary(Model_Null)

```

```
##
```

```
## Call:
```

```
## lm(formula = log(Monthly.Income) ~ ., data = EmplTrain)
```

```
##
```

```
## Residuals:
```

```
##      Min       1Q   Median       3Q      Max
```

```
## -0.78497 -0.13365 -0.00122  0.13938  0.61954
```

```
##
```

```
## Coefficients:
```

```
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  7.727e+00  1.824e-01  42.370  < 2e-16 **
```

```
*
```

```
## Age          8.366e-04  1.323e-03   0.632  0.52730
```

```
## AttritionYes -7.454e-02  2.849e-02 -2.617  0.00908 **
```

```
## BusinessTravelTravel_Frequently  5.906e-02  3.341e-02   1.767  0.07762 .
```

```
## BusinessTravelTravel_Rarely      7.993e-02  2.763e-02   2.893  0.00394 **
```

```
## DepartmentResearch & Development  9.363e-02  1.120e-01   0.836  0.40338
```

```
## DepartmentSales      8.109e-02  1.170e-01   0.693  0.48836
```

```
## Daily.Rate        5.585e-05  2.170e-05   2.574  0.01028 *
```

```
## Distance.From.Home  5.649e-04  1.070e-03   0.528  0.59769
```

```
## Education        -2.473e-03  8.711e-03  -0.284  0.77657
```

```
## EducationFieldLife Sciences -8.975e-03  8.768e-02  -0.102  0.91850
```

```
## EducationFieldMarketing -1.925e-03  9.291e-02  -0.021  0.98348
```

```
## EducationFieldMedical -2.113e-02  8.833e-02  -0.239  0.81099
```

```
## EducationFieldOther    3.874e-02  9.366e-02   0.414  0.67924
```

```
## EducationFieldTechnical Degree -4.399e-02  9.113e-02  -0.483  0.62945
```

```
## Environment.Satisfaction -1.502e-02  8.061e-03  -1.863  0.06290 .
```

```
## GenderMale        3.603e-03  1.772e-02   0.203  0.83892
```

```
## Hourly.Rate       3.207e-05  4.392e-04   0.073  0.94182
```

```
## Job.Involvement    4.726e-03  1.267e-02   0.373  0.70921
```

```
## Job.Level         3.732e-01  2.010e-02  18.571  < 2e-16 **
```

```
*
```

```
## Job.RoleHuman Resources -1.725e-01  1.195e-01  -1.443  0.14945
```

```

## Job.RoleLaboratory Technician    -3.499e-01  4.089e-02  -8.559  < 2e-16  **
*
## Job.RoleManager                  1.287e-01  6.796e-02   1.894  0.05872  .
## Job.RoleManufacturing Director  -4.889e-05  4.073e-02  -0.001  0.99904
## Job.RoleResearch Director       1.700e-01  5.208e-02   3.264  0.00115  **
## Job.RoleResearch Scientist      -3.233e-01  4.067e-02  -7.949  8.34e-15  **
*
## Job.RoleSales Executive          -1.649e-02  8.714e-02  -0.189  0.84998
## Job.RoleSales Representative     -3.825e-01  9.458e-02  -4.045  5.87e-05  **
*
## Job.Satisfaction                 1.536e-03  7.917e-03   0.194  0.84622
## Marital.StatusMarried            1.039e-02  2.379e-02   0.437  0.66249
## Marital.StatusSingle             1.315e-02  3.238e-02   0.406  0.68487
## Monthly.Rate                     2.124e-06  1.227e-06   1.731  0.08390  .
## Num.Companies.Worked             9.393e-03  4.018e-03   2.338  0.01970  *
## OverTimeYes                      4.811e-02  2.001e-02   2.404  0.01651  *
## Percent.Salary.Hike              4.631e-03  3.736e-03   1.240  0.21559
## Performance.Rating               -6.309e-02  3.849e-02  -1.639  0.10165
## Relationship.Satisfaction         -1.336e-02  7.897e-03  -1.692  0.09110  .
## Stock.Option.Level               8.154e-03  1.369e-02   0.596  0.55169
## Total.Working.Years              5.480e-03  2.607e-03   2.102  0.03595  *
## Training.Times.Last.Year         1.164e-03  6.965e-03   0.167  0.86732
## Work.Life.Balance                -7.488e-03  1.234e-02  -0.607  0.54404
## Years.At.Company                 -2.902e-03  3.409e-03  -0.851  0.39490
## Years.In.Current.Role             9.278e-03  4.183e-03   2.218  0.02690  *
## Years.Since.Last.Promotion        2.961e-03  3.716e-03   0.797  0.42583
## Years.With.Curr.Manager           3.363e-03  4.043e-03   0.832  0.40584
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2225 on 650 degrees of freedom
## Multiple R-squared:  0.8954, Adjusted R-squared:  0.8884
## F-statistic: 126.5 on 44 and 650 DF,  p-value: < 2.2e-16

```

```
vif(Model_Null)
```

```

##              GVIF Df GVIF^(1/(2*Df))
## Age              1.976077  1      1.405730
## Attrition        1.425854  1      1.194091
## BusinessTravel   1.152761  2      1.036179
## Department      121.929719  2      3.322977
## Daily.Rate       1.069148  1      1.033996
## Distance.From.Home 1.086419  1      1.042314
## Education        1.129670  1      1.062859
## EducationField   3.303965  5      1.126947
## Environment.Satisfaction 1.095402  1      1.046615
## Gender           1.054963  1      1.027114
## Hourly.Rate      1.071097  1      1.034938
## Job.Involvement  1.094423  1      1.046147
## Job.Level        6.747920  1      2.597676

```

## Job.Role	641.056708	8	1.497721
## Job.Satisfaction	1.089498	1	1.043790
## Marital.Status	2.137359	2	1.209120
## Monthly.Rate	1.044819	1	1.022164
## Num.Companies.Worked	1.409970	1	1.187422
## OverTime	1.162226	1	1.078066
## Percent.Salary.Hike	2.632904	1	1.622622
## Performance.Rating	2.644845	1	1.626298
## Relationship.Satisfaction	1.067791	1	1.033340
## Stock.Option.Level	1.896768	1	1.377232
## Total.Working.Years	5.325026	1	2.307602
## Training.Times.Last.Year	1.081166	1	1.039791
## Work.Life.Balance	1.050614	1	1.024995
## Years.At.Company	5.456434	1	2.335901
## Years.In.Current.Role	3.196533	1	1.787885
## Years.Since.Last.Promotion	1.895031	1	1.376601
## Years.With.Curr.Manager	2.915403	1	1.707455

*#Department and Job.Role have a greater vif > 10 so we can try rerunning without these 2 predictors. Also taking a log on Monthly Income makes the residual charts look better especially the qq plot, histogram and the cooks D. All the observations are below 0.02 so we are good. The QQ plot is a straight line and the histogram is a nice bell shaped curve displaying normality.*

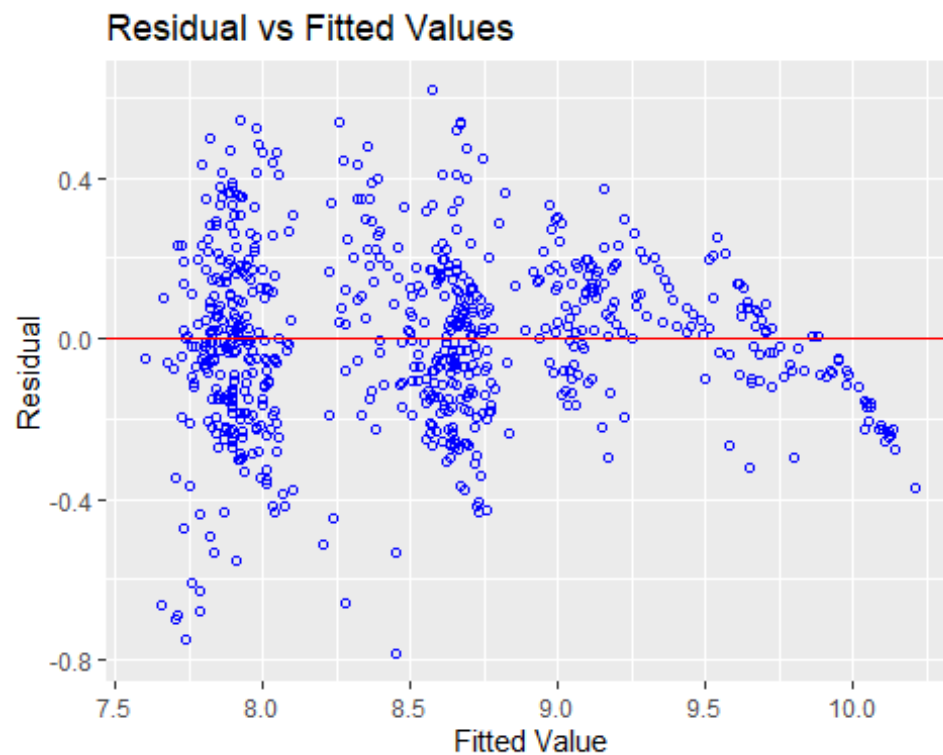
*#Outlier:*

*#Outliers seen are the below observations:*

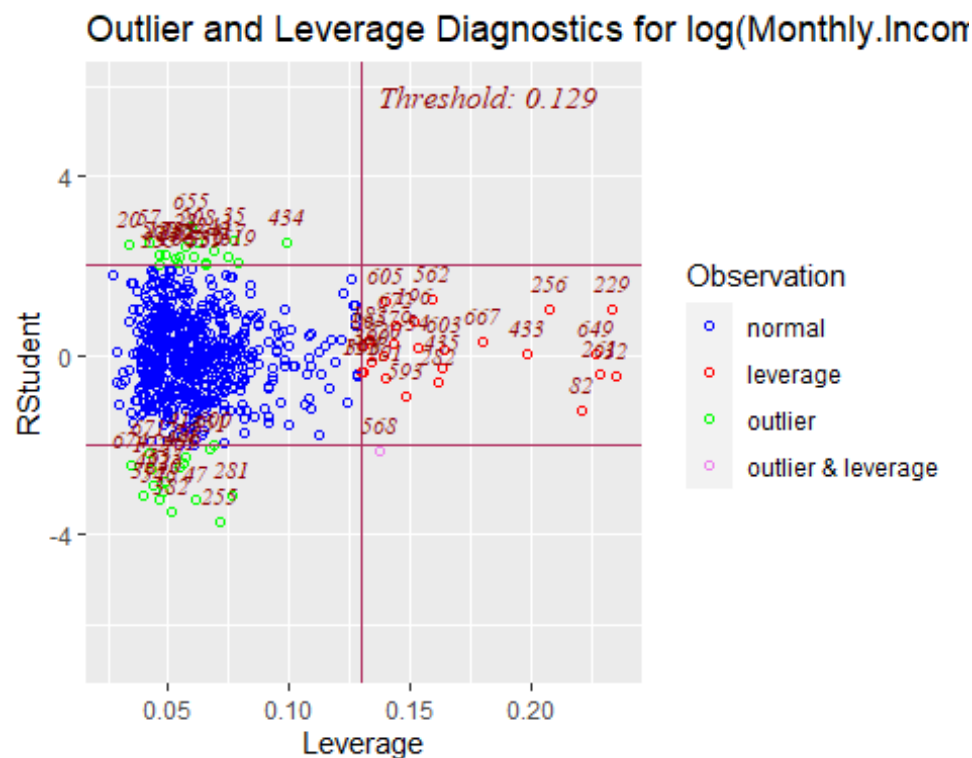
```
Train = subset(Train, ID != 365)
Train = subset(Train, ID != 458)
Train = subset(Train, ID != 364)
Train = subset(Train, ID != 266)
Train = subset(Train, ID != 265)
Train = subset(Train, ID != 254)
Train = subset(Train, ID != 253)
```

```
par(mfrow=c(1,5))
ols_plot_resid_fit(Model_Null)
```

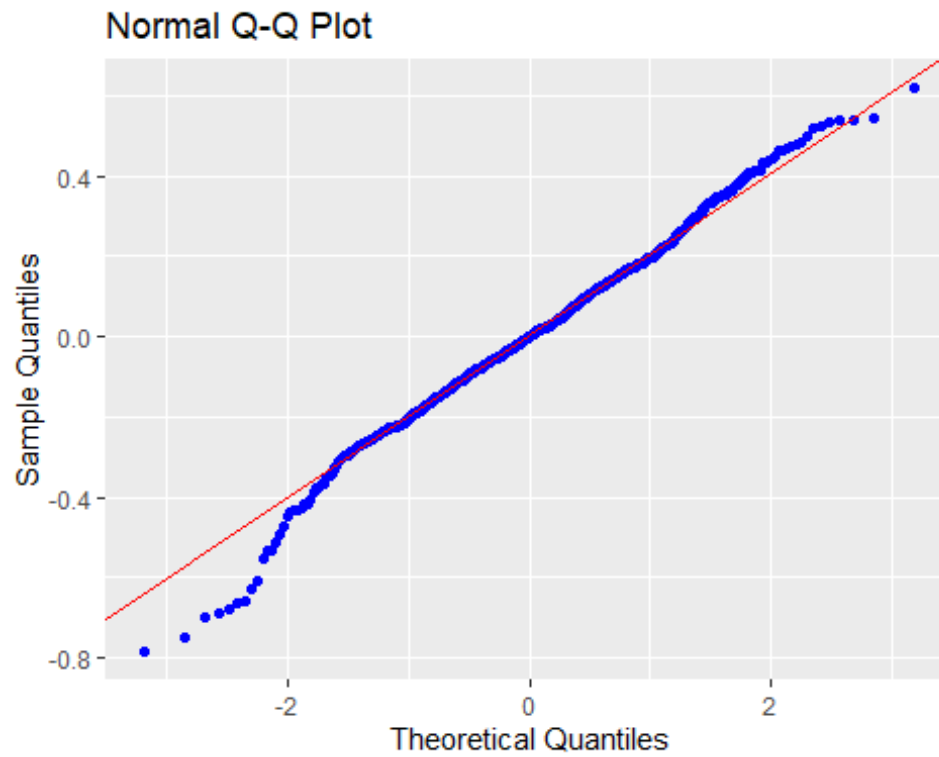




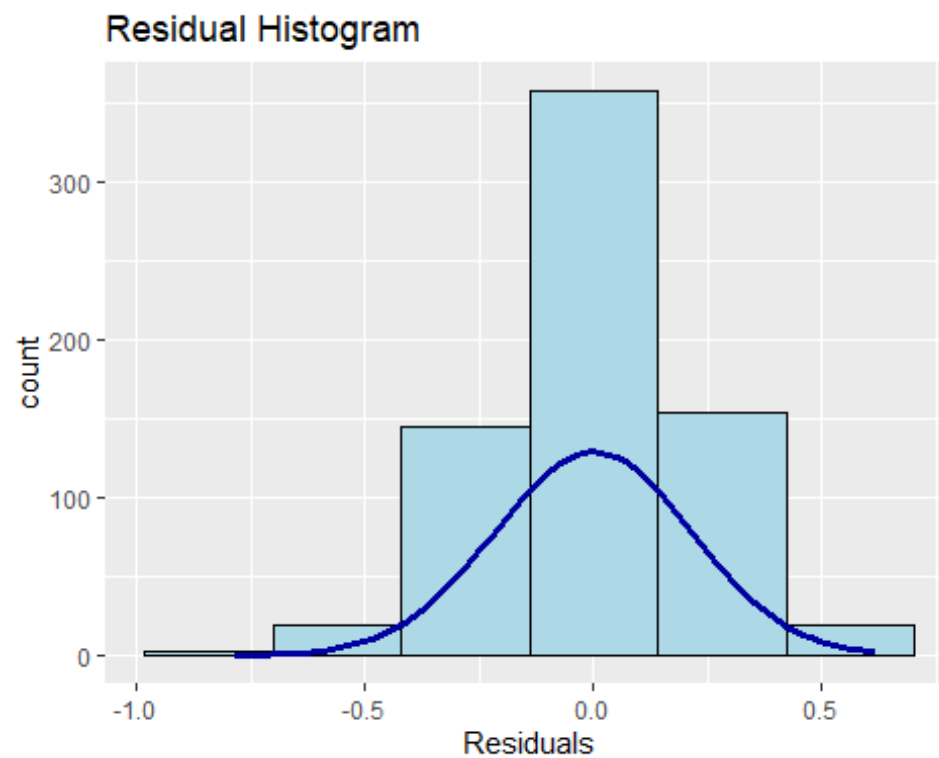
```
ols_plot_resid_lev(Model_Null)
```



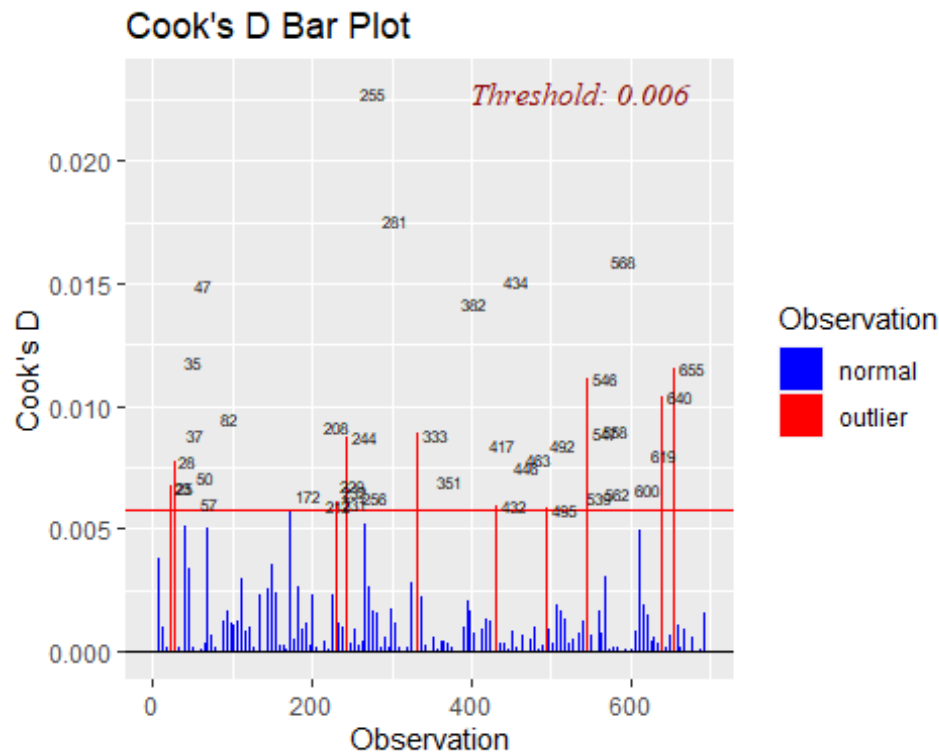
```
ols_plot_resid_qq(Model_Null)
```



```
ols_plot_resid_hist(Model_Null)
```



```
ols_plot_cooks_bar(Model_Null)
```



*#Business Travel Rarely, Daily Rates, Job Level, Laboratory Technician, Research Director, Research Scientist, Sales Representative, Number of companies worked, overtime, Total Working Years, Years In Current Role are statistically significant.*

*#Prediction*

```
Pred_Full=predict(Model_Null , newdata = EmplTest, interval = "confidence")
```

```
as.data.frame(Pred_Full)
```

##	fit	lwr	upr
## 6	8.935808	8.825122	9.046495
## 27	8.670848	8.590364	8.751333
## 32	8.034357	7.916504	8.152210
## 35	8.657264	8.553041	8.761486
## 40	7.851354	7.746477	7.956231
## 45	7.787182	7.700121	7.874242
## 48	9.060691	8.973492	9.147891
## 49	7.749149	7.641731	7.856567
## 53	8.039803	7.938009	8.141596
## 55	8.648090	8.555760	8.740420
## 57	7.913026	7.803566	8.022486
## 58	8.051037	7.948522	8.153551
## 65	7.772001	7.669161	7.874841
## 82	8.762209	8.660295	8.864124
## 83	8.634445	8.532113	8.736777
## 86	9.615853	9.497501	9.734206

```
## 94 8.691813 8.596707 8.786918
## 95 10.059810 9.927598 10.192021
## 97 9.641311 9.491737 9.790885
## 103 8.640974 8.539798 8.742151
## 107 8.634047 8.510607 8.757487
## 109 8.561137 8.437907 8.684368
## 114 8.547596 8.426459 8.668732
## 118 8.470475 8.366817 8.574133
## 124 8.554675 8.455117 8.654233
## 125 8.684821 8.586091 8.783550
## 127 7.893628 7.775049 8.012207
## 137 7.767464 7.665330 7.869598
## 160 9.291042 9.161454 9.420631
## 162 8.930429 8.801569 9.059289
## 166 7.698237 7.595340 7.801134
## 176 7.891663 7.779473 8.003854
## 181 9.119207 9.026117 9.212297
## 182 8.697316 8.607081 8.787551
## 187 8.626440 8.516364 8.736515
## 191 8.369995 8.271321 8.468669
## 192 8.992583 8.891391 9.093776
## 202 8.347240 8.258938 8.435543
## 204 7.984664 7.877250 8.092078
## 216 7.893670 7.819139 7.968202
## 217 8.746397 8.644778 8.848016
## 224 7.906647 7.816024 7.997269
## 225 7.987110 7.890613 8.083608
## 228 7.978948 7.892233 8.065664
## 245 8.725866 8.631287 8.820446
## 253 7.815777 7.724504 7.907050
## 254 7.839820 7.669643 8.009997
## 261 7.733779 7.625803 7.841756
## 272 8.378565 8.293007 8.464123
## 273 8.246965 8.119177 8.374753
## 278 7.934910 7.830724 8.039095
## 279 8.523271 8.425164 8.621378
## 280 8.680986 8.570290 8.791682
## 283 8.679888 8.588573 8.771204
## 284 8.657224 8.565023 8.749425
## 289 9.047089 8.937356 9.156822
## 295 9.512214 9.301152 9.723277
## 297 8.692302 8.590280 8.794323
## 308 7.856147 7.747380 7.964913
## 311 8.458391 8.366236 8.550547
## 312 9.542327 9.426305 9.658349
## 318 8.613599 8.523163 8.704035
## 324 8.575434 8.451801 8.699068
## 328 8.391564 8.299181 8.483946
## 333 7.851042 7.742742 7.959343
## 338 8.639090 8.532997 8.745184
```

```
## 340 7.819098 7.718135 7.920061
## 368 8.639170 8.531127 8.747213
## 369 7.870590 7.777959 7.963221
## 377 8.021192 7.888104 8.154281
## 379 8.068341 7.968266 8.168416
## 387 9.015914 8.914243 9.117585
## 388 8.586196 8.476026 8.696367
## 389 8.317530 8.212771 8.422290
## 400 9.193728 9.083739 9.303718
## 406 9.702232 9.579169 9.825295
## 407 8.710870 8.611948 8.809792
## 417 7.872522 7.775149 7.969895
## 424 7.749240 7.641172 7.857307
## 425 8.585035 8.485368 8.684701
## 436 8.691898 8.603970 8.779827
## 438 7.898641 7.799766 7.997516
## 448 8.703351 8.602472 8.804231
## 451 8.754185 8.632053 8.876316
## 452 7.963746 7.875334 8.052159
## 453 8.625318 8.520227 8.730409
## 454 8.619723 8.534115 8.705332
## 456 9.977372 9.819441 10.135303
## 459 7.927541 7.815688 8.039393
## 461 8.009459 7.898381 8.120537
## 465 7.896411 7.783488 8.009334
## 466 7.925857 7.844806 8.006908
## 467 7.900670 7.788090 8.013250
## 473 9.275864 9.154153 9.397575
## 474 8.032209 7.937729 8.126689
## 479 8.047267 7.927508 8.167026
## 480 9.328019 9.210629 9.445408
## 482 8.046390 7.965580 8.127201
## 488 7.951231 7.851362 8.051100
## 492 9.751050 9.637461 9.864640
## 494 9.085828 8.974016 9.197640
## 496 9.732702 9.572639 9.892766
## 511 8.634608 8.542508 8.726707
## 516 8.679442 8.575998 8.782886
## 521 7.877544 7.791474 7.963614
## 527 8.697972 8.596737 8.799208
## 530 8.046984 7.927273 8.166695
## 532 8.705996 8.615588 8.796404
## 540 8.634369 8.540609 8.728129
## 547 8.890774 8.744472 9.037075
## 550 8.013700 7.875389 8.152011
## 565 7.888240 7.789742 7.986737
## 566 8.023894 7.940641 8.107148
## 567 8.200699 8.096755 8.304642
## 573 8.656401 8.562272 8.750529
## 584 8.669050 8.560164 8.777936
```

```
## 596 8.669085 8.564393 8.773776
## 601 7.675062 7.572837 7.777287
## 603 9.261877 9.137595 9.386160
## 604 8.050325 7.956802 8.143848
## 608 8.623958 8.504290 8.743626
## 618 8.695206 8.589054 8.801357
## 626 7.943131 7.855456 8.030807
## 627 8.643503 8.549160 8.737845
## 628 9.295515 9.181108 9.409922
## 636 7.897206 7.788652 8.005759
## 639 8.019895 7.929804 8.109986
## 653 9.338808 9.213739 9.463876
## 654 9.200091 9.044370 9.355812
## 665 8.559067 8.454543 8.663592
## 667 9.026317 8.907379 9.145255
## 674 7.914342 7.789566 8.039118
## 680 7.914462 7.800727 8.028196
## 681 8.566124 8.461578 8.670670
## 688 7.848846 7.754119 7.943573
## 695 8.561031 8.449991 8.672070
## 696 7.943319 7.826909 8.059730
## 697 9.526412 9.382247 9.670577
## 698 8.456033 8.357691 8.554374
## 700 10.084350 9.976740 10.191960
## 703 9.060490 8.933842 9.187137
## 712 9.652964 9.496298 9.809630
## 719 8.695565 8.570498 8.820633
## 727 7.943253 7.837465 8.049041
## 731 8.577893 8.470751 8.685035
## 732 8.642993 8.534047 8.751939
## 738 8.634308 8.531498 8.737119
## 740 8.360172 8.255130 8.465214
## 752 7.759887 7.653272 7.866501
## 755 9.376088 9.243728 9.508447
## 756 7.811952 7.704949 7.918956
## 768 9.010626 8.884053 9.137198
## 769 8.573951 8.468935 8.678966
## 772 9.133874 8.995538 9.272209
## 774 7.843001 7.744010 7.941992
## 776 7.900494 7.812085 7.988904
## 778 7.712335 7.598975 7.825695
## 788 8.302892 8.192990 8.412794
## 799 7.722806 7.608245 7.837367
## 803 9.607483 9.473745 9.741220
## 804 8.952154 8.836883 9.067425
## 809 7.928495 7.827517 8.029474
## 814 9.879090 9.670943 10.087238
## 816 8.011770 7.919173 8.104368
## 818 9.186773 9.081701 9.291844
## 821 8.002181 7.892368 8.111994
```

```
## 825 8.732519 8.633142 8.831895
## 831 8.278899 8.168372 8.389427
## 834 7.825153 7.737407 7.912899
## 845 8.621222 8.521778 8.720667
## 852 7.848969 7.750422 7.947516
## 854 8.671832 8.564195 8.779469
## 864 9.484186 9.336369 9.632003
```

```
MSPE = data.frame(Observed = log(Emp1Test$Monthly.Income), Predicted = Pred_Full)
```

```
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
```

```
MSPE$SquaredResidual = MSPE$Residual^2
```

```
MSPE
```

##	Observed	Predicted.fit	Predicted.lwr	Predicted.upr	Residual
## 6	9.081711	8.935808	8.825122	9.046495	0.145903178
## 27	9.202711	8.670848	8.590364	8.751333	0.531863109
## 32	7.614805	8.034357	7.916504	8.152210	-0.419551542
## 35	9.177714	8.657264	8.553041	8.761486	0.520450255
## 40	7.934155	7.851354	7.746477	7.956231	0.082801485
## 45	7.109062	7.787182	7.700121	7.874242	-0.678119382
## 48	9.075665	9.060691	8.973492	9.147891	0.014974097
## 49	7.537963	7.749149	7.641731	7.856567	-0.211186460
## 53	7.606387	8.039803	7.938009	8.141596	-0.433415289
## 55	8.394800	8.648090	8.555760	8.740420	-0.253290685
## 57	7.922624	7.913026	7.803566	8.022486	0.009598023
## 58	8.460199	8.051037	7.948522	8.153551	0.409162605
## 65	7.700748	7.772001	7.669161	7.874841	-0.071253319
## 82	8.836810	8.762209	8.660295	8.864124	0.074600490
## 83	8.579417	8.634445	8.532113	8.736777	-0.055028303
## 86	9.527047	9.615853	9.497501	9.734206	-0.088806244
## 94	8.722906	8.691813	8.596707	8.786918	0.031093196
## 95	9.899781	10.059810	9.927598	10.192021	-0.160028849
## 97	9.717519	9.641311	9.491737	9.790885	0.076208399
## 103	8.785387	8.640974	8.539798	8.742151	0.144412556
## 107	8.370779	8.634047	8.510607	8.757487	-0.263267585
## 109	9.096724	8.561137	8.437907	8.684368	0.535586167
## 114	8.535622	8.547596	8.426459	8.668732	-0.011973457
## 118	8.300280	8.470475	8.366817	8.574133	-0.170194863
## 124	8.301025	8.554675	8.455117	8.654233	-0.253649820
## 125	8.423761	8.684821	8.586091	8.783550	-0.261059576
## 127	8.273592	7.893628	7.775049	8.012207	0.379963827
## 137	7.748891	7.767464	7.665330	7.869598	-0.018572817
## 160	9.487290	9.291042	9.161454	9.420631	0.196247664
## 162	9.073604	8.930429	8.801569	9.059289	0.143174671
## 166	7.622664	7.698237	7.595340	7.801134	-0.075573125
## 176	7.635304	7.891663	7.779473	8.003854	-0.256359410
## 181	9.237372	9.119207	9.026117	9.212297	0.118164801
## 182	8.838262	8.697316	8.607081	8.787551	0.140945668
## 187	8.557567	8.626440	8.516364	8.736515	-0.068872538

## 191	8.661294	8.369995	8.271321	8.468669	0.291298259
## 192	9.173365	8.992583	8.891391	9.093776	0.180782121
## 202	8.735525	8.347240	8.258938	8.435543	0.388284845
## 204	7.703459	7.984664	7.877250	8.092078	-0.281205118
## 216	7.760041	7.893670	7.819139	7.968202	-0.133629611
## 217	9.192584	8.746397	8.644778	8.848016	0.446186509
## 224	7.354362	7.906647	7.816024	7.997269	-0.552284593
## 225	8.470311	7.987110	7.890613	8.083608	0.483200937
## 228	7.752765	7.978948	7.892233	8.065664	-0.226183385
## 245	8.528331	8.725866	8.631287	8.820446	-0.197535542
## 253	7.729296	7.815777	7.724504	7.907050	-0.086481140
## 254	7.991592	7.839820	7.669643	8.009997	0.151772180
## 261	7.932003	7.733779	7.625803	7.841756	0.198223663
## 272	8.600247	8.378565	8.293007	8.464123	0.221681767
## 273	8.171882	8.246965	8.119177	8.374753	-0.075083378
## 278	7.805882	7.934910	7.830724	8.039095	-0.129027576
## 279	8.655911	8.523271	8.425164	8.621378	0.132639779
## 280	8.302762	8.680986	8.570290	8.791682	-0.378224368
## 283	8.781555	8.679888	8.588573	8.771204	0.101667040
## 284	8.928905	8.657224	8.565023	8.749425	0.271681407
## 289	9.183791	9.047089	8.937356	9.156822	0.136702343
## 295	9.707290	9.512214	9.301152	9.723277	0.195076050
## 297	9.163982	8.692302	8.590280	8.794323	0.471680746
## 308	7.999343	7.856147	7.747380	7.964913	0.143196114
## 311	8.609590	8.458391	8.366236	8.550547	0.151198555
## 312	9.490771	9.542327	9.426305	9.658349	-0.051556245
## 318	8.437500	8.613599	8.523163	8.704035	-0.176098341
## 324	8.437067	8.575434	8.451801	8.699068	-0.138367099
## 328	8.596004	8.391564	8.299181	8.483946	0.2044440393
## 333	7.758761	7.851042	7.742742	7.959343	-0.092281803
## 338	8.956222	8.639090	8.532997	8.745184	0.317131735
## 340	7.758333	7.819098	7.718135	7.920061	-0.060764601
## 368	8.607582	8.639170	8.531127	8.747213	-0.031587553
## 369	7.636752	7.870590	7.777959	7.963221	-0.233837817
## 377	7.916807	8.021192	7.888104	8.154281	-0.104384718
## 379	7.681560	8.068341	7.968266	8.168416	-0.386780902
## 387	9.081256	9.015914	8.914243	9.117585	0.065341958
## 388	8.357494	8.586196	8.476026	8.696367	-0.228702640
## 389	8.412277	8.317530	8.212771	8.422290	0.094746897
## 400	9.231025	9.193728	9.083739	9.303718	0.037296474
## 406	9.718783	9.702232	9.579169	9.825295	0.016551261
## 407	8.606668	8.710870	8.611948	8.809792	-0.104202009
## 417	7.849324	7.872522	7.775149	7.969895	-0.023198189
## 424	7.384610	7.749240	7.641172	7.857307	-0.364629507
## 425	8.460411	8.585035	8.485368	8.684701	-0.124623561
## 436	8.734560	8.691898	8.603970	8.779827	0.042661936
## 438	7.961021	7.898641	7.799766	7.997516	0.062380568
## 448	8.619389	8.703351	8.602472	8.804231	-0.083962757
## 451	8.492491	8.754185	8.632053	8.876316	-0.261694225
## 452	8.137396	7.963746	7.875334	8.052159	0.173649551



## 453	8.667852	8.625318	8.520227	8.730409	0.042533878
## 454	8.610137	8.619723	8.534115	8.705332	-0.009586370
## 456	9.895102	9.977372	9.819441	10.135303	-0.082269149
## 459	7.633370	7.927541	7.815688	8.039393	-0.294170871
## 461	7.646354	8.009459	7.898381	8.120537	-0.363105172
## 465	7.798523	7.896411	7.783488	8.009334	-0.097888015
## 466	8.279951	7.925857	7.844806	8.006908	0.354093692
## 467	7.880048	7.900670	7.788090	8.013250	-0.020622026
## 473	9.491375	9.275864	9.154153	9.397575	0.215511209
## 474	8.146709	8.032209	7.937729	8.126689	0.114499925
## 479	7.989560	8.047267	7.927508	8.167026	-0.057706541
## 480	9.528358	9.328019	9.210629	9.445408	0.200339083
## 482	7.764721	8.046390	7.965580	8.127201	-0.281669795
## 488	7.976252	7.951231	7.851362	8.051100	0.025020830
## 492	9.733885	9.751050	9.637461	9.864640	-0.017165721
## 494	9.060215	9.085828	8.974016	9.197640	-0.025613239
## 496	9.699350	9.732702	9.572639	9.892766	-0.033352370
## 511	8.583543	8.634608	8.542508	8.726707	-0.051065146
## 516	8.609225	8.679442	8.575998	8.782886	-0.070216503
## 521	7.845024	7.877544	7.791474	7.963614	-0.032519561
## 527	8.518392	8.697972	8.596737	8.799208	-0.179579887
## 530	8.509766	8.046984	7.927273	8.166695	0.462781558
## 532	8.826881	8.705996	8.615588	8.796404	0.120885365
## 540	8.547722	8.634369	8.540609	8.728129	-0.086646957
## 547	8.909641	8.890774	8.744472	9.037075	0.018867100
## 550	7.685703	8.013700	7.875389	8.152011	-0.327996955
## 565	8.251403	7.888240	7.789742	7.986737	0.363163368
## 566	7.798113	8.023894	7.940641	8.107148	-0.225781725
## 567	7.685244	8.200699	8.096755	8.304642	-0.515455096
## 573	8.829665	8.656401	8.562272	8.750529	0.173264619
## 584	8.471987	8.669050	8.560164	8.777936	-0.197063249
## 596	8.303257	8.669085	8.564393	8.773776	-0.365827508
## 601	7.617268	7.675062	7.572837	7.777287	-0.057794399
## 603	9.342771	9.261877	9.137595	9.386160	0.080893909
## 604	8.049108	8.050325	7.956802	8.143848	-0.001217363
## 608	8.631414	8.623958	8.504290	8.743626	0.007456340
## 618	8.604105	8.695206	8.589054	8.801357	-0.091100999
## 626	7.830823	7.943131	7.855456	8.030807	-0.112308317
## 627	8.333751	8.643503	8.549160	8.737845	-0.309751527
## 628	9.350972	9.295515	9.181108	9.409922	0.055456920
## 636	7.773174	7.897206	7.788652	8.005759	-0.124032134
## 639	7.910224	8.019895	7.929804	8.109986	-0.109671322
## 653	9.510371	9.338808	9.213739	9.463876	0.171563356
## 654	9.433804	9.200091	9.044370	9.355812	0.233712796
## 665	8.426831	8.559067	8.454543	8.663592	-0.132236646
## 667	8.976894	9.026317	8.907379	9.145255	-0.049423232
## 674	7.611842	7.914342	7.789566	8.039118	-0.302499685
## 680	7.753194	7.914462	7.800727	8.028196	-0.161267578
## 681	8.356085	8.566124	8.461578	8.670670	-0.210038806
## 688	7.871693	7.848846	7.754119	7.943573	0.022846742

```

## 695 9.161675      8.561031      8.449991      8.672070  0.600644495
## 696 8.099858      7.943319      7.826909      8.059730  0.156538582
## 697 9.629182      9.526412      9.382247      9.670577  0.102770387
## 698 8.685078      8.456033      8.357691      8.554374  0.229044737
## 700 9.856448     10.084350      9.976740     10.191960 -0.227901474
## 703 9.247347      9.060490      8.933842      9.187137  0.186857571
## 712 9.555206      9.652964      9.496298      9.809630 -0.097758109
## 719 8.429673      8.695565      8.570498      8.820633 -0.265892583
## 727 7.997327      7.943253      7.837465      8.049041  0.054074009
## 731 8.469053      8.577893      8.470751      8.685035 -0.108840241
## 732 8.563695      8.642993      8.534047      8.751939 -0.079298427
## 738 8.550821      8.634308      8.531498      8.737119 -0.083486828
## 740 8.210940      8.360172      8.255130      8.465214 -0.149232626
## 752 7.741534      7.759887      7.653272      7.866501 -0.018353120
## 755 9.514068      9.376088      9.243728      9.508447  0.137980318
## 756 8.218248      7.811952      7.704949      7.918956  0.406295617
## 768 9.299450      9.010626      8.884053      9.137198  0.288823984
## 769 8.906393      8.573951      8.468935      8.678966  0.332442884
## 772 9.254644      9.133874      8.995538      9.272209  0.120770410
## 774 8.127995      7.843001      7.744010      7.941992  0.284994044
## 776 8.161946      7.900494      7.812085      7.988904  0.261451648
## 778 7.946971      7.712335      7.598975      7.825695  0.234636511
## 788 8.505323      8.302892      8.192990      8.412794  0.202430792
## 799 7.527794      7.722806      7.608245      7.837367 -0.195012091
## 803 9.744961      9.607483      9.473745      9.741220  0.137477896
## 804 9.167642      8.952154      8.836883      9.067425  0.215487972
## 809 7.959276      7.928495      7.827517      8.029474  0.030780730
## 814 9.886240      9.879090      9.670943     10.087238  0.007149265
## 816 7.930566      8.011770      7.919173      8.104368 -0.081204613
## 818 9.366575      9.186773      9.081701      9.291844  0.179801773
## 821 8.105308      8.002181      7.892368      8.111994  0.103126490
## 825 8.447414      8.732519      8.633142      8.831895 -0.285104320
## 831 8.197814      8.278899      8.168372      8.389427 -0.081085445
## 834 7.844633      7.825153      7.737407      7.912899  0.019479257
## 845 8.704336      8.621222      8.521778      8.720667  0.083114111
## 852 7.698936      7.848969      7.750422      7.947516 -0.150032848
## 854 8.641356      8.671832      8.564195      8.779469 -0.030476560
## 864 9.530248      9.484186      9.336369      9.632003  0.046061442
##      SquaredResidual
## 6      2.128774e-02
## 27     2.828784e-01
## 32     1.760235e-01
## 35     2.708685e-01
## 40     6.856086e-03
## 45     4.598459e-01
## 48     2.242236e-04
## 49     4.459972e-02
## 53     1.878488e-01
## 55     6.415617e-02
## 57     9.212204e-05

```

```
## 58      1.674140e-01
## 65      5.077035e-03
## 82      5.565233e-03
## 83      3.028114e-03
## 86      7.886549e-03
## 94      9.667868e-04
## 95      2.560923e-02
## 97      5.807720e-03
## 103     2.085499e-02
## 107     6.930982e-02
## 109     2.868525e-01
## 114     1.433637e-04
## 118     2.896629e-02
## 124     6.433823e-02
## 125     6.815210e-02
## 127     1.443725e-01
## 137     3.449495e-04
## 160     3.851315e-02
## 162     2.049899e-02
## 166     5.711297e-03
## 176     6.572015e-02
## 181     1.396292e-02
## 182     1.986568e-02
## 187     4.743427e-03
## 191     8.485468e-02
## 192     3.268218e-02
## 202     1.507651e-01
## 204     7.907632e-02
## 216     1.785687e-02
## 217     1.990824e-01
## 224     3.050183e-01
## 225     2.334831e-01
## 228     5.115892e-02
## 245     3.902029e-02
## 253     7.478988e-03
## 254     2.303479e-02
## 261     3.929262e-02
## 272     4.914281e-02
## 273     5.637514e-03
## 278     1.664812e-02
## 279     1.759331e-02
## 280     1.430537e-01
## 283     1.033619e-02
## 284     7.381079e-02
## 289     1.868753e-02
## 295     3.805467e-02
## 297     2.224827e-01
## 308     2.050513e-02
## 311     2.286100e-02
## 312     2.658046e-03
```

```
## 318    3.101063e-02
## 324    1.914545e-02
## 328    4.179587e-02
## 333    8.515931e-03
## 338    1.005725e-01
## 340    3.692337e-03
## 368    9.977735e-04
## 369    5.468012e-02
## 377    1.089617e-02
## 379    1.495995e-01
## 387    4.269572e-03
## 388    5.230490e-02
## 389    8.976975e-03
## 400    1.391027e-03
## 406    2.739442e-04
## 407    1.085806e-02
## 417    5.381560e-04
## 424    1.329547e-01
## 425    1.553103e-02
## 436    1.820041e-03
## 438    3.891335e-03
## 448    7.049745e-03
## 451    6.848387e-02
## 452    3.015417e-02
## 453    1.809131e-03
## 454    9.189850e-05
## 456    6.768213e-03
## 459    8.653650e-02
## 461    1.318454e-01
## 465    9.582064e-03
## 466    1.253823e-01
## 467    4.252680e-04
## 473    4.644508e-02
## 474    1.311023e-02
## 479    3.330045e-03
## 480    4.013575e-02
## 482    7.933787e-02
## 488    6.260419e-04
## 492    2.946620e-04
## 494    6.560380e-04
## 496    1.112381e-03
## 511    2.607649e-03
## 516    4.930357e-03
## 521    1.057522e-03
## 527    3.224894e-02
## 530    2.141668e-01
## 532    1.461327e-02
## 540    7.507695e-03
## 547    3.559674e-04
## 550    1.075820e-01
```

```
## 565    1.318876e-01
## 566    5.097739e-02
## 567    2.656940e-01
## 573    3.002063e-02
## 584    3.883392e-02
## 596    1.338298e-01
## 601    3.340193e-03
## 603    6.543825e-03
## 604    1.481972e-06
## 608    5.559701e-05
## 618    8.299392e-03
## 626    1.261316e-02
## 627    9.594601e-02
## 628    3.075470e-03
## 636    1.538397e-02
## 639    1.202780e-02
## 653    2.943399e-02
## 654    5.462167e-02
## 665    1.748653e-02
## 667    2.442656e-03
## 674    9.150606e-02
## 680    2.600723e-02
## 681    4.411630e-02
## 688    5.219736e-04
## 695    3.607738e-01
## 696    2.450433e-02
## 697    1.056175e-02
## 698    5.246149e-02
## 700    5.193908e-02
## 703    3.491575e-02
## 712    9.556648e-03
## 719    7.069887e-02
## 727    2.923998e-03
## 731    1.184620e-02
## 732    6.288241e-03
## 738    6.970050e-03
## 740    2.227038e-02
## 752    3.368370e-04
## 755    1.903857e-02
## 756    1.650761e-01
## 768    8.341929e-02
## 769    1.105183e-01
## 772    1.458549e-02
## 774    8.122161e-02
## 776    6.835696e-02
## 778    5.505429e-02
## 788    4.097823e-02
## 799    3.802972e-02
## 803    1.890017e-02
## 804    4.643507e-02
```

```
## 809      9.474533e-04
## 814      5.111200e-05
## 816      6.594189e-03
## 818      3.232868e-02
## 821      1.063507e-02
## 825      8.128447e-02
## 831      6.574849e-03
## 834      3.794414e-04
## 845      6.907955e-03
## 852      2.250986e-02
## 854      9.288207e-04
## 864      2.121656e-03
```

```
mean(MSPE$SquaredResidual)
```

```
## [1] 0.05108796
```

```
##Removing Job ROle and Department and removing outliers
```

```
EmplTrain<-Train%>%select(Age,Attrition,BusinessTravel,Daily.Rate,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Hourly.Rate),(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,(Monthly.Rate),Num.Companies.Worked,OverTime,Percent.Salary.Hike,Performance.Rating,Relationship.Satisfaction,Stock.Option.Level,(Total.Working.Years),Training.Times.Last.Year,Work.Life.Balance,(Years.At.Company),Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
EmplTest<-Test%>%select(Age,Attrition,BusinessTravel,Daily.Rate,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Hourly.Rate),(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,(Monthly.Rate),Num.Companies.Worked,OverTime,Percent.Salary.Hike,Performance.Rating,Relationship.Satisfaction,Stock.Option.Level,(Total.Working.Years),Training.Times.Last.Year,Work.Life.Balance,(Years.At.Company),Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
dim(EmplTest)
```

```
## [1] 173 29
```

```
dim(EmplTrain)
```

```
## [1] 689 29
```

```
Model_Null<-lm(log(Monthly.Income)~.,data=EmplTrain) # . means all variable not mpg
```

```
summary(Model_Null)
```

```
##
```

```
## Call:
```

```
## lm(formula = log(Monthly.Income) ~ ., data = EmplTrain)
```

```
##
```

```
## Residuals:
```

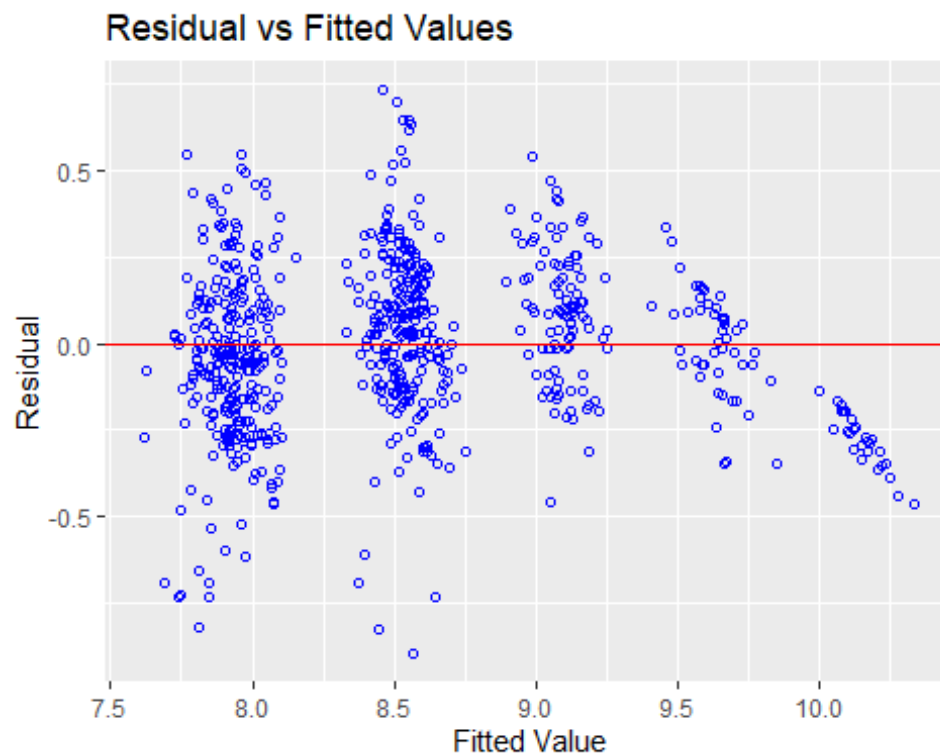
```
##      Min      1Q   Median      3Q      Max
## -0.89888 -0.14967 -0.00222  0.15484  0.73458
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    7.214e+00  1.625e-01  44.400 < 2e-16 ***
## Age            1.259e-03  1.461e-03   0.862 0.389245
## AttritionYes   -1.147e-01  3.102e-02 -3.698 0.000236 ***
## BusinessTravelTravel_Frequently  4.507e-02  3.631e-02   1.241 0.215017
## BusinessTravelTravel_Rarely      6.992e-02  3.017e-02   2.318 0.020776 *
## Daily.Rate      6.136e-05  2.371e-05   2.588 0.009858 **
## Distance.From.Home -1.205e-04  1.172e-03  -0.103 0.918097
## Education      -1.276e-03  9.573e-03  -0.133 0.894015
## EducationFieldLife Sciences    6.635e-02  7.707e-02   0.861 0.389569
## EducationFieldMarketing    1.130e-01  8.047e-02   1.404 0.160736
## EducationFieldMedical    5.298e-02  7.771e-02   0.682 0.495676
## EducationFieldOther    1.119e-01  8.469e-02   1.321 0.187075
## EducationFieldTechnical Degree  2.203e-02  8.196e-02   0.269 0.788144
## Environment.Satisfaction -2.028e-02  8.803e-03  -2.303 0.021566 *
## GenderMale      5.995e-04  1.951e-02   0.031 0.975494
## Hourly.Rate     3.513e-04  4.834e-04   0.727 0.467642
## Job.Involvement  9.814e-03  1.396e-02   0.703 0.482199
## Job.Level       5.371e-01  1.448e-02  37.095 < 2e-16 ***
## Job.Satisfaction  3.570e-03  8.721e-03   0.409 0.682427
## Marital.StatusMarried -3.489e-03  2.614e-02  -0.133 0.893890
## Marital.StatusSingle -1.479e-02  3.555e-02  -0.416 0.677483
## Monthly.Rate     2.090e-06  1.357e-06   1.540 0.123940
## Num.Companies.Worked  1.154e-02  4.386e-03   2.632 0.008693 **
## OverTimeYes      5.120e-02  2.190e-02   2.338 0.019687 *
## Percent.Salary.Hike  4.900e-03  4.110e-03   1.192 0.233620
## Performance.Rating -3.933e-02  4.213e-02  -0.934 0.350894
## Relationship.Satisfaction -1.230e-02  8.697e-03  -1.414 0.157872
## Stock.Option.Level  3.752e-03  1.506e-02   0.249 0.803334
## Total.Working.Years  3.810e-04  2.791e-03   0.136 0.891479
## Training.Times.Last.Year  1.397e-03  7.617e-03   0.183 0.854497
## Work.Life.Balance -7.019e-03  1.362e-02  -0.516 0.606375
## Years.At.Company -6.035e-03  3.735e-03  -1.616 0.106596
## Years.In.Current.Role  1.188e-02  4.582e-03   2.593 0.009718 **
## Years.Since.Last.Promotion  1.574e-03  4.083e-03   0.386 0.699984
## Years.With.Curr.Manager  7.822e-03  4.425e-03   1.767 0.077611 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2454 on 654 degrees of freedom
## Multiple R-squared:  0.87, Adjusted R-squared:  0.8632
## F-statistic: 128.7 on 34 and 654 DF, p-value: < 2.2e-16
```

```
vif(Model_Null)
```

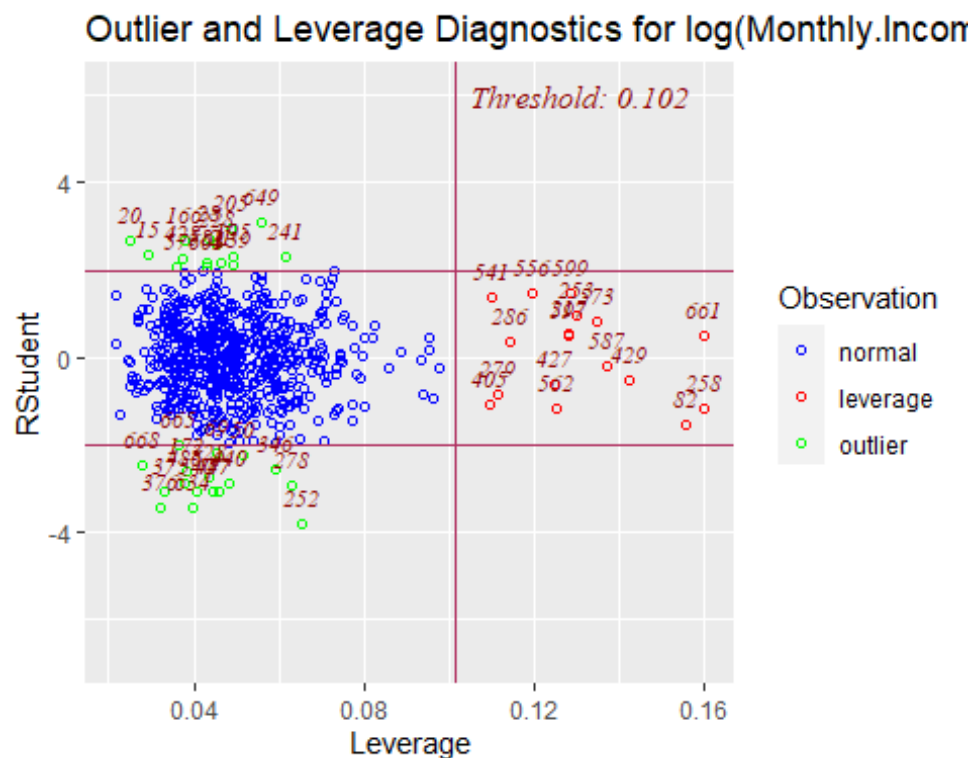
##		GVIF	Df	GVIF^(1/(2*Df))
##	Age	1.953799	1	1.397784
##	Attrition	1.376464	1	1.173228
##	BusinessTravel	1.096878	2	1.023386
##	Daily.Rate	1.036521	1	1.018097
##	Distance.From.Home	1.060868	1	1.029984
##	Education	1.105174	1	1.051272
##	EducationField	1.275694	5	1.024648
##	Environment.Satisfaction	1.064364	1	1.031680
##	Gender	1.042569	1	1.021063
##	Hourly.Rate	1.058995	1	1.029075
##	Job.Involvement	1.074719	1	1.036686
##	Job.Level	2.807214	1	1.675474
##	Job.Satisfaction	1.080699	1	1.039567
##	Marital.Status	2.079730	2	1.200886
##	Monthly.Rate	1.041107	1	1.020347
##	Num.Companies.Worked	1.370725	1	1.170780
##	OverTime	1.136492	1	1.066064
##	Percent.Salary.Hike	2.598258	1	1.611911
##	Performance.Rating	2.580588	1	1.606421
##	Relationship.Satisfaction	1.055597	1	1.027422
##	Stock.Option.Level	1.879109	1	1.370806
##	Total.Working.Years	4.955875	1	2.226179
##	Training.Times.Last.Year	1.051358	1	1.025358
##	Work.Life.Balance	1.041605	1	1.020591
##	Years.At.Company	5.284511	1	2.298806
##	Years.In.Current.Role	3.126788	1	1.768273
##	Years.Since.Last.Promotion	1.864074	1	1.365311
##	Years.With.Curr.Manager	2.829962	1	1.682249

```
par(mfrow=c(1,5))
ols_plot_resid_fit(Model_Null)
```

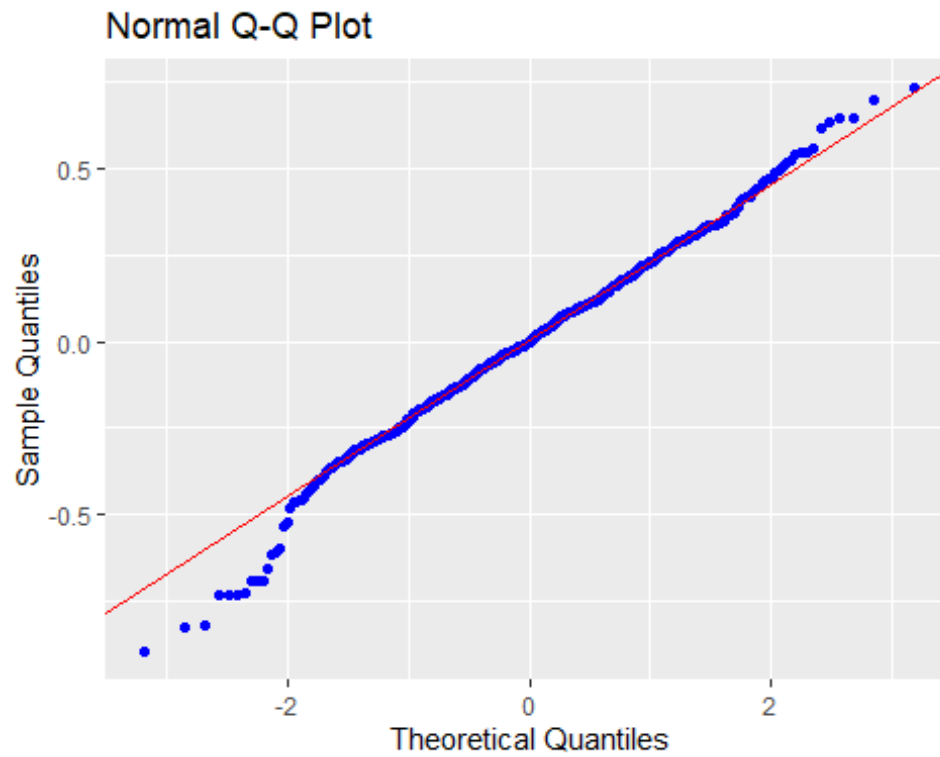




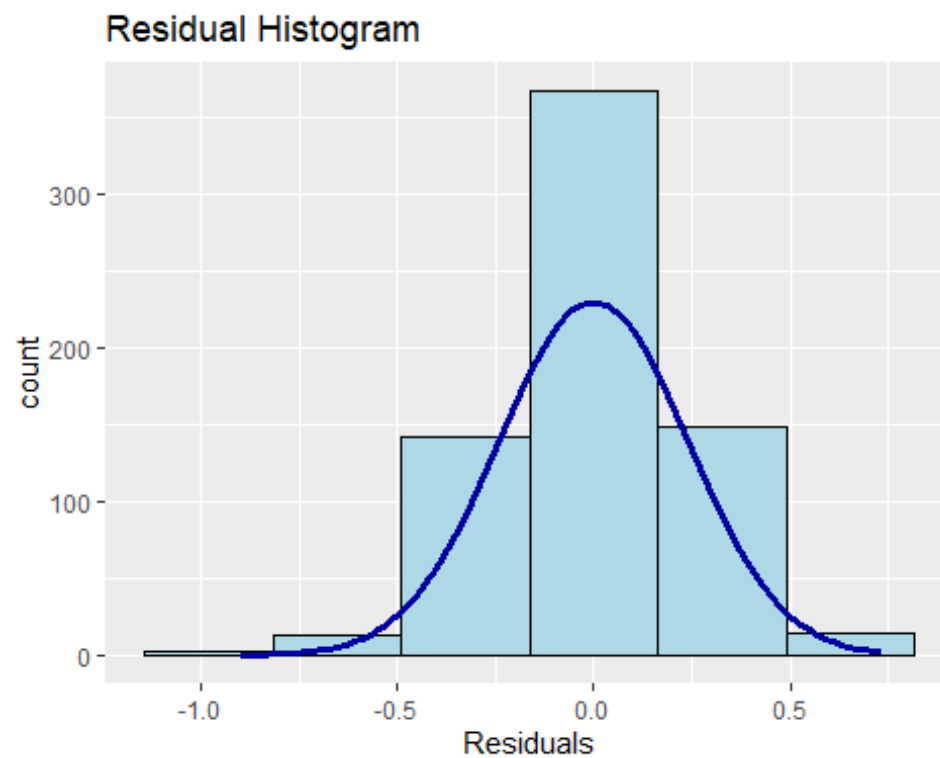
```
ols_plot_resid_lev(Model_Null)
```



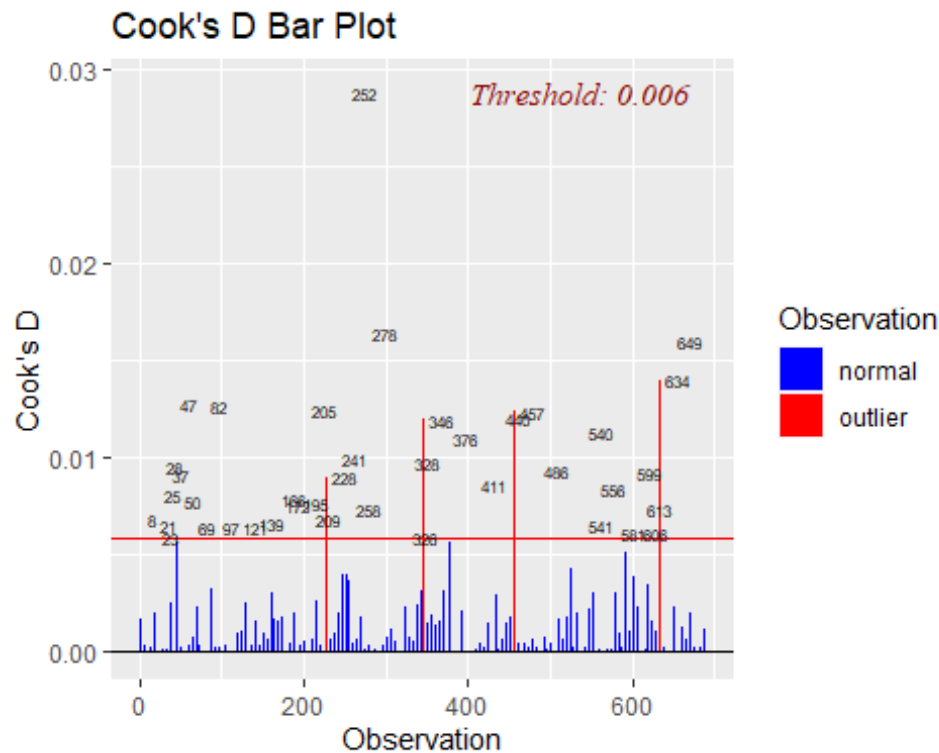
```
ols_plot_resid_qq(Model_Null)
```



```
ols_plot_resid_hist(Model_Null)
```



```
ols_plot_cooksd_bar(Model_Null)
```



*#Assumptions are met:*

*#The histogram shows a bell shape curve which suggests that there is enough evidence for normality.*

*#The QQ Plot shows a straight line which suggests that there is enough evidence for constant variance.*

*#The outliers are all below 0.2 which suggests there is not major high leverage points.*

*#The observations are considered to be independent as they are randomly assigned.*

*#Business Travel Rarely, Daily Rates, Job Level, Laboratory Technician, Research Director, Research Scientist, Sales Representative, Number of companies worked, overtime, Total Working Years, Years In Current Role are statistically significant.*

*#Prediction*

```
Pred_Null=predict(Model_Null , newdata = EmplTest, interval = "confidence")
```

```
as.data.frame(Pred_Null)
```

##	fit	lwr	upr
## 6	8.966675	8.853946	9.079404
## 27	8.553834	8.477738	8.629931
## 32	8.072180	7.944277	8.200083
## 35	8.528084	8.427371	8.628797
## 40	7.951552	7.859629	8.043475
## 45	7.844903	7.757056	7.932750
## 48	9.167045	9.073327	9.260764

## 49	7.862934	7.759261	7.966608
## 53	8.072873	7.967125	8.178621
## 55	8.520492	8.433540	8.607444
## 57	7.917627	7.800776	8.034478
## 58	8.093502	7.988611	8.198393
## 65	7.791887	7.684906	7.898867
## 82	8.576249	8.480853	8.671646
## 83	8.485891	8.387836	8.583946
## 86	9.691359	9.582896	9.799821
## 94	8.544279	8.461301	8.627257
## 95	10.212364	10.110621	10.314107
## 97	9.631403	9.519873	9.742934
## 103	8.609982	8.499430	8.720535
## 107	8.488624	8.365828	8.611421
## 109	8.382242	8.264626	8.499858
## 114	8.376871	8.257697	8.496044
## 118	8.650310	8.543061	8.757559
## 124	8.491513	8.382315	8.600711
## 125	8.563795	8.465429	8.662162
## 127	7.852915	7.728962	7.976867
## 137	7.789474	7.685867	7.893082
## 160	9.076918	8.949588	9.204247
## 162	8.893225	8.764878	9.021571
## 166	7.755306	7.662484	7.848128
## 176	7.910050	7.793780	8.026319
## 181	9.109276	9.020064	9.198489
## 182	8.604664	8.516819	8.692508
## 187	8.516917	8.406306	8.627528
## 191	8.535820	8.439179	8.632462
## 192	9.078909	8.972246	9.185571
## 202	8.530321	8.446275	8.614368
## 204	7.976061	7.863280	8.088841
## 216	7.926476	7.850502	8.002449
## 217	8.556385	8.462707	8.650063
## 224	7.974841	7.880431	8.069250
## 225	8.013332	7.910772	8.115893
## 228	8.016383	7.923647	8.109119
## 245	8.562254	8.475071	8.649436
## 253	7.866969	7.770714	7.963225
## 254	7.701408	7.515337	7.887479
## 261	7.806283	7.702448	7.910117
## 272	8.566638	8.485701	8.647575
## 273	8.511483	8.403233	8.619734
## 278	7.966969	7.858665	8.075274
## 279	8.392815	8.288285	8.497345
## 280	8.557047	8.450623	8.663470
## 283	8.546856	8.466103	8.627609
## 284	8.585986	8.486275	8.685697
## 289	9.106986	8.993741	9.220232
## 295	9.576961	9.468145	9.685778

## 297	8.549076	8.446200	8.651952
## 308	7.874680	7.760094	7.989267
## 311	8.652752	8.563845	8.741659
## 312	9.667832	9.562518	9.773147
## 318	8.466919	8.391006	8.542831
## 324	8.750926	8.620746	8.881106
## 328	8.567301	8.474366	8.660236
## 333	7.848730	7.734030	7.963430
## 338	8.487508	8.388509	8.586506
## 340	7.890165	7.784127	7.996204
## 368	8.498917	8.390491	8.607343
## 369	7.887190	7.790213	7.984168
## 377	7.971999	7.830883	8.113114
## 379	8.085348	7.979097	8.191599
## 387	9.112418	9.004743	9.220093
## 388	8.417723	8.312115	8.523332
## 389	8.515860	8.438775	8.592944
## 400	9.187092	9.079846	9.294339
## 406	9.664552	9.543163	9.785941
## 407	8.602444	8.495712	8.709177
## 417	7.894481	7.794192	7.994769
## 424	7.836322	7.724323	7.948320
## 425	8.456746	8.358084	8.555408
## 436	8.636693	8.541329	8.732057
## 438	7.938260	7.832473	8.044047
## 448	8.563485	8.470617	8.656352
## 451	8.586025	8.468515	8.703536
## 452	7.960558	7.870779	8.050336
## 453	8.449602	8.344226	8.554977
## 454	8.529563	8.436529	8.622596
## 456	10.111709	9.995821	10.227597
## 459	8.008270	7.890077	8.126463
## 461	8.066668	7.948370	8.184966
## 465	7.864553	7.745993	7.983112
## 466	7.943248	7.859510	8.026986
## 467	8.024963	7.933743	8.116183
## 473	9.074468	8.960706	9.188230
## 474	8.039872	7.940179	8.139564
## 479	8.093627	7.964849	8.222404
## 480	9.162659	9.060071	9.265247
## 482	8.054337	7.968896	8.139778
## 488	7.970076	7.865095	8.075057
## 492	9.668762	9.561160	9.776365
## 494	9.065817	8.957388	9.174246
## 496	9.763666	9.636974	9.890359
## 511	8.550500	8.459404	8.641595
## 516	8.526651	8.425395	8.627907
## 521	7.891127	7.802295	7.979959
## 527	8.596846	8.494203	8.699488
## 530	8.046374	7.916339	8.176410

## 532	8.562289	8.474763	8.649816
## 540	8.565693	8.463186	8.668201
## 547	9.131761	8.982208	9.281313
## 550	7.958544	7.860267	8.056822
## 565	7.940966	7.836798	8.045134
## 566	8.057852	7.970271	8.145433
## 567	8.376255	8.270498	8.482012
## 573	8.555848	8.462588	8.649107
## 584	8.637247	8.517776	8.756717
## 596	8.616336	8.507378	8.725294
## 601	7.788779	7.700855	7.876703
## 603	9.119398	9.004679	9.234118
## 604	8.103770	8.005182	8.202359
## 608	8.546896	8.423499	8.670292
## 618	8.688520	8.571601	8.805440
## 626	7.990382	7.899664	8.081100
## 627	8.532163	8.438930	8.625396
## 628	9.159502	9.062100	9.256903
## 636	7.949650	7.834216	8.065085
## 639	8.049490	7.954596	8.144384
## 653	9.157857	9.042831	9.272883
## 654	9.097074	8.977531	9.216617
## 665	8.494850	8.380022	8.609679
## 667	9.046747	8.925160	9.168335
## 674	7.875823	7.739543	8.012103
## 680	7.965268	7.865944	8.064593
## 681	8.496846	8.384305	8.609388
## 688	7.892014	7.792808	7.991220
## 695	8.445019	8.334482	8.555556
## 696	8.053416	7.949680	8.157152
## 697	9.539408	9.415941	9.662876
## 698	8.633580	8.533247	8.733913
## 700	10.171325	10.071683	10.270967
## 703	9.137267	8.999481	9.275053
## 712	9.641369	9.506661	9.776077
## 719	8.522941	8.392305	8.653576
## 727	8.005452	7.913515	8.097389
## 731	8.498823	8.393123	8.604523
## 732	8.464904	8.360206	8.569602
## 738	8.499412	8.399751	8.599074
## 740	8.544546	8.435275	8.653817
## 752	7.811529	7.708158	7.914901
## 755	9.219353	9.095886	9.342819
## 756	7.836283	7.721892	7.950674
## 768	8.992849	8.862328	9.123369
## 769	8.415455	8.315495	8.515415
## 772	9.154925	9.006240	9.303610
## 774	7.827361	7.721181	7.933541
## 776	7.947442	7.855841	8.039043
## 778	7.843303	7.739100	7.947505

```
## 788 8.431988 8.318275 8.545701
## 799 7.761630 7.639331 7.883930
## 803 9.585419 9.473111 9.697727
## 804 8.976190 8.857032 9.095347
## 809 7.916602 7.810594 8.022610
## 814 10.084418 9.973347 10.195490
## 816 8.007866 7.912266 8.103465
## 818 9.002215 8.912521 9.091908
## 821 8.032253 7.917417 8.147089
## 825 8.604230 8.511919 8.696541
## 831 8.487732 8.376182 8.599283
## 834 7.869657 7.780415 7.958898
## 845 8.490197 8.389901 8.590494
## 852 7.852041 7.747050 7.957031
## 854 8.519911 8.416502 8.623320
## 864 9.590017 9.439599 9.740435
```

```
MSPE = data.frame(Observed = log(EmplTest$Monthly.Income), Predicted = Pred_Null)
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
MSPE$SquaredResidual = MSPE$Residual^2
MSPE
```

##	Observed	Predicted.fit	Predicted.lwr	Predicted.upr	Residual
## 6	9.081711	8.966675	8.853946	9.079404	0.115036597
## 27	9.202711	8.553834	8.477738	8.629931	0.648877183
## 32	7.614805	8.072180	7.944277	8.200083	-0.457374279
## 35	9.177714	8.528084	8.427371	8.628797	0.649629980
## 40	7.934155	7.951552	7.859629	8.043475	-0.017396722
## 45	7.109062	7.844903	7.757056	7.932750	-0.735841163
## 48	9.075665	9.167045	9.073327	9.260764	-0.091379993
## 49	7.537963	7.862934	7.759261	7.966608	-0.324971564
## 53	7.606387	8.072873	7.967125	8.178621	-0.466485865
## 55	8.394800	8.520492	8.433540	8.607444	-0.125692148
## 57	7.922624	7.917627	7.800776	8.034478	0.004996754
## 58	8.460199	8.093502	7.988611	8.198393	0.366697464
## 65	7.700748	7.791887	7.684906	7.898867	-0.091138804
## 82	8.836810	8.576249	8.480853	8.671646	0.260560581
## 83	8.579417	8.485891	8.387836	8.583946	0.093525753
## 86	9.527047	9.691359	9.582896	9.799821	-0.164311464
## 94	8.722906	8.544279	8.461301	8.627257	0.178626938
## 95	9.899781	10.212364	10.110621	10.314107	-0.312583059
## 97	9.717519	9.631403	9.519873	9.742934	0.086115910
## 103	8.785387	8.609982	8.499430	8.720535	0.175404542
## 107	8.370779	8.488624	8.365828	8.611421	-0.117845016
## 109	9.096724	8.382242	8.264626	8.499858	0.714481751
## 114	8.535622	8.376871	8.257697	8.496044	0.158751642
## 118	8.300280	8.650310	8.543061	8.757559	-0.350030051
## 124	8.301025	8.491513	8.382315	8.600711	-0.190487996
## 125	8.423761	8.563795	8.465429	8.662162	-0.140034124

## 127	8.273592	7.852915	7.728962	7.976867	0.420676886
## 137	7.748891	7.789474	7.685867	7.893082	-0.040583037
## 160	9.487290	9.076918	8.949588	9.204247	0.410372519
## 162	9.073604	8.893225	8.764878	9.021571	0.180379299
## 166	7.622664	7.755306	7.662484	7.848128	-0.132641988
## 176	7.635304	7.910050	7.793780	8.026319	-0.274745883
## 181	9.237372	9.109276	9.020064	9.198489	0.128095549
## 182	8.838262	8.604664	8.516819	8.692508	0.233598050
## 187	8.557567	8.516917	8.406306	8.627528	0.040649707
## 191	8.661294	8.535820	8.439179	8.632462	0.125473277
## 192	9.173365	9.078909	8.972246	9.185571	0.094456574
## 202	8.735525	8.530321	8.446275	8.614368	0.205203928
## 204	7.703459	7.976061	7.863280	8.088841	-0.272601490
## 216	7.760041	7.926476	7.850502	8.002449	-0.166434836
## 217	9.192584	8.556385	8.462707	8.650063	0.636198530
## 224	7.354362	7.974841	7.880431	8.069250	-0.620478228
## 225	8.470311	8.013332	7.910772	8.115893	0.456978763
## 228	7.752765	8.016383	7.923647	8.109119	-0.263618033
## 245	8.528331	8.562254	8.475071	8.649436	-0.033922608
## 253	7.729296	7.866969	7.770714	7.963225	-0.137673646
## 254	7.991592	7.701408	7.515337	7.887479	0.290184207
## 261	7.932003	7.806283	7.702448	7.910117	0.125720632
## 272	8.600247	8.566638	8.485701	8.647575	0.033608289
## 273	8.171882	8.511483	8.403233	8.619734	-0.339601491
## 278	7.805882	7.966969	7.858665	8.075274	-0.161087006
## 279	8.655911	8.392815	8.288285	8.497345	0.263096427
## 280	8.302762	8.557047	8.450623	8.663470	-0.254284932
## 283	8.781555	8.546856	8.466103	8.627609	0.234699715
## 284	8.928905	8.585986	8.486275	8.685697	0.342919025
## 289	9.183791	9.106986	8.993741	9.220232	0.076804748
## 295	9.707290	9.576961	9.468145	9.685778	0.130328774
## 297	9.163982	8.549076	8.446200	8.651952	0.614906307
## 308	7.999343	7.874680	7.760094	7.989267	0.124662487
## 311	8.609590	8.652752	8.563845	8.741659	-0.043161953
## 312	9.490771	9.667832	9.562518	9.773147	-0.177060957
## 318	8.437500	8.466919	8.391006	8.542831	-0.029418274
## 324	8.437067	8.750926	8.620746	8.881106	-0.313858681
## 328	8.596004	8.567301	8.474366	8.660236	0.028703368
## 333	7.758761	7.848730	7.734030	7.963430	-0.089969742
## 338	8.956222	8.487508	8.388509	8.586506	0.468714231
## 340	7.758333	7.890165	7.784127	7.996204	-0.131831855
## 368	8.607582	8.498917	8.390491	8.607343	0.108665208
## 369	7.636752	7.887190	7.790213	7.984168	-0.250438297
## 377	7.916807	7.971999	7.830883	8.113114	-0.055191066
## 379	7.681560	8.085348	7.979097	8.191599	-0.403787640
## 387	9.081256	9.112418	9.004743	9.220093	-0.031161744
## 388	8.357494	8.417723	8.312115	8.523332	-0.060229486
## 389	8.412277	8.515860	8.438775	8.592944	-0.103582553
## 400	9.231025	9.187092	9.079846	9.294339	0.043932607
## 406	9.718783	9.664552	9.543163	9.785941	0.054230851



## 407	8.606668	8.602444	8.495712	8.709177	0.004223855
## 417	7.849324	7.894481	7.794192	7.994769	-0.045156734
## 424	7.384610	7.836322	7.724323	7.948320	-0.451711415
## 425	8.460411	8.456746	8.358084	8.555408	0.003665267
## 436	8.734560	8.636693	8.541329	8.732057	0.097866736
## 438	7.961021	7.938260	7.832473	8.044047	0.022761556
## 448	8.619389	8.563485	8.470617	8.656352	0.055904007
## 451	8.492491	8.586025	8.468515	8.703536	-0.093534921
## 452	8.137396	7.960558	7.870779	8.050336	0.176838304
## 453	8.667852	8.449602	8.344226	8.554977	0.218250430
## 454	8.610137	8.529563	8.436529	8.622596	0.080574256
## 456	9.895102	10.111709	9.995821	10.227597	-0.216606471
## 459	7.633370	8.008270	7.890077	8.126463	-0.374900143
## 461	7.646354	8.066668	7.948370	8.184966	-0.420314001
## 465	7.798523	7.864553	7.745993	7.983112	-0.066029693
## 466	8.279951	7.943248	7.859510	8.026986	0.336702619
## 467	7.880048	8.024963	7.933743	8.116183	-0.144914369
## 473	9.491375	9.074468	8.960706	9.188230	0.416907229
## 474	8.146709	8.039872	7.940179	8.139564	0.106837407
## 479	7.989560	8.093627	7.964849	8.222404	-0.104066189
## 480	9.528358	9.162659	9.060071	9.265247	0.365698322
## 482	7.764721	8.054337	7.968896	8.139778	-0.289616537
## 488	7.976252	7.970076	7.865095	8.075057	0.006176189
## 492	9.733885	9.668762	9.561160	9.776365	0.065122354
## 494	9.060215	9.065817	8.957388	9.174246	-0.005602186
## 496	9.699350	9.763666	9.636974	9.890359	-0.064316667
## 511	8.583543	8.550500	8.459404	8.641595	0.033042648
## 516	8.609225	8.526651	8.425395	8.627907	0.082574141
## 521	7.845024	7.891127	7.802295	7.979959	-0.046102572
## 527	8.518392	8.596846	8.494203	8.699488	-0.078453078
## 530	8.509766	8.046374	7.916339	8.176410	0.463391450
## 532	8.826881	8.562289	8.474763	8.649816	0.264591866
## 540	8.547722	8.565693	8.463186	8.668201	-0.017971066
## 547	8.909641	9.131761	8.982208	9.281313	-0.222120286
## 550	7.685703	7.958544	7.860267	8.056822	-0.272841234
## 565	8.251403	7.940966	7.836798	8.045134	0.310437053
## 566	7.798113	8.057852	7.970271	8.145433	-0.259739407
## 567	7.685244	8.376255	8.270498	8.482012	-0.691011035
## 573	8.829665	8.555848	8.462588	8.649107	0.273817521
## 584	8.471987	8.637247	8.517776	8.756717	-0.165259987
## 596	8.303257	8.616336	8.507378	8.725294	-0.313078906
## 601	7.617268	7.788779	7.700855	7.876703	-0.171511422
## 603	9.342771	9.119398	9.004679	9.234118	0.223372953
## 604	8.049108	8.103770	8.005182	8.202359	-0.054662735
## 608	8.631414	8.546896	8.423499	8.670292	0.084518673
## 618	8.604105	8.688520	8.571601	8.805440	-0.084415521
## 626	7.830823	7.990382	7.899664	8.081100	-0.159559244
## 627	8.333751	8.532163	8.438930	8.625396	-0.198412103
## 628	9.350972	9.159502	9.062100	9.256903	0.191469914
## 636	7.773174	7.949650	7.834216	8.065085	-0.176476595

```

## 639 7.910224      8.049490      7.954596      8.144384 -0.139266137
## 653 9.510371      9.157857      9.042831      9.272883  0.352514066
## 654 9.433804      9.097074      8.977531      9.216617  0.336729702
## 665 8.426831      8.494850      8.380022      8.609679 -0.068019711
## 667 8.976894      9.046747      8.925160      9.168335 -0.069853481
## 674 7.611842      7.875823      7.739543      8.012103 -0.263980765
## 680 7.753194      7.965268      7.865944      8.064593 -0.212073991
## 681 8.356085      8.496846      8.384305      8.609388 -0.140761106
## 688 7.871693      7.892014      7.792808      7.991220 -0.020321117
## 695 9.161675      8.445019      8.334482      8.555556  0.716656477
## 696 8.099858      8.053416      7.949680      8.157152  0.046441636
## 697 9.629182      9.539408      9.415941      9.662876  0.089774122
## 698 8.685078      8.633580      8.533247      8.733913  0.051498018
## 700 9.856448      10.171325     10.071683     10.270967 -0.314876816
## 703 9.247347      9.137267      8.999481      9.275053  0.110080300
## 712 9.555206      9.641369      9.506661      9.776077 -0.086163120
## 719 8.429673      8.522941      8.392305      8.653576 -0.093268279
## 727 7.997327      8.005452      7.913515      8.097389 -0.008124995
## 731 8.469053      8.498823      8.393123      8.604523 -0.029769969
## 732 8.563695      8.464904      8.360206      8.569602  0.098791084
## 738 8.550821      8.499412      8.399751      8.599074  0.051409117
## 740 8.210940      8.544546      8.435275      8.653817 -0.333606258
## 752 7.741534      7.811529      7.708158      7.914901 -0.069995807
## 755 9.514068      9.219353      9.095886      9.342819  0.294715266
## 756 8.218248      7.836283      7.721892      7.950674  0.381964944
## 768 9.299450      8.992849      8.862328      9.123369  0.306600741
## 769 8.906393      8.415455      8.315495      8.515415  0.490938525
## 772 9.254644      9.154925      9.006240      9.303610  0.099719021
## 774 8.127995      7.827361      7.721181      7.933541  0.300633734
## 776 8.161946      7.947442      7.855841      8.039043  0.214503415
## 778 7.946971      7.843303      7.739100      7.947505  0.103668774
## 788 8.505323      8.431988      8.318275      8.545701  0.073334754
## 799 7.527794      7.761630      7.639331      7.883930 -0.233836314
## 803 9.744961      9.585419      9.473111      9.697727  0.159541567
## 804 9.167642      8.976190      8.857032      9.095347  0.191452090
## 809 7.959276      7.916602      7.810594      8.022610  0.042673928
## 814 9.886240      10.084418     9.973347     10.195490 -0.198178809
## 816 7.930566      8.007866      7.912266      8.103465 -0.077300097
## 818 9.366575      9.002215      8.912521      9.091908  0.364359712
## 821 8.105308      8.032253      7.917417      8.147089  0.073054661
## 825 8.447414      8.604230      8.511919      8.696541 -0.156815739
## 831 8.197814      8.487732      8.376182      8.599283 -0.289918352
## 834 7.844633      7.869657      7.780415      7.958898 -0.025023865
## 845 8.704336      8.490197      8.389901      8.590494  0.214138968
## 852 7.698936      7.852041      7.747050      7.957031 -0.153104498
## 854 8.641356      8.519911      8.416502      8.623320  0.121445036
## 864 9.530248      9.590017      9.439599      9.740435 -0.059769782
##      SquaredResidual
## 6      1.323342e-02
## 27     4.210416e-01

```

```
## 32      2.091912e-01
## 35      4.220191e-01
## 40      3.026459e-04
## 45      5.414622e-01
## 48      8.350303e-03
## 49      1.056065e-01
## 53      2.176091e-01
## 55      1.579852e-02
## 57      2.496755e-05
## 58      1.344670e-01
## 65      8.306282e-03
## 82      6.789182e-02
## 83      8.747066e-03
## 86      2.699826e-02
## 94      3.190758e-02
## 95      9.770817e-02
## 97      7.415950e-03
## 103     3.076675e-02
## 107     1.388745e-02
## 109     5.104842e-01
## 114     2.520208e-02
## 118     1.225210e-01
## 124     3.628568e-02
## 125     1.960956e-02
## 127     1.769690e-01
## 137     1.646983e-03
## 160     1.684056e-01
## 162     3.253669e-02
## 166     1.759390e-02
## 176     7.548530e-02
## 181     1.640847e-02
## 182     5.456805e-02
## 187     1.652399e-03
## 191     1.574354e-02
## 192     8.922044e-03
## 202     4.210865e-02
## 204     7.431157e-02
## 216     2.770055e-02
## 217     4.047486e-01
## 224     3.849932e-01
## 225     2.088296e-01
## 228     6.949447e-02
## 245     1.150743e-03
## 253     1.895403e-02
## 254     8.420687e-02
## 261     1.580568e-02
## 272     1.129517e-03
## 273     1.153292e-01
## 278     2.594902e-02
## 279     6.921973e-02
```

```
## 280    6.466083e-02
## 283    5.508396e-02
## 284    1.175935e-01
## 289    5.898969e-03
## 295    1.698559e-02
## 297    3.781098e-01
## 308    1.554074e-02
## 311    1.862954e-03
## 312    3.135058e-02
## 318    8.654348e-04
## 324    9.850727e-02
## 328    8.238833e-04
## 333    8.094554e-03
## 338    2.196930e-01
## 340    1.737964e-02
## 368    1.180813e-02
## 369    6.271934e-02
## 377    3.046054e-03
## 379    1.630445e-01
## 387    9.710543e-04
## 388    3.627591e-03
## 389    1.072935e-02
## 400    1.930074e-03
## 406    2.940985e-03
## 407    1.784095e-05
## 417    2.039131e-03
## 424    2.040432e-01
## 425    1.343418e-05
## 436    9.577898e-03
## 438    5.180885e-04
## 448    3.125258e-03
## 451    8.748781e-03
## 452    3.127179e-02
## 453    4.763325e-02
## 454    6.492211e-03
## 456    4.691836e-02
## 459    1.405501e-01
## 461    1.766639e-01
## 465    4.359920e-03
## 466    1.133687e-01
## 467    2.100017e-02
## 473    1.738116e-01
## 474    1.141423e-02
## 479    1.082977e-02
## 480    1.337353e-01
## 482    8.387774e-02
## 488    3.814531e-05
## 492    4.240921e-03
## 494    3.138448e-05
## 496    4.136634e-03
```

```
## 511    1.091817e-03
## 516    6.818489e-03
## 521    2.125447e-03
## 527    6.154885e-03
## 530    2.147316e-01
## 532    7.000886e-02
## 540    3.229592e-04
## 547    4.933742e-02
## 550    7.444234e-02
## 565    9.637116e-02
## 566    6.746456e-02
## 567    4.774963e-01
## 573    7.497603e-02
## 584    2.731086e-02
## 596    9.801840e-02
## 601    2.941617e-02
## 603    4.989548e-02
## 604    2.988015e-03
## 608    7.143406e-03
## 618    7.125980e-03
## 626    2.545915e-02
## 627    3.936736e-02
## 628    3.666073e-02
## 636    3.114399e-02
## 639    1.939506e-02
## 653    1.242662e-01
## 654    1.133869e-01
## 665    4.626681e-03
## 667    4.879509e-03
## 674    6.968584e-02
## 680    4.497538e-02
## 681    1.981369e-02
## 688    4.129478e-04
## 695    5.135965e-01
## 696    2.156826e-03
## 697    8.059393e-03
## 698    2.652046e-03
## 700    9.914741e-02
## 703    1.211767e-02
## 712    7.424083e-03
## 719    8.698972e-03
## 727    6.601555e-05
## 731    8.862510e-04
## 732    9.759678e-03
## 738    2.642897e-03
## 740    1.112931e-01
## 752    4.899413e-03
## 755    8.685709e-02
## 756    1.458972e-01
## 768    9.400401e-02
```

```
## 769      2.410206e-01
## 772      9.943883e-03
## 774      9.038064e-02
## 776      4.601172e-02
## 778      1.074721e-02
## 788      5.377986e-03
## 799      5.467942e-02
## 803      2.545351e-02
## 804      3.665390e-02
## 809      1.821064e-03
## 814      3.927484e-02
## 816      5.975305e-03
## 818      1.327580e-01
## 821      5.336983e-03
## 825      2.459118e-02
## 831      8.405265e-02
## 834      6.261938e-04
## 845      4.585550e-02
## 852      2.344099e-02
## 854      1.474890e-02
## 864      3.572427e-03

mean(MSPE$SquaredResidual)

## [1] 0.06735389

##### Forward Model #####
#Forward:
Model_FWD<-stepAIC(Model_Null,direction="forward",trace=FALSE)
summary(Model_FWD)

##
## Call:
## lm(formula = log(Monthly.Income) ~ Age + Attrition + BusinessTravel +
##      Daily.Rate + Distance.From.Home + Education + EducationField +
##      Environment.Satisfaction + Gender + Hourly.Rate + Job.Involvement +
##      Job.Level + Job.Satisfaction + Marital.Status + Monthly.Rate +
##      Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Ra
ting +
##      Relationship.Satisfaction + Stock.Option.Level + Total.Working.Years +
##      Training.Times.Last.Year + Work.Life.Balance + Years.At.Company +
##      Years.In.Current.Role + Years.Since.Last.Promotion + Years.With.Curr.M
anager,
##      data = EmplTrain)
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -0.89888 -0.14967 -0.00222  0.15484  0.73458
##
## Coefficients:
##                                     Estimate Std. Error t value Pr(>|t|)
```

```
## (Intercept)          7.214e+00  1.625e-01  44.400 < 2e-16 ***
## Age                  1.259e-03  1.461e-03   0.862 0.389245
## AttritionYes        -1.147e-01  3.102e-02  -3.698 0.000236 ***
## BusinessTravelTravel_Frequently  4.507e-02  3.631e-02   1.241 0.215017
## BusinessTravelTravel_Rarely      6.992e-02  3.017e-02   2.318 0.020776 *
## Daily.Rate           6.136e-05  2.371e-05   2.588 0.009858 **
## Distance.From.Home -1.205e-04  1.172e-03  -0.103 0.918097
## Education            -1.276e-03  9.573e-03  -0.133 0.894015
## EducationFieldLife Sciences    6.635e-02  7.707e-02   0.861 0.389569
## EducationFieldMarketing    1.130e-01  8.047e-02   1.404 0.160736
## EducationFieldMedical    5.298e-02  7.771e-02   0.682 0.495676
## EducationFieldOther    1.119e-01  8.469e-02   1.321 0.187075
## EducationFieldTechnical Degree  2.203e-02  8.196e-02   0.269 0.788144
## Environment.Satisfaction -2.028e-02  8.803e-03  -2.303 0.021566 *
## GenderMale           5.995e-04  1.951e-02   0.031 0.975494
## Hourly.Rate          3.513e-04  4.834e-04   0.727 0.467642
## Job.Involvement       9.814e-03  1.396e-02   0.703 0.482199
## Job.Level            5.371e-01  1.448e-02  37.095 < 2e-16 ***
## Job.Satisfaction      3.570e-03  8.721e-03   0.409 0.682427
## Marital.StatusMarried -3.489e-03  2.614e-02  -0.133 0.893890
## Marital.StatusSingle -1.479e-02  3.555e-02  -0.416 0.677483
## Monthly.Rate         2.090e-06  1.357e-06   1.540 0.123940
## Num.Companies.Worked  1.154e-02  4.386e-03   2.632 0.008693 **
## OverTimeYes          5.120e-02  2.190e-02   2.338 0.019687 *
## Percent.Salary.Hike    4.900e-03  4.110e-03   1.192 0.233620
## Performance.Rating    -3.933e-02  4.213e-02  -0.934 0.350894
## Relationship.Satisfaction -1.230e-02  8.697e-03  -1.414 0.157872
## Stock.Option.Level    3.752e-03  1.506e-02   0.249 0.803334
## Total.Working.Years    3.810e-04  2.791e-03   0.136 0.891479
## Training.Times.Last.Year  1.397e-03  7.617e-03   0.183 0.854497
## Work.Life.Balance     -7.019e-03  1.362e-02  -0.516 0.606375
## Years.At.Company      -6.035e-03  3.735e-03  -1.616 0.106596
## Years.In.Current.Role   1.188e-02  4.582e-03   2.593 0.009718 **
## Years.Since.Last.Promotion  1.574e-03  4.083e-03   0.386 0.699984
## Years.With.Curr.Manager  7.822e-03  4.425e-03   1.767 0.077611 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2454 on 654 degrees of freedom
## Multiple R-squared:  0.87, Adjusted R-squared:  0.8632
## F-statistic: 128.7 on 34 and 654 DF, p-value: < 2.2e-16
```

```
vif(Model_FWD)
```

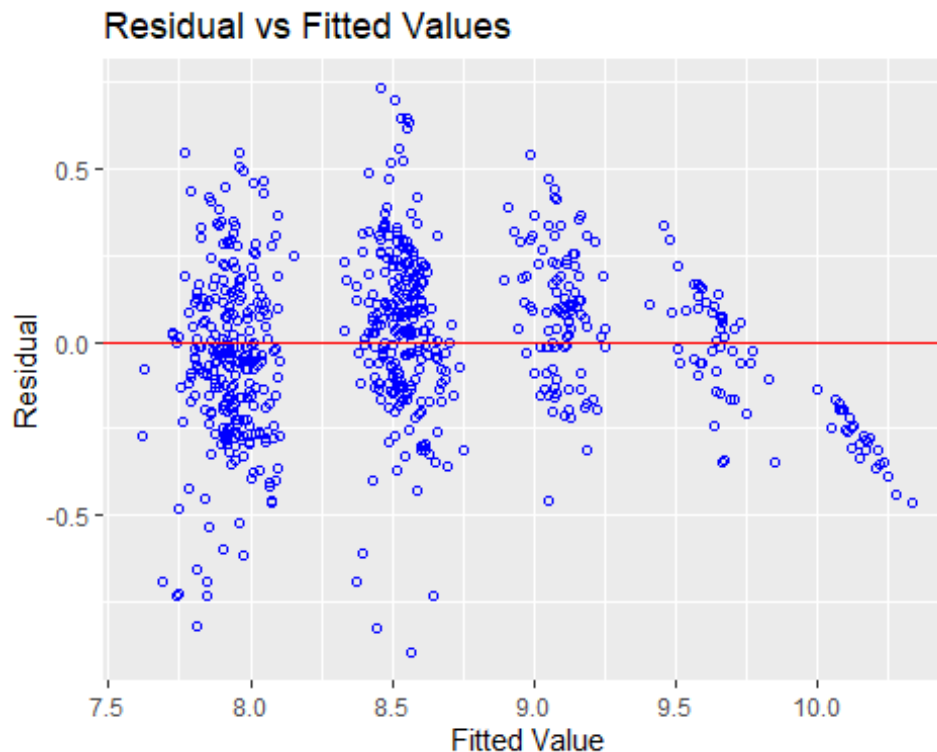
```
##              GVIF Df GVIF^(1/(2*Df))
## Age          1.953799  1      1.397784
## Attrition    1.376464  1      1.173228
## BusinessTravel  1.096878  2      1.023386
## Daily.Rate   1.036521  1      1.018097
## Distance.From.Home  1.060868  1      1.029984
```

```
## Education 1.105174 1 1.051272
## EducationField 1.275694 5 1.024648
## Environment.Satisfaction 1.064364 1 1.031680
## Gender 1.042569 1 1.021063
## Hourly.Rate 1.058995 1 1.029075
## Job.Involvement 1.074719 1 1.036686
## Job.Level 2.807214 1 1.675474
## Job.Satisfaction 1.080699 1 1.039567
## Marital.Status 2.079730 2 1.200886
## Monthly.Rate 1.041107 1 1.020347
## Num.Companies.Worked 1.370725 1 1.170780
## OverTime 1.136492 1 1.066064
## Percent.Salary.Hike 2.598258 1 1.611911
## Performance.Rating 2.580588 1 1.606421
## Relationship.Satisfaction 1.055597 1 1.027422
## Stock.Option.Level 1.879109 1 1.370806
## Total.Working.Years 4.955875 1 2.226179
## Training.Times.Last.Year 1.051358 1 1.025358
## Work.Life.Balance 1.041605 1 1.020591
## Years.At.Company 5.284511 1 2.298806
## Years.In.Current.Role 3.126788 1 1.768273
## Years.Since.Last.Promotion 1.864074 1 1.365311
## Years.With.Curr.Manager 2.829962 1 1.682249
```

```
#Residual Plots
```

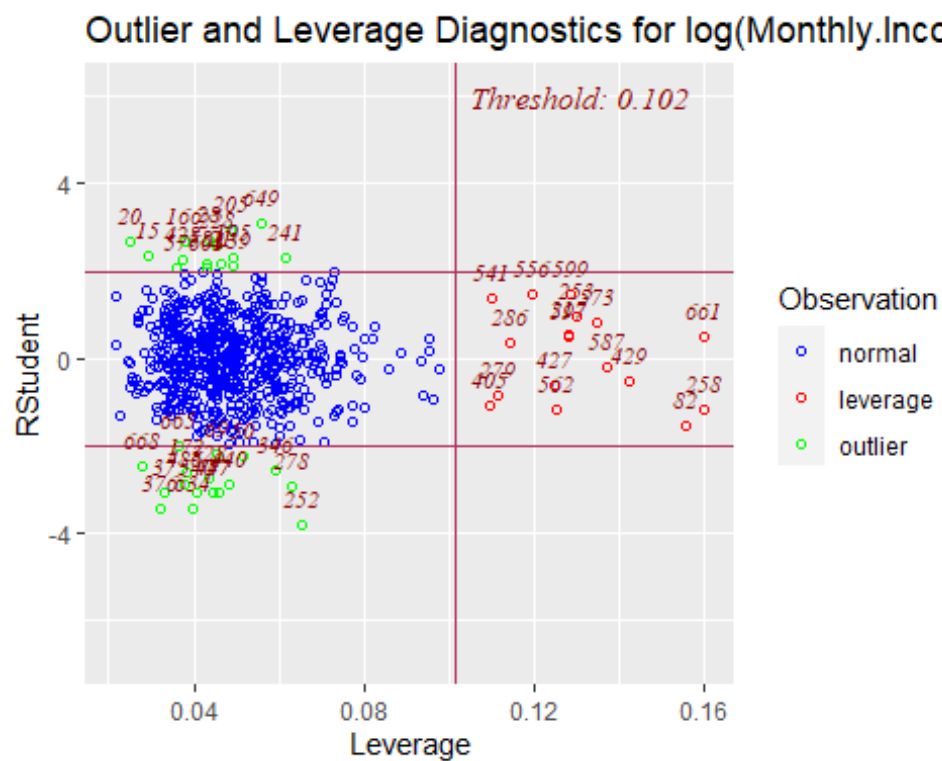
```
par(mfrow=c(1,5))
```

```
ols_plot_resid_fit(Model_FWD)
```

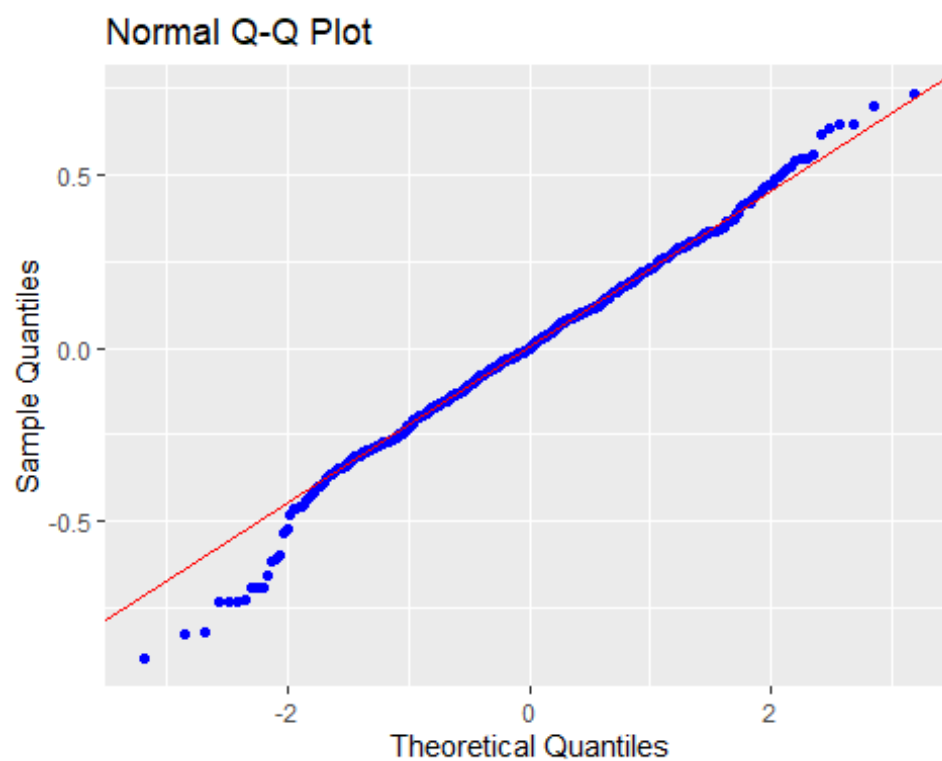




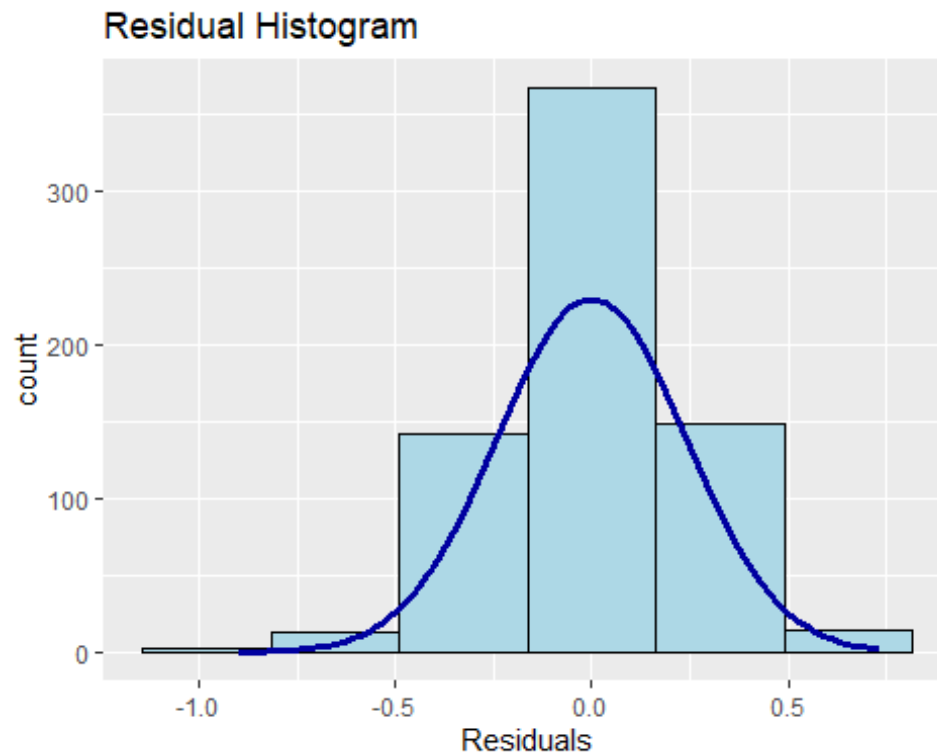
```
ols_plot_resid_lev(Model_FWD)
```



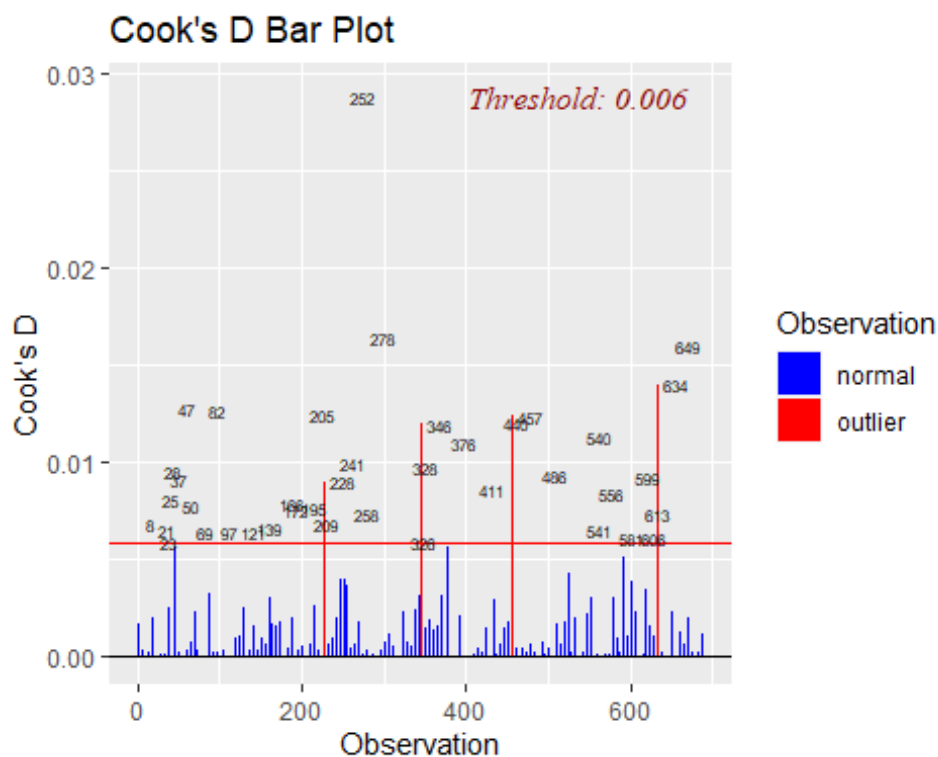
```
ols_plot_resid_qq(Model_FWD)
```



```
ols_plot_resid_hist(Model_FWD)
```



```
ols_plot_cooks_d_bar(Model_FWD)
```



*#Assumptions are met:  
 #The histogram shows a bell shape curve which suggests that there is enough evidence for normality.  
 #The QQ Plot shows a straight line which suggests that there is enough evidence for constant variance.  
 #The outliers are all below 0.2 which suggests there is not major high leverage points.  
 #The observations are considered to be independent as they are randomly assigned.  
 #Business Travel Rarely, Daily Rates, Job Level, Laboratory Technician, Research Director, Research Scientist, Sales Representative, Number of companies worked, overtime, Total.Working.Years, Years.In.Current.Role are statistically significant.*

#### *#Prediction*

```
Pred_FWD=predict(Model_FWD, newdata = EmplTest, interval = "confidence")
as.data.frame(Pred_FWD)
```

##	fit	lwr	upr
## 6	8.966675	8.853946	9.079404
## 27	8.553834	8.477738	8.629931
## 32	8.072180	7.944277	8.200083
## 35	8.528084	8.427371	8.628797
## 40	7.951552	7.859629	8.043475
## 45	7.844903	7.757056	7.932750
## 48	9.167045	9.073327	9.260764
## 49	7.862934	7.759261	7.966608
## 53	8.072873	7.967125	8.178621
## 55	8.520492	8.433540	8.607444
## 57	7.917627	7.800776	8.034478
## 58	8.093502	7.988611	8.198393
## 65	7.791887	7.684906	7.898867
## 82	8.576249	8.480853	8.671646
## 83	8.485891	8.387836	8.583946
## 86	9.691359	9.582896	9.799821
## 94	8.544279	8.461301	8.627257
## 95	10.212364	10.110621	10.314107
## 97	9.631403	9.519873	9.742934
## 103	8.609982	8.499430	8.720535
## 107	8.488624	8.365828	8.611421
## 109	8.382242	8.264626	8.499858
## 114	8.376871	8.257697	8.496044
## 118	8.650310	8.543061	8.757559
## 124	8.491513	8.382315	8.600711
## 125	8.563795	8.465429	8.662162
## 127	7.852915	7.728962	7.976867
## 137	7.789474	7.685867	7.893082
## 160	9.076918	8.949588	9.204247
## 162	8.893225	8.764878	9.021571
## 166	7.755306	7.662484	7.848128

## 176	7.910050	7.793780	8.026319
## 181	9.109276	9.020064	9.198489
## 182	8.604664	8.516819	8.692508
## 187	8.516917	8.406306	8.627528
## 191	8.535820	8.439179	8.632462
## 192	9.078909	8.972246	9.185571
## 202	8.530321	8.446275	8.614368
## 204	7.976061	7.863280	8.088841
## 216	7.926476	7.850502	8.002449
## 217	8.556385	8.462707	8.650063
## 224	7.974841	7.880431	8.069250
## 225	8.013332	7.910772	8.115893
## 228	8.016383	7.923647	8.109119
## 245	8.562254	8.475071	8.649436
## 253	7.866969	7.770714	7.963225
## 254	7.701408	7.515337	7.887479
## 261	7.806283	7.702448	7.910117
## 272	8.566638	8.485701	8.647575
## 273	8.511483	8.403233	8.619734
## 278	7.966969	7.858665	8.075274
## 279	8.392815	8.288285	8.497345
## 280	8.557047	8.450623	8.663470
## 283	8.546856	8.466103	8.627609
## 284	8.585986	8.486275	8.685697
## 289	9.106986	8.993741	9.220232
## 295	9.576961	9.468145	9.685778
## 297	8.549076	8.446200	8.651952
## 308	7.874680	7.760094	7.989267
## 311	8.652752	8.563845	8.741659
## 312	9.667832	9.562518	9.773147
## 318	8.466919	8.391006	8.542831
## 324	8.750926	8.620746	8.881106
## 328	8.567301	8.474366	8.660236
## 333	7.848730	7.734030	7.963430
## 338	8.487508	8.388509	8.586506
## 340	7.890165	7.784127	7.996204
## 368	8.498917	8.390491	8.607343
## 369	7.887190	7.790213	7.984168
## 377	7.971999	7.830883	8.113114
## 379	8.085348	7.979097	8.191599
## 387	9.112418	9.004743	9.220093
## 388	8.417723	8.312115	8.523332
## 389	8.515860	8.438775	8.592944
## 400	9.187092	9.079846	9.294339
## 406	9.664552	9.543163	9.785941
## 407	8.602444	8.495712	8.709177
## 417	7.894481	7.794192	7.994769
## 424	7.836322	7.724323	7.948320
## 425	8.456746	8.358084	8.555408
## 436	8.636693	8.541329	8.732057

## 438	7.938260	7.832473	8.044047
## 448	8.563485	8.470617	8.656352
## 451	8.586025	8.468515	8.703536
## 452	7.960558	7.870779	8.050336
## 453	8.449602	8.344226	8.554977
## 454	8.529563	8.436529	8.622596
## 456	10.111709	9.995821	10.227597
## 459	8.008270	7.890077	8.126463
## 461	8.066668	7.948370	8.184966
## 465	7.864553	7.745993	7.983112
## 466	7.943248	7.859510	8.026986
## 467	8.024963	7.933743	8.116183
## 473	9.074468	8.960706	9.188230
## 474	8.039872	7.940179	8.139564
## 479	8.093627	7.964849	8.222404
## 480	9.162659	9.060071	9.265247
## 482	8.054337	7.968896	8.139778
## 488	7.970076	7.865095	8.075057
## 492	9.668762	9.561160	9.776365
## 494	9.065817	8.957388	9.174246
## 496	9.763666	9.636974	9.890359
## 511	8.550500	8.459404	8.641595
## 516	8.526651	8.425395	8.627907
## 521	7.891127	7.802295	7.979959
## 527	8.596846	8.494203	8.699488
## 530	8.046374	7.916339	8.176410
## 532	8.562289	8.474763	8.649816
## 540	8.565693	8.463186	8.668201
## 547	9.131761	8.982208	9.281313
## 550	7.958544	7.860267	8.056822
## 565	7.940966	7.836798	8.045134
## 566	8.057852	7.970271	8.145433
## 567	8.376255	8.270498	8.482012
## 573	8.555848	8.462588	8.649107
## 584	8.637247	8.517776	8.756717
## 596	8.616336	8.507378	8.725294
## 601	7.788779	7.700855	7.876703
## 603	9.119398	9.004679	9.234118
## 604	8.103770	8.005182	8.202359
## 608	8.546896	8.423499	8.670292
## 618	8.688520	8.571601	8.805440
## 626	7.990382	7.899664	8.081100
## 627	8.532163	8.438930	8.625396
## 628	9.159502	9.062100	9.256903
## 636	7.949650	7.834216	8.065085
## 639	8.049490	7.954596	8.144384
## 653	9.157857	9.042831	9.272883
## 654	9.097074	8.977531	9.216617
## 665	8.494850	8.380022	8.609679
## 667	9.046747	8.925160	9.168335

```
## 674 7.875823 7.739543 8.012103
## 680 7.965268 7.865944 8.064593
## 681 8.496846 8.384305 8.609388
## 688 7.892014 7.792808 7.991220
## 695 8.445019 8.334482 8.555556
## 696 8.053416 7.949680 8.157152
## 697 9.539408 9.415941 9.662876
## 698 8.633580 8.533247 8.733913
## 700 10.171325 10.071683 10.270967
## 703 9.137267 8.999481 9.275053
## 712 9.641369 9.506661 9.776077
## 719 8.522941 8.392305 8.653576
## 727 8.005452 7.913515 8.097389
## 731 8.498823 8.393123 8.604523
## 732 8.464904 8.360206 8.569602
## 738 8.499412 8.399751 8.599074
## 740 8.544546 8.435275 8.653817
## 752 7.811529 7.708158 7.914901
## 755 9.219353 9.095886 9.342819
## 756 7.836283 7.721892 7.950674
## 768 8.992849 8.862328 9.123369
## 769 8.415455 8.315495 8.515415
## 772 9.154925 9.006240 9.303610
## 774 7.827361 7.721181 7.933541
## 776 7.947442 7.855841 8.039043
## 778 7.843303 7.739100 7.947505
## 788 8.431988 8.318275 8.545701
## 799 7.761630 7.639331 7.883930
## 803 9.585419 9.473111 9.697727
## 804 8.976190 8.857032 9.095347
## 809 7.916602 7.810594 8.022610
## 814 10.084418 9.973347 10.195490
## 816 8.007866 7.912266 8.103465
## 818 9.002215 8.912521 9.091908
## 821 8.032253 7.917417 8.147089
## 825 8.604230 8.511919 8.696541
## 831 8.487732 8.376182 8.599283
## 834 7.869657 7.780415 7.958898
## 845 8.490197 8.389901 8.590494
## 852 7.852041 7.747050 7.957031
## 854 8.519911 8.416502 8.623320
## 864 9.590017 9.439599 9.740435
```

```
MSPE = data.frame(Observed = log(EmplTest$Monthly.Income), Predicted = Pred_F
WD)
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
MSPE$SquaredResidual = MSPE$Residual^2
MSPE
```

##	Observed	Predicted.fit	Predicted.lwr	Predicted.upr	Residual
## 6	9.081711	8.966675	8.853946	9.079404	0.115036597
## 27	9.202711	8.553834	8.477738	8.629931	0.648877183
## 32	7.614805	8.072180	7.944277	8.200083	-0.457374279
## 35	9.177714	8.528084	8.427371	8.628797	0.649629980
## 40	7.934155	7.951552	7.859629	8.043475	-0.017396722
## 45	7.109062	7.844903	7.757056	7.932750	-0.735841163
## 48	9.075665	9.167045	9.073327	9.260764	-0.091379993
## 49	7.537963	7.862934	7.759261	7.966608	-0.324971564
## 53	7.606387	8.072873	7.967125	8.178621	-0.466485865
## 55	8.394800	8.520492	8.433540	8.607444	-0.125692148
## 57	7.922624	7.917627	7.800776	8.034478	0.004996754
## 58	8.460199	8.093502	7.988611	8.198393	0.366697464
## 65	7.700748	7.791887	7.684906	7.898867	-0.091138804
## 82	8.836810	8.576249	8.480853	8.671646	0.260560581
## 83	8.579417	8.485891	8.387836	8.583946	0.093525753
## 86	9.527047	9.691359	9.582896	9.799821	-0.164311464
## 94	8.722906	8.544279	8.461301	8.627257	0.178626938
## 95	9.899781	10.212364	10.110621	10.314107	-0.312583059
## 97	9.717519	9.631403	9.519873	9.742934	0.086115910
## 103	8.785387	8.609982	8.499430	8.720535	0.175404542
## 107	8.370779	8.488624	8.365828	8.611421	-0.117845016
## 109	9.096724	8.382242	8.264626	8.499858	0.714481751
## 114	8.535622	8.376871	8.257697	8.496044	0.158751642
## 118	8.300280	8.650310	8.543061	8.757559	-0.350030051
## 124	8.301025	8.491513	8.382315	8.600711	-0.190487996
## 125	8.423761	8.563795	8.465429	8.662162	-0.140034124
## 127	8.273592	7.852915	7.728962	7.976867	0.420676886
## 137	7.748891	7.789474	7.685867	7.893082	-0.040583037
## 160	9.487290	9.076918	8.949588	9.204247	0.410372519
## 162	9.073604	8.893225	8.764878	9.021571	0.180379299
## 166	7.622664	7.755306	7.662484	7.848128	-0.132641988
## 176	7.635304	7.910050	7.793780	8.026319	-0.274745883
## 181	9.237372	9.109276	9.020064	9.198489	0.128095549
## 182	8.838262	8.604664	8.516819	8.692508	0.233598050
## 187	8.557567	8.516917	8.406306	8.627528	0.040649707
## 191	8.661294	8.535820	8.439179	8.632462	0.125473277
## 192	9.173365	9.078909	8.972246	9.185571	0.094456574
## 202	8.735525	8.530321	8.446275	8.614368	0.205203928
## 204	7.703459	7.976061	7.863280	8.088841	-0.272601490
## 216	7.760041	7.926476	7.850502	8.002449	-0.166434836
## 217	9.192584	8.556385	8.462707	8.650063	0.636198530
## 224	7.354362	7.974841	7.880431	8.069250	-0.620478228
## 225	8.470311	8.013332	7.910772	8.115893	0.456978763
## 228	7.752765	8.016383	7.923647	8.109119	-0.263618033
## 245	8.528331	8.562254	8.475071	8.649436	-0.033922608
## 253	7.729296	7.866969	7.770714	7.963225	-0.137673646
## 254	7.991592	7.701408	7.515337	7.887479	0.290184207
## 261	7.932003	7.806283	7.702448	7.910117	0.125720632
## 272	8.600247	8.566638	8.485701	8.647575	0.033608289

## 273	8.171882	8.511483	8.403233	8.619734	-0.339601491
## 278	7.805882	7.966969	7.858665	8.075274	-0.161087006
## 279	8.655911	8.392815	8.288285	8.497345	0.263096427
## 280	8.302762	8.557047	8.450623	8.663470	-0.254284932
## 283	8.781555	8.546856	8.466103	8.627609	0.234699715
## 284	8.928905	8.585986	8.486275	8.685697	0.342919025
## 289	9.183791	9.106986	8.993741	9.220232	0.076804748
## 295	9.707290	9.576961	9.468145	9.685778	0.130328774
## 297	9.163982	8.549076	8.446200	8.651952	0.614906307
## 308	7.999343	7.874680	7.760094	7.989267	0.124662487
## 311	8.609590	8.652752	8.563845	8.741659	-0.043161953
## 312	9.490771	9.667832	9.562518	9.773147	-0.177060957
## 318	8.437500	8.466919	8.391006	8.542831	-0.029418274
## 324	8.437067	8.750926	8.620746	8.881106	-0.313858681
## 328	8.596004	8.567301	8.474366	8.660236	0.028703368
## 333	7.758761	7.848730	7.734030	7.963430	-0.089969742
## 338	8.956222	8.487508	8.388509	8.586506	0.468714231
## 340	7.758333	7.890165	7.784127	7.996204	-0.131831855
## 368	8.607582	8.498917	8.390491	8.607343	0.108665208
## 369	7.636752	7.887190	7.790213	7.984168	-0.250438297
## 377	7.916807	7.971999	7.830883	8.113114	-0.055191066
## 379	7.681560	8.085348	7.979097	8.191599	-0.403787640
## 387	9.081256	9.112418	9.004743	9.220093	-0.031161744
## 388	8.357494	8.417723	8.312115	8.523332	-0.060229486
## 389	8.412277	8.515860	8.438775	8.592944	-0.103582553
## 400	9.231025	9.187092	9.079846	9.294339	0.043932607
## 406	9.718783	9.664552	9.543163	9.785941	0.054230851
## 407	8.606668	8.602444	8.495712	8.709177	0.004223855
## 417	7.849324	7.894481	7.794192	7.994769	-0.045156734
## 424	7.384610	7.836322	7.724323	7.948320	-0.451711415
## 425	8.460411	8.456746	8.358084	8.555408	0.003665267
## 436	8.734560	8.636693	8.541329	8.732057	0.097866736
## 438	7.961021	7.938260	7.832473	8.044047	0.022761556
## 448	8.619389	8.563485	8.470617	8.656352	0.055904007
## 451	8.492491	8.586025	8.468515	8.703536	-0.093534921
## 452	8.137396	7.960558	7.870779	8.050336	0.176838304
## 453	8.667852	8.449602	8.344226	8.554977	0.218250430
## 454	8.610137	8.529563	8.436529	8.622596	0.080574256
## 456	9.895102	10.111709	9.995821	10.227597	-0.216606471
## 459	7.633370	8.008270	7.890077	8.126463	-0.374900143
## 461	7.646354	8.066668	7.948370	8.184966	-0.420314001
## 465	7.798523	7.864553	7.745993	7.983112	-0.066029693
## 466	8.279951	7.943248	7.859510	8.026986	0.336702619
## 467	7.880048	8.024963	7.933743	8.116183	-0.144914369
## 473	9.491375	9.074468	8.960706	9.188230	0.416907229
## 474	8.146709	8.039872	7.940179	8.139564	0.106837407
## 479	7.989560	8.093627	7.964849	8.222404	-0.104066189
## 480	9.528358	9.162659	9.060071	9.265247	0.365698322
## 482	7.764721	8.054337	7.968896	8.139778	-0.289616537
## 488	7.976252	7.970076	7.865095	8.075057	0.006176189



## 492	9.733885	9.668762	9.561160	9.776365	0.065122354
## 494	9.060215	9.065817	8.957388	9.174246	-0.005602186
## 496	9.699350	9.763666	9.636974	9.890359	-0.064316667
## 511	8.583543	8.550500	8.459404	8.641595	0.033042648
## 516	8.609225	8.526651	8.425395	8.627907	0.082574141
## 521	7.845024	7.891127	7.802295	7.979959	-0.046102572
## 527	8.518392	8.596846	8.494203	8.699488	-0.078453078
## 530	8.509766	8.046374	7.916339	8.176410	0.463391450
## 532	8.826881	8.562289	8.474763	8.649816	0.264591866
## 540	8.547722	8.565693	8.463186	8.668201	-0.017971066
## 547	8.909641	9.131761	8.982208	9.281313	-0.222120286
## 550	7.685703	7.958544	7.860267	8.056822	-0.272841234
## 565	8.251403	7.940966	7.836798	8.045134	0.310437053
## 566	7.798113	8.057852	7.970271	8.145433	-0.259739407
## 567	7.685244	8.376255	8.270498	8.482012	-0.691011035
## 573	8.829665	8.555848	8.462588	8.649107	0.273817521
## 584	8.471987	8.637247	8.517776	8.756717	-0.165259987
## 596	8.303257	8.616336	8.507378	8.725294	-0.313078906
## 601	7.617268	7.788779	7.700855	7.876703	-0.171511422
## 603	9.342771	9.119398	9.004679	9.234118	0.223372953
## 604	8.049108	8.103770	8.005182	8.202359	-0.054662735
## 608	8.631414	8.546896	8.423499	8.670292	0.084518673
## 618	8.604105	8.688520	8.571601	8.805440	-0.084415521
## 626	7.830823	7.990382	7.899664	8.081100	-0.159559244
## 627	8.333751	8.532163	8.438930	8.625396	-0.198412103
## 628	9.350972	9.159502	9.062100	9.256903	0.191469914
## 636	7.773174	7.949650	7.834216	8.065085	-0.176476595
## 639	7.910224	8.049490	7.954596	8.144384	-0.139266137
## 653	9.510371	9.157857	9.042831	9.272883	0.352514066
## 654	9.433804	9.097074	8.977531	9.216617	0.336729702
## 665	8.426831	8.494850	8.380022	8.609679	-0.068019711
## 667	8.976894	9.046747	8.925160	9.168335	-0.069853481
## 674	7.611842	7.875823	7.739543	8.012103	-0.263980765
## 680	7.753194	7.965268	7.865944	8.064593	-0.212073991
## 681	8.356085	8.496846	8.384305	8.609388	-0.140761106
## 688	7.871693	7.892014	7.792808	7.991220	-0.020321117
## 695	9.161675	8.445019	8.334482	8.555556	0.716656477
## 696	8.099858	8.053416	7.949680	8.157152	0.046441636
## 697	9.629182	9.539408	9.415941	9.662876	0.089774122
## 698	8.685078	8.633580	8.533247	8.733913	0.051498018
## 700	9.856448	10.171325	10.071683	10.270967	-0.314876816
## 703	9.247347	9.137267	8.999481	9.275053	0.110080300
## 712	9.555206	9.641369	9.506661	9.776077	-0.086163120
## 719	8.429673	8.522941	8.392305	8.653576	-0.093268279
## 727	7.997327	8.005452	7.913515	8.097389	-0.008124995
## 731	8.469053	8.498823	8.393123	8.604523	-0.029769969
## 732	8.563695	8.464904	8.360206	8.569602	0.098791084
## 738	8.550821	8.499412	8.399751	8.599074	0.051409117
## 740	8.210940	8.544546	8.435275	8.653817	-0.333606258
## 752	7.741534	7.811529	7.708158	7.914901	-0.069995807

```

## 755 9.514068      9.219353      9.095886      9.342819  0.294715266
## 756 8.218248      7.836283      7.721892      7.950674  0.381964944
## 768 9.299450      8.992849      8.862328      9.123369  0.306600741
## 769 8.906393      8.415455      8.315495      8.515415  0.490938525
## 772 9.254644      9.154925      9.006240      9.303610  0.099719021
## 774 8.127995      7.827361      7.721181      7.933541  0.300633734
## 776 8.161946      7.947442      7.855841      8.039043  0.214503415
## 778 7.946971      7.843303      7.739100      7.947505  0.103668774
## 788 8.505323      8.431988      8.318275      8.545701  0.073334754
## 799 7.527794      7.761630      7.639331      7.883930 -0.233836314
## 803 9.744961      9.585419      9.473111      9.697727  0.159541567
## 804 9.167642      8.976190      8.857032      9.095347  0.191452090
## 809 7.959276      7.916602      7.810594      8.022610  0.042673928
## 814 9.886240      10.084418     9.973347     10.195490 -0.198178809
## 816 7.930566      8.007866      7.912266      8.103465 -0.077300097
## 818 9.366575      9.002215      8.912521      9.091908  0.364359712
## 821 8.105308      8.032253      7.917417      8.147089  0.073054661
## 825 8.447414      8.604230      8.511919      8.696541 -0.156815739
## 831 8.197814      8.487732      8.376182      8.599283 -0.289918352
## 834 7.844633      7.869657      7.780415      7.958898 -0.025023865
## 845 8.704336      8.490197      8.389901      8.590494  0.214138968
## 852 7.698936      7.852041      7.747050      7.957031 -0.153104498
## 854 8.641356      8.519911      8.416502      8.623320  0.121445036
## 864 9.530248      9.590017      9.439599      9.740435 -0.059769782
##      SquaredResidual
## 6      1.323342e-02
## 27     4.210416e-01
## 32     2.091912e-01
## 35     4.220191e-01
## 40     3.026459e-04
## 45     5.414622e-01
## 48     8.350303e-03
## 49     1.056065e-01
## 53     2.176091e-01
## 55     1.579852e-02
## 57     2.496755e-05
## 58     1.344670e-01
## 65     8.306282e-03
## 82     6.789182e-02
## 83     8.747066e-03
## 86     2.699826e-02
## 94     3.190758e-02
## 95     9.770817e-02
## 97     7.415950e-03
## 103    3.076675e-02
## 107    1.388745e-02
## 109    5.104842e-01
## 114    2.520208e-02
## 118    1.225210e-01
## 124    3.628568e-02

```

```
## 125    1.960956e-02
## 127    1.769690e-01
## 137    1.646983e-03
## 160    1.684056e-01
## 162    3.253669e-02
## 166    1.759390e-02
## 176    7.548530e-02
## 181    1.640847e-02
## 182    5.456805e-02
## 187    1.652399e-03
## 191    1.574354e-02
## 192    8.922044e-03
## 202    4.210865e-02
## 204    7.431157e-02
## 216    2.770055e-02
## 217    4.047486e-01
## 224    3.849932e-01
## 225    2.088296e-01
## 228    6.949447e-02
## 245    1.150743e-03
## 253    1.895403e-02
## 254    8.420687e-02
## 261    1.580568e-02
## 272    1.129517e-03
## 273    1.153292e-01
## 278    2.594902e-02
## 279    6.921973e-02
## 280    6.466083e-02
## 283    5.508396e-02
## 284    1.175935e-01
## 289    5.898969e-03
## 295    1.698559e-02
## 297    3.781098e-01
## 308    1.554074e-02
## 311    1.862954e-03
## 312    3.135058e-02
## 318    8.654348e-04
## 324    9.850727e-02
## 328    8.238833e-04
## 333    8.094554e-03
## 338    2.196930e-01
## 340    1.737964e-02
## 368    1.180813e-02
## 369    6.271934e-02
## 377    3.046054e-03
## 379    1.630445e-01
## 387    9.710543e-04
## 388    3.627591e-03
## 389    1.072935e-02
## 400    1.930074e-03
```

```
## 406    2.940985e-03
## 407    1.784095e-05
## 417    2.039131e-03
## 424    2.040432e-01
## 425    1.343418e-05
## 436    9.577898e-03
## 438    5.180885e-04
## 448    3.125258e-03
## 451    8.748781e-03
## 452    3.127179e-02
## 453    4.763325e-02
## 454    6.492211e-03
## 456    4.691836e-02
## 459    1.405501e-01
## 461    1.766639e-01
## 465    4.359920e-03
## 466    1.133687e-01
## 467    2.100017e-02
## 473    1.738116e-01
## 474    1.141423e-02
## 479    1.082977e-02
## 480    1.337353e-01
## 482    8.387774e-02
## 488    3.814531e-05
## 492    4.240921e-03
## 494    3.138448e-05
## 496    4.136634e-03
## 511    1.091817e-03
## 516    6.818489e-03
## 521    2.125447e-03
## 527    6.154885e-03
## 530    2.147316e-01
## 532    7.000886e-02
## 540    3.229592e-04
## 547    4.933742e-02
## 550    7.444234e-02
## 565    9.637116e-02
## 566    6.746456e-02
## 567    4.774963e-01
## 573    7.497603e-02
## 584    2.731086e-02
## 596    9.801840e-02
## 601    2.941617e-02
## 603    4.989548e-02
## 604    2.988015e-03
## 608    7.143406e-03
## 618    7.125980e-03
## 626    2.545915e-02
## 627    3.936736e-02
## 628    3.666073e-02
```

```
## 636      3.114399e-02
## 639      1.939506e-02
## 653      1.242662e-01
## 654      1.133869e-01
## 665      4.626681e-03
## 667      4.879509e-03
## 674      6.968584e-02
## 680      4.497538e-02
## 681      1.981369e-02
## 688      4.129478e-04
## 695      5.135965e-01
## 696      2.156826e-03
## 697      8.059393e-03
## 698      2.652046e-03
## 700      9.914741e-02
## 703      1.211767e-02
## 712      7.424083e-03
## 719      8.698972e-03
## 727      6.601555e-05
## 731      8.862510e-04
## 732      9.759678e-03
## 738      2.642897e-03
## 740      1.112931e-01
## 752      4.899413e-03
## 755      8.685709e-02
## 756      1.458972e-01
## 768      9.400401e-02
## 769      2.410206e-01
## 772      9.943883e-03
## 774      9.038064e-02
## 776      4.601172e-02
## 778      1.074721e-02
## 788      5.377986e-03
## 799      5.467942e-02
## 803      2.545351e-02
## 804      3.665390e-02
## 809      1.821064e-03
## 814      3.927484e-02
## 816      5.975305e-03
## 818      1.327580e-01
## 821      5.336983e-03
## 825      2.459118e-02
## 831      8.405265e-02
## 834      6.261938e-04
## 845      4.585550e-02
## 852      2.344099e-02
## 854      1.474890e-02
## 864      3.572427e-03
```

```
mean(MSPE$SquaredResidual)
```

```
## [1] 0.06735389

reg.fwd=regsubsets(log(Monthly.Income)~.,data=EmplTrain,method="forward",nvmax=29)
k<-ols_step_forward_aic(Model_Null, details = TRUE)

## Forward Selection Method
## -----
##
## Candidate Terms:
##
## 1 . Age
## 2 . Attrition
## 3 . BusinessTravel
## 4 . Daily.Rate
## 5 . Distance.From.Home
## 6 . Education
## 7 . EducationField
## 8 . Environment.Satisfaction
## 9 . Gender
## 10 . Hourly.Rate
## 11 . Job.Involvement
## 12 . Job.Level
## 13 . Job.Satisfaction
## 14 . Marital.Status
## 15 . Monthly.Rate
## 16 . Num.Companies.Worked
## 17 . OverTime
## 18 . Percent.Salary.Hike
## 19 . Performance.Rating
## 20 . Relationship.Satisfaction
## 21 . Stock.Option.Level
## 22 . Total.Working.Years
## 23 . Training.Times.Last.Year
## 24 . Work.Life.Balance
## 25 . Years.At.Company
## 26 . Years.In.Current.Role
## 27 . Years.Since.Last.Promotion
## 28 . Years.With.Curr.Manager
##
## Step 0: AIC = 1393.29
## log(Monthly.Income) ~ 1
##
## -----
##
```

## Variable	DF	AIC	Sum Sq	RSS	R-Sq
## Adj. R-Sq					
## -----					
## Job.Level	1	75.972	258.352	44.653	0.85

3	0.852					
## Total.Working.Years	1	822.312	171.092	131.913	0.56	
5	0.564					
## Years.At.Company	1	1209.933	71.471	231.534	0.23	
6	0.235					
## Age	1	1214.403	69.964	233.041	0.23	
1	0.230					
## Years.In.Current.Role	1	1271.951	49.664	253.342	0.16	
4	0.163					
## Years.With.Curr.Manager	1	1297.264	40.183	262.822	0.13	
3	0.131					
## Years.Since.Last.Promotion	1	1323.485	29.988	273.017	0.09	
9	0.098					
## Attrition	1	1357.267	16.268	286.737	0.05	
4	0.052					
## Num.Companies.Worked	1	1371.338	10.353	292.653	0.03	
4	0.033					
## Education	1	1380.446	6.458	296.547	0.02	
1	0.020					
## Marital.Status	1	1385.871	4.980	298.025	0.01	
6	0.014					
## EducationField	1	1392.075	4.892	298.113	0.01	
6	0.009					
## Monthly.Rate	1	1389.858	2.379	300.626	0.00	
8	0.006					
## Training.Times.Last.Year	1	1392.177	1.366	301.639	0.00	
5	0.003					
## BusinessTravel	1	1394.576	1.191	301.814	0.00	
4	0.001					
## Stock.Option.Level	1	1393.377	0.840	302.165	0.00	
3	0.001					
## Performance.Rating	1	1393.953	0.587	302.418	0.00	
2	0.000					
## Percent.Salary.Hike	1	1394.202	0.478	302.527	0.00	
2	0.000					
## Distance.From.Home	1	1394.448	0.370	302.635	0.00	
1	0.000					
## Gender	1	1394.496	0.349	302.656	0.00	
1	0.000					
## Relationship.Satisfaction	1	1394.523	0.337	302.668	0.00	
1	0.000					
## Daily.Rate	1	1394.597	0.304	302.701	0.00	
1	0.000					
## Work.Life.Balance	1	1394.647	0.283	302.723	0.00	
1	-0.001					
## Job.Satisfaction	1	1394.809	0.211	302.794	0.00	
1	-0.001					
## Environment.Satisfaction	1	1395.099	0.084	302.921	0.00	
0	-0.001					
## Job.Involvement	1	1395.264	0.011	302.994	0.00	

```

0          -0.001
## OverTime          1      1395.271      0.008      302.997      0.00
0          -0.001
## Hourly.Rate       1      1395.280      0.004      303.001      0.00
0          -0.001
## -----
##
##
## - Job.Level
##
##
## Step 1 : AIC = 75.97176
## log(Monthly.Income) ~ Job.Level
##
## -----
##
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## -----
## Attrition          1      63.193      0.948      43.705      0.856
0.855
## Years.In.Current.Role  1      65.003      0.833      43.820      0.855
0.855
## Years.With.Curr.Manager  1      68.934      0.582      44.071      0.855
0.854
## EducationField      1      76.977      0.579      44.074      0.855
0.853
## Daily.Rate          1      69.246      0.562      44.091      0.854
0.854
## Total.Working.Years   1      71.568      0.413      44.240      0.854
0.854
## BusinessTravel      1      73.586      0.412      44.241      0.854
0.853
## Age                 1      71.740      0.402      44.251      0.854
0.854
## Num.Companies.Worked  1      72.437      0.357      44.296      0.854
0.853
## Marital.Status      1      76.001      0.257      44.396      0.853
0.853
## Job.Involvement      1      74.203      0.244      44.409      0.853
0.853
## Environment.Satisfaction  1      75.281      0.174      44.479      0.853
0.853
## Relationship.Satisfaction  1      75.559      0.156      44.497      0.853
0.853
## Stock.Option.Level   1      75.563      0.156      44.497      0.853
0.853
## Monthly.Rate        1      75.878      0.135      44.517      0.853

```



```

0.853
## Years.At.Company          1    75.893    0.135    44.518    0.853
0.853
## Education                  1    76.562    0.091    44.562    0.853
0.853
## OverTime                   1    76.759    0.079    44.574    0.853
0.852
## Years.Since.Last.Promotion  1    77.138    0.054    44.599    0.853
0.852
## Job.Satisfaction           1    77.331    0.042    44.611    0.853
0.852
## Hourly.Rate                1    77.457    0.033    44.620    0.853
0.852
## Percent.Salary.Hike        1    77.524    0.029    44.624    0.853
0.852
## Gender                     1    77.671    0.020    44.633    0.853
0.852
## Work.Life.Balance          1    77.813    0.010    44.643    0.853
0.852
## Distance.From.Home         1    77.831    0.009    44.644    0.853
0.852
## Performance.Rating         1    77.899    0.005    44.648    0.853
0.852
## Training.Times.Last.Year   1    77.888    0.005    44.648    0.853
0.852
## -----
##
##
## - Attrition
##
##
## Step 2 : AIC = 63.19317
## log(Monthly.Income) ~ Job.Level + Attrition
##
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
##
## Years.In.Current.Role      1      54.224      0.690      43.015      0.858
0.857
## EducationField             1      64.934      0.521      43.185      0.857
0.856
## Daily.Rate                 1      57.053      0.513      43.192      0.857
0.857
## Num.Companies.Worked       1      57.956      0.457      43.249      0.857
0.857
## Years.With.Curr.Manager    1      58.267      0.437      43.268      0.857
0.857

```

## BusinessTravel	1	60.717	0.409	43.296	0.857
0.856					
## OverTime	1	59.814	0.340	43.365	0.857
0.856					
## Total.Working.Years	1	60.340	0.307	43.399	0.857
0.856					
## Age	1	60.372	0.305	43.401	0.857
0.856					
## Environment.Satisfaction	1	61.068	0.261	43.444	0.857
0.856					
## Relationship.Satisfaction	1	62.195	0.190	43.516	0.856
0.856					
## Marital.Status	1	65.341	0.117	43.588	0.856
0.855					
## Monthly.Rate	1	63.420	0.112	43.593	0.856
0.856					
## Job.Involvement	1	63.544	0.105	43.601	0.856
0.855					
## Years.At.Company	1	63.816	0.087	43.618	0.856
0.855					
## Education	1	63.928	0.080	43.625	0.856
0.855					
## Stock.Option.Level	1	63.952	0.079	43.627	0.856
0.855					
## Years.Since.Last.Promotion	1	64.198	0.063	43.642	0.856
0.855					
## Hourly.Rate	1	64.365	0.053	43.653	0.856
0.855					
## Percent.Salary.Hike	1	64.674	0.033	43.672	0.856
0.855					
## Work.Life.Balance	1	64.714	0.030	43.675	0.856
0.855					
## Gender	1	64.939	0.016	43.689	0.856
0.855					
## Training.Times.Last.Year	1	64.959	0.015	43.691	0.856
0.855					
## Job.Satisfaction	1	65.074	0.008	43.698	0.856
0.855					
## Performance.Rating	1	65.146	0.003	43.702	0.856
0.855					
## Distance.From.Home	1	65.179	0.001	43.704	0.856
0.855					

## -----  
-----

##

## - Years.In.Current.Role

##

##

## Step 3 : AIC = 54.22357

## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role

##					
##	-----				
-----					
## Variable	DF	AIC	Sum Sq	RSS	R-Sq
Adj. R-Sq					
##	-----				
-----					
## Num.Companies.Worked	1	45.248	0.680	42.335	0.860
0.859					
## Daily.Rate	1	47.549	0.538	42.477	0.860
0.859					
## EducationField	1	55.669	0.531	42.484	0.860
0.858					
## BusinessTravel	1	52.030	0.385	42.630	0.859
0.858					
## OverTime	1	50.733	0.341	42.674	0.859
0.858					
## Environment.Satisfaction	1	51.338	0.304	42.711	0.859
0.858					
## Age	1	51.705	0.281	42.734	0.859
0.858					
## Years.At.Company	1	52.161	0.253	42.762	0.859
0.858					
## Relationship.Satisfaction	1	53.425	0.174	42.841	0.859
0.858					
## Total.Working.Years	1	54.519	0.106	42.909	0.858
0.858					
## Monthly.Rate	1	54.536	0.105	42.910	0.858
0.858					
## Job.Involvement	1	54.576	0.103	42.912	0.858
0.858					
## Marital.Status	1	56.767	0.091	42.924	0.858
0.857					
## Education	1	55.036	0.074	42.941	0.858
0.857					
## Stock.Option.Level	1	55.384	0.052	42.963	0.858
0.857					
## Hourly.Rate	1	55.479	0.046	42.969	0.858
0.857					
## Work.Life.Balance	1	55.556	0.042	42.973	0.858
0.857					
## Percent.Salary.Hike	1	55.599	0.039	42.976	0.858
0.857					
## Years.Since.Last.Promotion	1	55.600	0.039	42.976	0.858
0.857					
## Years.With.Curr.Manager	1	55.920	0.019	42.996	0.858
0.857					
## Training.Times.Last.Year	1	56.030	0.012	43.003	0.858
0.857					
## Job.Satisfaction	1	56.124	0.006	43.009	0.858

```

0.857
## Gender                1    56.143    0.005    43.010    0.858
0.857
## Performance.Rating    1    56.169    0.003    43.012    0.858
0.857
## Distance.From.Home    1    56.222    0.000    43.015    0.858
0.857
## -----
-----
##
## - Num.Companies.Worked
##
##
## Step 4 : AIC = 45.24834
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked
##
## -----
-----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## EducationField          1    46.626    0.526    41.809    0.862
0.860
## Daily.Rate              1    39.237    0.489    41.846    0.862
0.861
## BusinessTravel          1    42.733    0.398    41.937    0.862
0.860
## OverTime                1    41.492    0.352    41.983    0.861
0.860
## Environment.Satisfaction 1    41.633    0.344    41.992    0.861
0.860
## Relationship.Satisfaction 1    44.296    0.181    42.154    0.861
0.860
## Years.At.Company        1    45.331    0.118    42.218    0.861
0.860
## Age                     1    45.532    0.105    42.230    0.861
0.860
## Monthly.Rate            1    45.654    0.098    42.237    0.861
0.860
## Job.Involvement         1    45.840    0.086    42.249    0.861
0.860
## Marital.Status          1    47.847    0.086    42.249    0.861
0.859
## Work.Life.Balance       1    46.298    0.058    42.277    0.860
0.859
## Years.With.Curr.Manager  1    46.339    0.056    42.279    0.860
0.859
## Hourly.Rate             1    46.498    0.046    42.289    0.860

```

```

0.859
## Stock.Option.Level          1    46.505    0.046    42.290    0.860
0.859
## Percent.Salary.Hike         1    46.592    0.040    42.295    0.860
0.859
## Education                   1    46.941    0.019    42.316    0.860
0.859
## Years.Since.Last.Promotion   1    46.949    0.018    42.317    0.860
0.859
## Job.Satisfaction            1    46.996    0.016    42.320    0.860
0.859
## Total.Working.Years         1    47.140    0.007    42.329    0.860
0.859
## Gender                      1    47.202    0.003    42.332    0.860
0.859
## Performance.Rating          1    47.219    0.002    42.333    0.860
0.859
## Distance.From.Home          1    47.237    0.001    42.335    0.860
0.859
## Training.Times.Last.Year     1    47.225    0.001    42.334    0.860
0.859
## -----
-----
##
## - Daily.Rate
##
##
## Step 5 : AIC = 39.23693
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate
##
## -----
-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## EducationField      1      40.326      0.538      41.308      0.864
0.862
## BusinessTravel      1      36.260      0.422      41.424      0.863
0.862
## Environment.Satisfaction  1      35.811      0.328      41.518      0.863
0.862
## OverTime            1      35.938      0.321      41.525      0.863
0.862
## Relationship.Satisfaction  1      38.385      0.173      41.673      0.862
0.861
## Monthly.Rate        1      39.301      0.117      41.728      0.862
0.861
## Age                 1      39.440      0.109      41.737      0.862

```

```

0.861
## Years.At.Company          1    39.868    0.083    41.763    0.862
0.861
## Job.Involvement           1    40.012    0.074    41.772    0.862
0.861
## Years.With.Curr.Manager    1    40.081    0.070    41.776    0.862
0.861
## Marital.Status            1    42.152    0.066    41.780    0.862
0.861
## Work.Life.Balance          1    40.475    0.046    41.800    0.862
0.861
## Stock.Option.Level         1    40.552    0.042    41.804    0.862
0.861
## Percent.Salary.Hike        1    40.713    0.032    41.814    0.862
0.861
## Hourly.Rate                1    40.771    0.028    41.818    0.862
0.861
## Education                  1    40.904    0.020    41.826    0.862
0.861
## Job.Satisfaction           1    40.971    0.016    41.830    0.862
0.861
## Total.Working.Years        1    41.000    0.014    41.831    0.862
0.861
## Years.Since.Last.Promotion  1    41.052    0.011    41.835    0.862
0.861
## Gender                     1    41.218    0.001    41.845    0.862
0.861
## Performance.Rating         1    41.213    0.001    41.844    0.862
0.861
## Training.Times.Last.Year   1    41.227    0.001    41.845    0.862
0.861
## Distance.From.Home         1    41.237    0.000    41.846    0.862
0.861
## -----
##
##
## - Environment.Satisfaction
##
##
## Step 6 : AIC = 35.81099
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction
##
## -----
##
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      36.833      0.537      40.980      0.865

```

```

0.863
## BusinessTravel          1    32.989    0.409    41.109    0.864
0.863
## OverTime                1    31.524    0.377    41.140    0.864
0.863
## Relationship.Satisfaction 1    34.850    0.178    41.340    0.864
0.862
## Monthly.Rate            1    35.745    0.124    41.393    0.863
0.862
## Age                     1    36.082    0.104    41.414    0.863
0.862
## Years.At.Company        1    36.202    0.097    41.421    0.863
0.862
## Marital.Status          1    38.661    0.069    41.448    0.863
0.862
## Job.Involvement         1    36.776    0.062    41.455    0.863
0.862
## Years.With.Curr.Manager  1    36.932    0.053    41.465    0.863
0.862
## Stock.Option.Level      1    37.022    0.048    41.470    0.863
0.862
## Percent.Salary.Hike     1    37.343    0.028    41.489    0.863
0.862
## Work.Life.Balance       1    37.388    0.025    41.492    0.863
0.862
## Hourly.Rate             1    37.480    0.020    41.498    0.863
0.862
## Education               1    37.565    0.015    41.503    0.863
0.862
## Job.Satisfaction        1    37.639    0.010    41.507    0.863
0.862
## Total.Working.Years     1    37.656    0.009    41.508    0.863
0.862
## Years.Since.Last.Promotion 1    37.687    0.007    41.510    0.863
0.862
## Performance.Rating     1    37.789    0.001    41.516    0.863
0.862
## Distance.From.Home      1    37.803    0.000    41.517    0.863
0.862
## Gender                  1    37.807    0.000    41.517    0.863
0.862
## Training.Times.Last.Year 1    37.808    0.000    41.517    0.863
0.862
## -----
-----
##
## - OverTime
##
##
## Step 7 : AIC = 31.52424

```

```
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime
##
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      32.746      0.521      40.620      0.866
0.864
## BusinessTravel      1      29.193      0.376      40.764      0.865
0.864
## Relationship.Satisfaction  1      30.265      0.194      40.946      0.865
0.863
## Monthly.Rate        1      31.421      0.125      41.015      0.865
0.863
## Years.At.Company    1      31.637      0.113      41.028      0.865
0.863
## Age                 1      32.107      0.085      41.056      0.865
0.863
## Job.Involvement     1      32.561      0.057      41.083      0.864
0.863
## Marital.Status      1      34.561      0.057      41.083      0.864
0.863
## Years.With.Curr.Manager  1      32.564      0.057      41.083      0.864
0.863
## Stock.Option.Level  1      32.854      0.040      41.101      0.864
0.863
## Percent.Salary.Hike  1      33.003      0.031      41.109      0.864
0.863
## Work.Life.Balance    1      33.064      0.027      41.113      0.864
0.863
## Hourly.Rate         1      33.165      0.021      41.119      0.864
0.863
## Education           1      33.275      0.015      41.126      0.864
0.863
## Total.Working.Years  1      33.411      0.007      41.134      0.864
0.863
## Job.Satisfaction     1      33.428      0.006      41.135      0.864
0.863
## Years.Since.Last.Promotion  1      33.442      0.005      41.136      0.864
0.863
## Distance.From.Home   1      33.478      0.003      41.138      0.864
0.863
## Gender              1      33.512      0.001      41.140      0.864
0.863
## Performance.Rating   1      33.523      0.000      41.140      0.864
0.863
## Training.Times.Last.Year  1      33.524      0.000      41.140      0.864
```



```

0.863
## -----
##
## - BusinessTravel
##
##
## Step 8 : AIC = 29.19285
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine
ssTravel
##
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField          1      30.905      0.487      40.277      0.867
0.864
## Relationship.Satisfaction 1      28.180      0.178      40.586      0.866
0.864
## Monthly.Rate            1      29.006      0.129      40.635      0.866
0.864
## Years.At.Company        1      29.602      0.094      40.670      0.866
0.864
## Age                    1      29.773      0.084      40.680      0.866
0.864
## Years.With.Curr.Manager 1      29.875      0.078      40.686      0.866
0.864
## Marital.Status          1      32.159      0.061      40.703      0.866
0.863
## Job.Involvement         1      30.391      0.047      40.717      0.866
0.864
## Percent.Salary.Hike     1      30.503      0.041      40.723      0.866
0.864
## Stock.Option.Level      1      30.506      0.041      40.724      0.866
0.864
## Work.Life.Balance       1      30.746      0.026      40.738      0.866
0.864
## Hourly.Rate             1      30.782      0.024      40.740      0.866
0.864
## Education               1      30.967      0.013      40.751      0.866
0.864
## Job.Satisfaction         1      31.049      0.008      40.756      0.865
0.864
## Total.Working.Years     1      31.128      0.004      40.760      0.865
0.863
## Years.Since.Last.Promotion 1      31.181      0.001      40.764      0.865
0.863

```

```

## Distance.From.Home          1    31.189    0.000    40.764    0.865
0.863
## Gender                      1    31.188    0.000    40.764    0.865
0.863
## Performance.Rating          1    31.190    0.000    40.764    0.865
0.863
## Training.Times.Last.Year    1    31.192    0.000    40.764    0.865
0.863
## -----
##
## - Relationship.Satisfaction
##
##
## Step 9 : AIC = 28.18003
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine
ssTravel + Relationship.Satisfaction
##
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      29.941      0.482      40.104      0.868
0.865
## Monthly.Rate        1      27.963      0.130      40.456      0.866
0.864
## Years.At.Company    1      28.736      0.085      40.501      0.866
0.864
## Age                 1      28.853      0.078      40.508      0.866
0.864
## Years.With.Curr.Manager 1      28.915      0.074      40.512      0.866
0.864
## Marital.Status      1      31.432      0.044      40.542      0.866
0.864
## Job.Involvement     1      29.465      0.042      40.544      0.866
0.864
## Percent.Salary.Hike  1      29.604      0.034      40.552      0.866
0.864
## Stock.Option.Level  1      29.678      0.030      40.557      0.866
0.864
## Hourly.Rate         1      29.695      0.029      40.558      0.866
0.864
## Work.Life.Balance   1      29.782      0.023      40.563      0.866
0.864
## Education           1      30.008      0.010      40.576      0.866
0.864
## Job.Satisfaction    1      30.075      0.006      40.580      0.866
0.866

```

```

0.864
## Total.Working.Years          1    30.153    0.002    40.585    0.866
0.864
## Distance.From.Home          1    30.179    0.000    40.586    0.866
0.864
## Gender                      1    30.178    0.000    40.586    0.866
0.864
## Performance.Rating          1    30.180    0.000    40.586    0.866
0.864
## Training.Times.Last.Year    1    30.179    0.000    40.586    0.866
0.864
## Years.Since.Last.Promotion  1    30.179    0.000    40.586    0.866
0.864
## -----
-----
##
## - Monthly.Rate
##
##
## Step 10 : AIC = 27.96347
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine
ssTravel + Relationship.Satisfaction + Monthly.Rate
##
## -----
-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## EducationField          1    29.278    0.507    39.949    0.868
0.865
## Years.With.Curr.Manager  1    28.502    0.086    40.370    0.867
0.864
## Years.At.Company        1    28.761    0.071    40.385    0.867
0.864
## Age                     1    28.802    0.068    40.388    0.867
0.864
## Marital.Status          1    31.168    0.047    40.409    0.867
0.864
## Job.Involvement         1    29.194    0.045    40.411    0.867
0.864
## Percent.Salary.Hike     1    29.354    0.036    40.420    0.867
0.864
## Stock.Option.Level      1    29.343    0.036    40.420    0.867
0.864
## Hourly.Rate             1    29.376    0.034    40.421    0.867
0.864
## Work.Life.Balance       1    29.598    0.021    40.434    0.867
0.864

```

## Education	1	29.778	0.011	40.445	0.867
0.864					
## Job.Satisfaction	1	29.877	0.005	40.451	0.867
0.864					
## Total.Working.Years	1	29.942	0.001	40.455	0.866
0.864					
## Distance.From.Home	1	29.956	0.000	40.456	0.866
0.864					
## Gender	1	29.963	0.000	40.456	0.866
0.864					
## Performance.Rating	1	29.963	0.000	40.456	0.866
0.864					
## Training.Times.Last.Year	1	29.963	0.000	40.456	0.866
0.864					
## Years.Since.Last.Promotion	1	29.963	0.000	40.456	0.866
0.864					

## -----  
-----

## ##

##

```
## No more variables to be added.
```

##

### ## Variables Entered:

##

## ## - Job.Level

## ## - Attrition

### ## - Years.In.Current.Role

## - Num.Companies.Worked

### ## - Daily.Rate

## ## - Environment.Satisfaction

## ## - OverTime

## ## - BusinessTravel

## ## - Relationship.Satisfaction

## ## - Monthly.Rate

##

## ##

## ## Final Model Output

## -----

##

##

## Model Summary

## -----

##	R	0.931	RMSE	0.244
----	---	-------	------	-------

## R-Squared	0.866	Coef. Var	2.867
--------------	-------	-----------	-------

## Adj. R-Squared	0.864	MSE	0.060
-------------------	-------	-----	-------

##	Pred R-Squared	0.862	MAE	0.188
----	----------------	-------	-----	-------

## -----

```
## RMSE: Root Mean Square Error
```

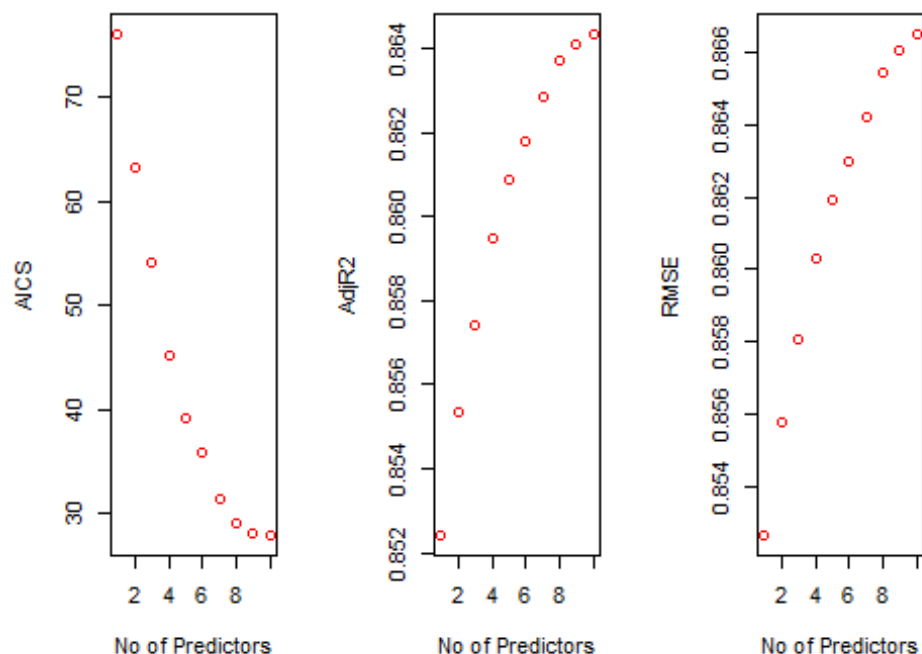
## MSE: Mean Square Error

```
## MAE: Mean Absolute Error
```

##

```
##                                ANOVA
## -----
##              Sum of
##              Squares      DF      Mean Square      F      Sig.
## -----
## Regression      262.549        11          23.868    399.415    0.0000
## Residual        40.456        677           0.060
## Total          303.005        688
## -----
##
##                                Parameter Estimates
## -----
##
##              Sig      lower      model      Beta      Std. Error      Std. Beta
##              t              upper
## -----
##              (Intercept)      7.316      0.055      13
3.445      0.000      7.209      7.424
##              Job.Level      0.538      0.010      0.878      5
5.463      0.000      0.519      0.557
##              AttritionYes      -0.129      0.028      -0.069      -
4.535      0.000      -0.185      -0.073
##              Years.In.Current.Role      0.011      0.003      0.062
3.955      0.000      0.006      0.017
##              Num.Companies.Worked      0.013      0.004      0.050
3.415      0.001      0.006      0.021
##              Daily.Rate      0.000      0.000      0.040
2.817      0.005      0.000      0.000
##              Environment.Satisfaction      -0.022      0.009      -0.036      -
2.537      0.011      -0.039      -0.005
##              OverTimeYes      0.053      0.021      0.036
2.452      0.014      0.010      0.095
## BusinessTravelTravel_Frequently      0.047      0.036      0.027
1.314      0.189      -0.023      0.116
## BusinessTravelTravel_Rarely      0.071      0.030      0.049
2.398      0.017      0.013      0.129
## Relationship.Satisfaction      -0.015      0.008      -0.024      -
1.731      0.084      -0.031      0.002
## Monthly.Rate      0.000      0.000      0.021
1.477      0.140      0.000      0.000
## -----
## -----

par(mfrow=c(1,3))
plot(k$aics,xlab="No of Predictors",ylab="AICS", col = "red")
plot(k$arsq,xlab="No of Predictors",ylab="AdjR2", col = "red")
plot(k$rsq,xlab="No of Predictors",ylab="RMSE", col = "red")
```



```
k$predictors
```

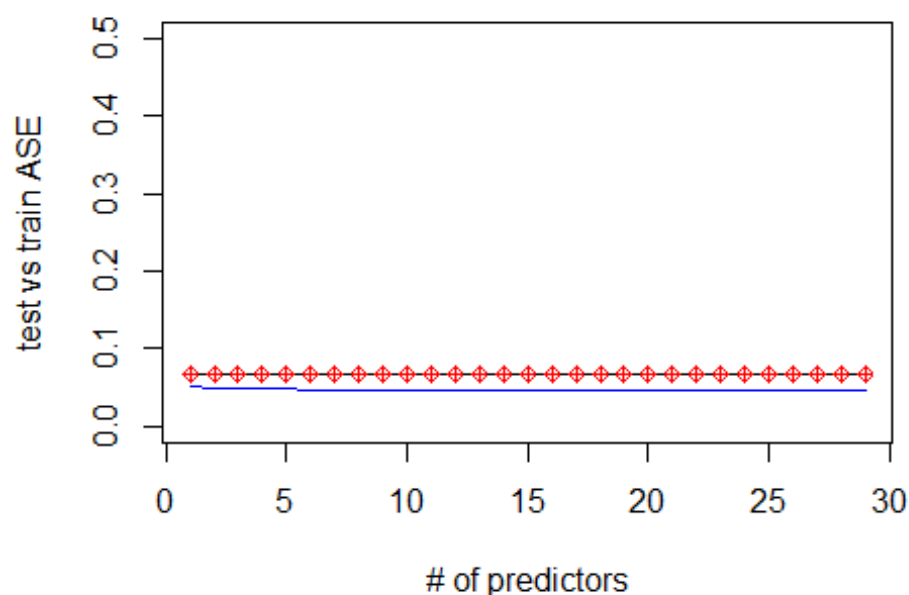
```
## [1] "Job.Level"           "Attrition"
## [3] "Years.In.Current.Role" "Num.Companies.Worked"
## [5] "Daily.Rate"          "Environment.Satisfaction"
## [7] "OverTime"            "BusinessTravel"
## [9] "Relationship.Satisfaction" "Monthly.Rate"
```

```
#Plot for AISC
```

```
for (i in 1:29){
  predictions<-predict(object=Model_FWD,newdata=EmplTest,id=i)
  testASEfwd[i]<-mean((log(EmplTest$Monthly.Income)-predictions)^2)
}
dim(EmplTest)

## [1] 173 29

par(mfrow=c(1,1))
plot(1:29,testASEfwd,type="l",xlab="# of predictors",ylab="test vs train ASE",
ylim=c(0,0.5))
index<-which(testASEfwd==min(testASEfwd))
points(index,testASEfwd[index],col="red",pch=10)
rss<-summary(reg.fwd)$rss
lines(index,rss/869,col="blue") #Dividing by 869 since ASE=RSS/sample size
```



#### ##### Backward Model #####

```
Model_BCK<-stepAIC(Model_Null,direction="backward",trace=FALSE)
summary(Model_BCK)
```

```
##
## Call:
## lm(formula = log(Monthly.Income) ~ Attrition + BusinessTravel +
##     Daily.Rate + Environment.Satisfaction + Job.Level + Monthly.Rate +
##     Num.Companies.Worked + OverTime + Relationship.Satisfaction +
##     Years.At.Company + Years.In.Current.Role + Years.With.Curr.Manager,
##     data = EmplTrain)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -0.9123 -0.1503  0.0086  0.1490  0.7614
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)   7.306e+00  5.543e-02 131.814 < 2e-16 ***
## AttritionYes  -1.263e-01  2.847e-02  -4.435 1.07e-05 ***
## BusinessTravelTravel_Frequently  4.593e-02  3.545e-02   1.296  0.19546
## BusinessTravelTravel_Rarely     7.170e-02  2.957e-02   2.425  0.01558 *
## Daily.Rate      6.372e-05  2.334e-05   2.730  0.00650 **
## Environment.Satisfaction -2.143e-02  8.598e-03  -2.492  0.01294 *
## Job.Level       5.440e-01  1.054e-02  51.596 < 2e-16 ***
## Monthly.Rate    1.916e-06  1.332e-06   1.439  0.15071
```

```

## Num.Companies.Worked      1.250e-02  3.927e-03   3.183  0.00152 **
## OverTimeYes               5.503e-02  2.146e-02   2.564  0.01056 *
## Relationship.Satisfaction -1.377e-02  8.474e-03  -1.625  0.10470
## Years.At.Company          -6.108e-03  3.313e-03  -1.844  0.06565 .
## Years.In.Current.Role      1.253e-02  4.466e-03   2.804  0.00518 **
## Years.With.Curr.Manager    8.286e-03  4.334e-03   1.912  0.05632 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2439 on 675 degrees of freedom
## Multiple R-squared:  0.8674, Adjusted R-squared:  0.8649
## F-statistic: 339.8 on 13 and 675 DF, p-value: < 2.2e-16

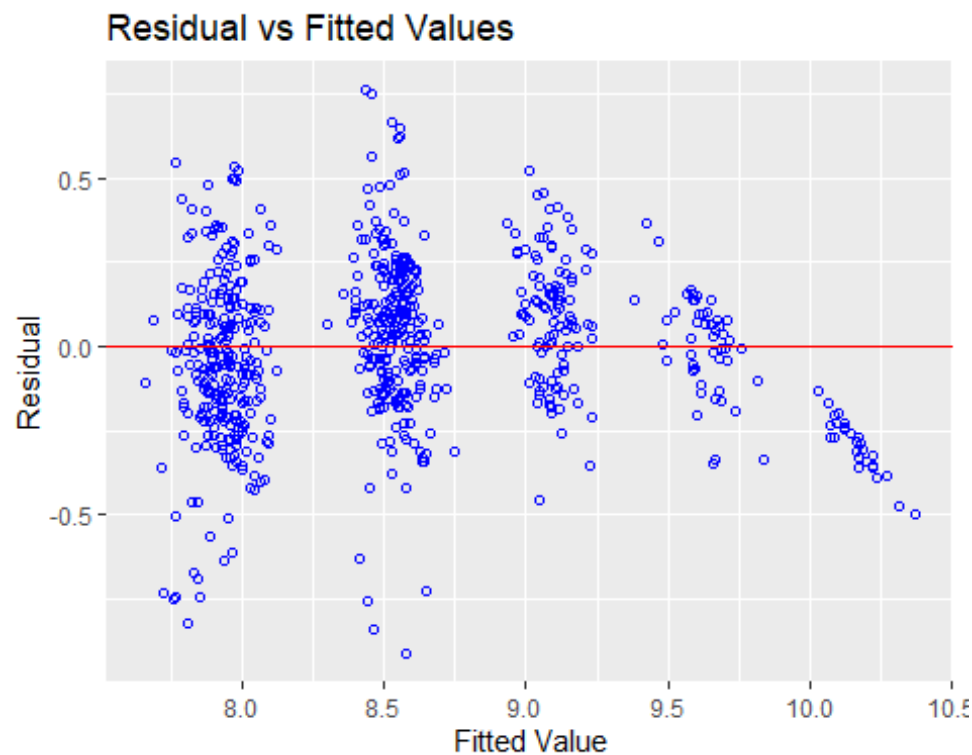
vif(Model_BCK)

##              GVIF Df GVIF^(1/(2*Df))
## Attrition      1.173884  1      1.083459
## BusinessTravel 1.031317  2      1.007739
## Daily.Rate     1.017393  1      1.008659
## Environment.Satisfaction 1.028015  1      1.013911
## Job.Level      1.506902  1      1.227559
## Monthly.Rate   1.015982  1      1.007959
## Num.Companies.Worked 1.112172  1      1.054596
## OverTime       1.105066  1      1.051221
## Relationship.Satisfaction 1.014559  1      1.007253
## Years.At.Company 4.208867  1      2.051552
## Years.In.Current.Role 3.007399  1      1.734185
## Years.With.Curr.Manager 2.747785  1      1.657644

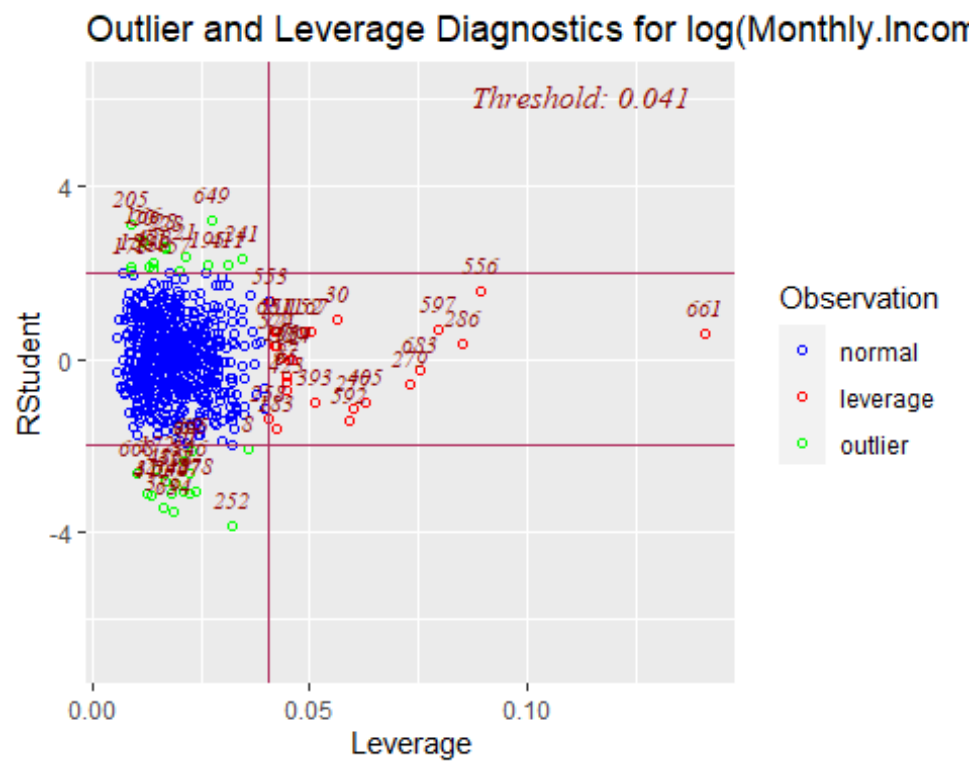
#Residual Plots
par(mfrow=c(1,5))
ols_plot_resid_fit(Model_BCK)

```

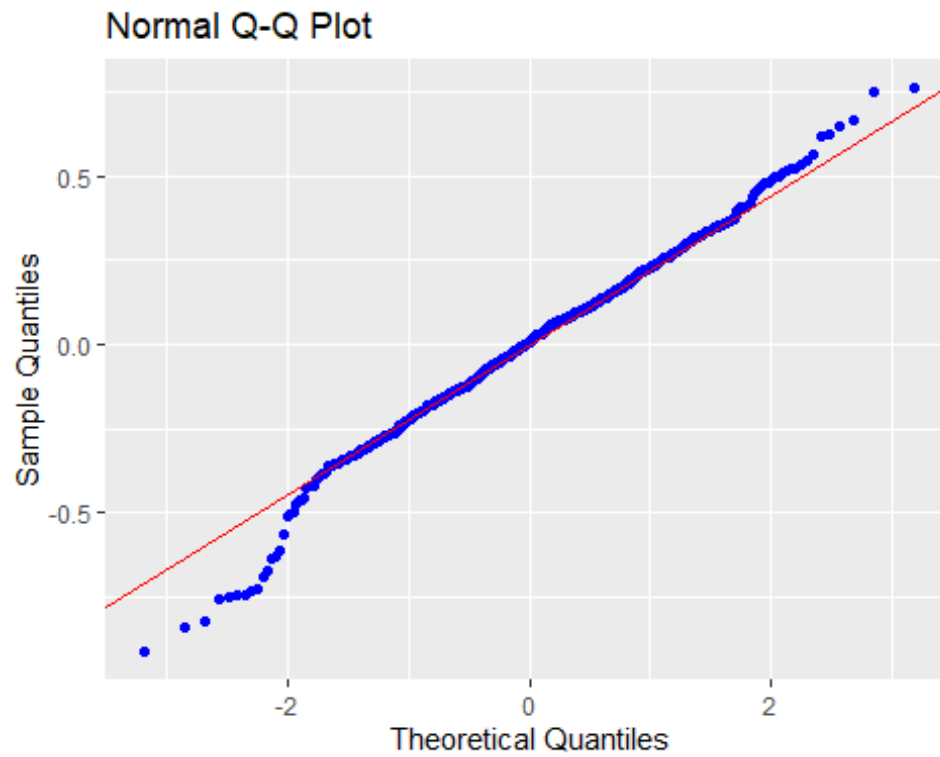




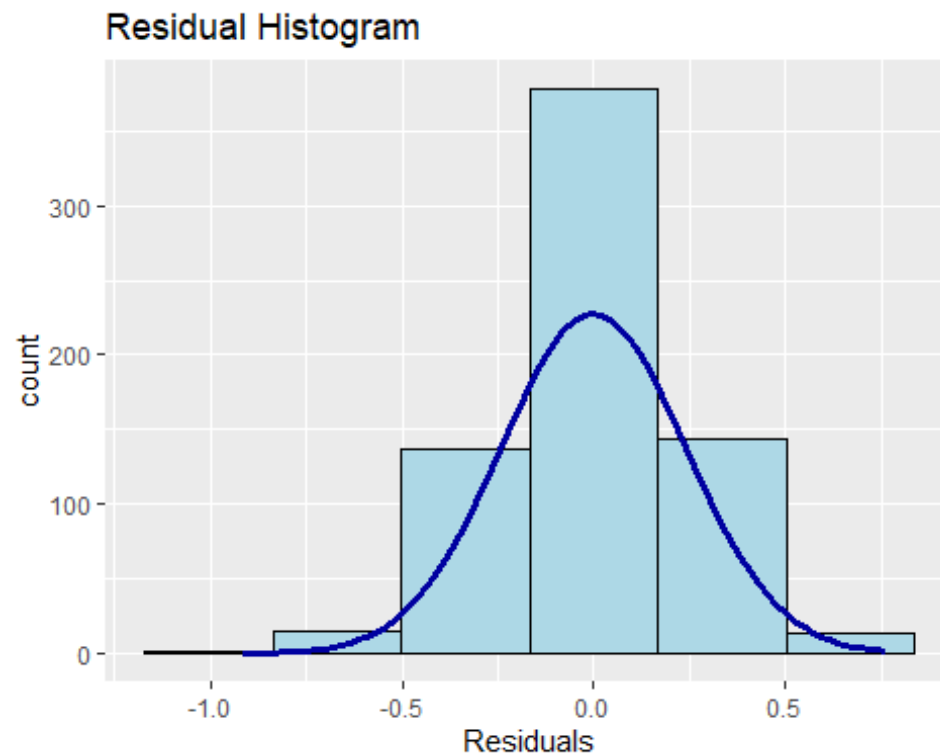
```
ols_plot_resid_lev(Model_BCK)
```



```
ols_plot_resid_qq(Model_BCK)
```



```
ols_plot_resid_hist(Model_BCK)
```



```
ols_plot_cooksd_bar(Model_BCK)
```



## 53	8.026602	7.968008	8.085196
## 55	8.532713	8.487919	8.577507
## 57	7.908115	7.834244	7.981985
## 58	8.102636	8.034502	8.170770
## 65	7.771408	7.694686	7.848129
## 82	8.577471	8.520739	8.634202
## 83	8.494810	8.431211	8.558408
## 86	9.687449	9.621792	9.753105
## 94	8.573856	8.514424	8.633288
## 95	10.221309	10.146156	10.296463
## 97	9.649847	9.551718	9.747975
## 103	8.564073	8.484016	8.644130
## 107	8.553808	8.470394	8.637222
## 109	8.376688	8.299596	8.453780
## 114	8.400524	8.323661	8.477387
## 118	8.642356	8.579083	8.705629
## 124	8.482912	8.421636	8.544189
## 125	8.563888	8.497321	8.630456
## 127	7.869327	7.787131	7.951522
## 137	7.822936	7.758623	7.887249
## 160	9.081372	9.000796	9.161949
## 162	8.979456	8.885426	9.073487
## 166	7.791997	7.722677	7.861316
## 176	8.002748	7.944223	8.061272
## 181	9.110624	9.067932	9.153316
## 182	8.609701	8.561259	8.658144
## 187	8.486994	8.423389	8.550598
## 191	8.555154	8.497281	8.613027
## 192	9.043237	8.972586	9.113889
## 202	8.520320	8.468572	8.572068
## 204	8.013359	7.927260	8.099458
## 216	7.924289	7.885741	7.962836
## 217	8.529183	8.476867	8.581499
## 224	7.966170	7.907285	8.025054
## 225	7.972268	7.926539	8.017996
## 228	8.002968	7.943675	8.062262
## 245	8.571810	8.514008	8.629611
## 253	7.857905	7.801166	7.914645
## 254	7.726274	7.651843	7.800705
## 261	7.812925	7.737238	7.888611
## 272	8.567748	8.517683	8.617813
## 273	8.551551	8.499023	8.604079
## 278	7.946833	7.876524	8.017143
## 279	8.392798	8.319306	8.466289
## 280	8.539958	8.483983	8.595934
## 283	8.521606	8.479116	8.564097
## 284	8.535482	8.480401	8.590564
## 289	9.136186	9.064453	9.207919
## 295	9.609803	9.533756	9.685850
## 297	8.546655	8.484463	8.608848

## 308	7.855523	7.788204	7.922843
## 311	8.639855	8.578378	8.701331
## 312	9.675990	9.589232	9.762747
## 318	8.513634	8.478010	8.549258
## 324	8.748473	8.658760	8.838187
## 328	8.555284	8.501692	8.608876
## 333	7.811990	7.745173	7.878807
## 338	8.480718	8.416545	8.544892
## 340	7.903999	7.847562	7.960437
## 368	8.521231	8.457242	8.585221
## 369	7.922052	7.875469	7.968636
## 377	7.949472	7.857190	8.041753
## 379	8.076049	8.009477	8.142621
## 387	9.088808	9.024795	9.152822
## 388	8.483849	8.433263	8.534435
## 389	8.511835	8.469519	8.554152
## 400	9.174236	9.102509	9.245963
## 406	9.623399	9.547570	9.699227
## 407	8.553474	8.495313	8.611635
## 417	7.907672	7.838770	7.976573
## 424	7.843998	7.775967	7.912030
## 425	8.506050	8.465697	8.546402
## 436	8.596862	8.540880	8.652844
## 438	7.945214	7.886451	8.003977
## 448	8.526753	8.478492	8.575014
## 451	8.578435	8.505485	8.651386
## 452	7.960472	7.903705	8.017238
## 453	8.417294	8.348875	8.485712
## 454	8.505098	8.450183	8.560014
## 456	10.125318	10.048523	10.202114
## 459	7.976896	7.920548	8.033244
## 461	7.972401	7.904551	8.040252
## 465	7.892910	7.810297	7.975523
## 466	7.967294	7.903981	8.030607
## 467	8.024367	7.972265	8.076469
## 473	9.042609	8.975988	9.109230
## 474	8.045648	7.995456	8.095839
## 479	8.030907	7.962738	8.099076
## 480	9.145374	9.078506	9.212243
## 482	8.037263	7.981745	8.092780
## 488	7.948720	7.899200	7.998239
## 492	9.695976	9.626450	9.765502
## 494	9.045435	8.986158	9.104711
## 496	9.704508	9.601831	9.807185
## 511	8.550005	8.492233	8.607776
## 516	8.506246	8.453051	8.559441
## 521	7.882758	7.829086	7.936431
## 527	8.629925	8.572620	8.687231
## 530	7.987379	7.902914	8.071844
## 532	8.575310	8.520658	8.629961

## 540	8.555616	8.495391	8.615840
## 547	9.085486	8.983980	9.186993
## 550	7.977688	7.930324	8.025052
## 565	7.966878	7.918791	8.014966
## 566	8.088967	8.032644	8.145290
## 567	8.442362	8.386457	8.498268
## 573	8.591515	8.527515	8.655515
## 584	8.612285	8.549463	8.675107
## 596	8.633584	8.574078	8.693089
## 601	7.795775	7.727016	7.864535
## 603	9.121202	9.055102	9.187302
## 604	8.122623	8.054660	8.190586
## 608	8.536846	8.461652	8.612041
## 618	8.639491	8.579060	8.699921
## 626	7.997529	7.942884	8.052174
## 627	8.573763	8.518480	8.629047
## 628	9.157412	9.092470	9.222354
## 636	7.915866	7.849353	7.982378
## 639	8.063327	8.009233	8.117422
## 653	9.161862	9.070704	9.253020
## 654	9.077906	9.016152	9.139661
## 665	8.462513	8.399283	8.525743
## 667	9.067502	8.975468	9.159536
## 674	7.807985	7.714909	7.901061
## 680	7.982490	7.921412	8.043569
## 681	8.491377	8.447125	8.535630
## 688	7.926996	7.868668	7.985323
## 695	8.468708	8.411985	8.525432
## 696	8.030768	7.967130	8.094406
## 697	9.524507	9.443085	9.605930
## 698	8.649222	8.571560	8.726884
## 700	10.199405	10.116694	10.282115
## 703	9.099828	9.001157	9.198498
## 712	9.578079	9.503491	9.652666
## 719	8.486215	8.406981	8.565448
## 727	8.005171	7.933966	8.076375
## 731	8.503688	8.444014	8.563361
## 732	8.446912	8.377362	8.516462
## 738	8.478442	8.424813	8.532071
## 740	8.523533	8.474837	8.572230
## 752	7.844400	7.767128	7.921673
## 755	9.248486	9.174739	9.322233
## 756	7.868120	7.792447	7.943793
## 768	8.963555	8.895998	9.031111
## 769	8.440645	8.393979	8.487311
## 772	9.049846	8.963681	9.136011
## 774	7.806765	7.731078	7.882452
## 776	7.944364	7.888101	8.000626
## 778	7.834270	7.772207	7.896333
## 788	8.400571	8.326119	8.475023

```
## 799 7.792505 7.707240 7.877769
## 803 9.586900 9.510106 9.663693
## 804 9.032283 8.950960 9.113605
## 809 7.926738 7.851627 8.001850
## 814 10.087663 10.005624 10.169702
## 816 8.014770 7.943098 8.086443
## 818 9.045013 8.984624 9.105402
## 821 7.960850 7.917636 8.004064
## 825 8.615757 8.549850 8.681663
## 831 8.488664 8.407863 8.569465
## 834 7.889768 7.845892 7.933644
## 845 8.539190 8.482226 8.596154
## 852 7.878667 7.793303 7.964031
## 854 8.531477 8.473134 8.589820
## 864 9.586472 9.454749 9.718195
```

```
MSPE = data.frame(Observed = log(EmlTest$Monthly.Income), Predicted = Pred_B
CK)
```

```
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
```

```
MSPE$SquaredResidual = MSPE$Residual^2
```

```
MSPE
```

```
##      Observed Predicted.fit Predicted.lwr Predicted.upr      Residual
## 6  9.081711      8.988037      8.919905      9.056169  0.093674392
## 27 9.202711      8.552513      8.500865      8.604161  0.650198529
## 32 7.614805      8.039287      7.964812      8.113763 -0.424482004
## 35 9.177714      8.553180      8.490666      8.615694  0.624533880
## 40 7.934155      7.939835      7.873789      8.005881 -0.005679346
## 45 7.109062      7.851645      7.798060      7.905231 -0.742583014
## 48 9.075665      9.129421      9.067715      9.191127 -0.053755769
## 49 7.537963      7.837830      7.762353      7.913307 -0.299867363
## 53 7.606387      8.026602      7.968008      8.085196 -0.420214729
## 55 8.394800      8.532713      8.487919      8.577507 -0.137913347
## 57 7.922624      7.908115      7.834244      7.981985  0.014508783
## 58 8.460199      8.102636      8.034502      8.170770  0.357563580
## 65 7.700748      7.771408      7.694686      7.848129 -0.070660044
## 82 8.836810      8.577471      8.520739      8.634202  0.259338983
## 83 8.579417      8.494810      8.431211      8.558408  0.084606786
## 86 9.527047      9.687449      9.621792      9.753105 -0.160401552
## 94 8.722906      8.573856      8.514424      8.633288  0.149049592
## 95 9.899781     10.221309     10.146156     10.296463 -0.321528759
## 97 9.717519      9.649847      9.551718      9.747975  0.067672813
## 103 8.785387      8.564073      8.484016      8.644130  0.221313538
## 107 8.370779      8.553808      8.470394      8.637222 -0.183028948
## 109 9.096724      8.376688      8.299596      8.453780  0.720035435
## 114 8.535622      8.400524      8.323661      8.477387  0.135098137
## 118 8.300280      8.642356      8.579083      8.705629 -0.342075843
## 124 8.301025      8.482912      8.421636      8.544189 -0.181887232
## 125 8.423761      8.563888      8.497321      8.630456 -0.140127065
## 127 8.273592      7.869327      7.787131      7.951522  0.404265289
```

## 137	7.748891	7.822936	7.758623	7.887249	-0.074044639
## 160	9.487290	9.081372	9.000796	9.161949	0.405917629
## 162	9.073604	8.979456	8.885426	9.073487	0.094147682
## 166	7.622664	7.791997	7.722677	7.861316	-0.169332814
## 176	7.635304	8.002748	7.944223	8.061272	-0.367443742
## 181	9.237372	9.110624	9.067932	9.153316	0.126747431
## 182	8.838262	8.609701	8.561259	8.658144	0.228560265
## 187	8.557567	8.486994	8.423389	8.550598	0.070573576
## 191	8.661294	8.555154	8.497281	8.613027	0.106139580
## 192	9.173365	9.043237	8.972586	9.113889	0.130127705
## 202	8.735525	8.520320	8.468572	8.572068	0.215205320
## 204	7.703459	8.013359	7.927260	8.099458	-0.309900233
## 216	7.760041	7.924289	7.885741	7.962836	-0.164248071
## 217	9.192584	8.529183	8.476867	8.581499	0.663400457
## 224	7.354362	7.966170	7.907285	8.025054	-0.611807358
## 225	8.470311	7.972268	7.926539	8.017996	0.498043372
## 228	7.752765	8.002968	7.943675	8.062262	-0.250203608
## 245	8.528331	8.571810	8.514008	8.629611	-0.043478664
## 253	7.729296	7.857905	7.801166	7.914645	-0.128609724
## 254	7.991592	7.726274	7.651843	7.800705	0.265318171
## 261	7.932003	7.812925	7.737238	7.888611	0.119078558
## 272	8.600247	8.567748	8.517683	8.617813	0.032498315
## 273	8.171882	8.551551	8.499023	8.604079	-0.379669013
## 278	7.805882	7.946833	7.876524	8.017143	-0.140951185
## 279	8.655911	8.392798	8.319306	8.466289	0.263113569
## 280	8.302762	8.539958	8.483983	8.595934	-0.237196653
## 283	8.781555	8.521606	8.479116	8.564097	0.259949265
## 284	8.928905	8.535482	8.480401	8.590564	0.393423090
## 289	9.183791	9.136186	9.064453	9.207919	0.047604773
## 295	9.707290	9.609803	9.533756	9.685850	0.097487097
## 297	9.163982	8.546655	8.484463	8.608848	0.617326918
## 308	7.999343	7.855523	7.788204	7.922843	0.143819641
## 311	8.609590	8.639855	8.578378	8.701331	-0.030264489
## 312	9.490771	9.675990	9.589232	9.762747	-0.185218615
## 318	8.437500	8.513634	8.478010	8.549258	-0.076133353
## 324	8.437067	8.748473	8.658760	8.838187	-0.311406264
## 328	8.596004	8.555284	8.501692	8.608876	0.040720407
## 333	7.758761	7.811990	7.745173	7.878807	-0.053229658
## 338	8.956222	8.480718	8.416545	8.544892	0.475503916
## 340	7.758333	7.903999	7.847562	7.960437	-0.145665972
## 368	8.607582	8.521231	8.457242	8.585221	0.086350707
## 369	7.636752	7.922052	7.875469	7.968636	-0.285300102
## 377	7.916807	7.949472	7.857190	8.041753	-0.032664013
## 379	7.681560	8.076049	8.009477	8.142621	-0.394488483
## 387	9.081256	9.088808	9.024795	9.152822	-0.007552098
## 388	8.357494	8.483849	8.433263	8.534435	-0.126355105
## 389	8.412277	8.511835	8.469519	8.554152	-0.099558418
## 400	9.231025	9.174236	9.102509	9.245963	0.056789113
## 406	9.718783	9.623399	9.547570	9.699227	0.095384598
## 407	8.606668	8.553474	8.495313	8.611635	0.053194180



## 417	7.849324	7.907672	7.838770	7.976573	-0.058347930
## 424	7.384610	7.843998	7.775967	7.912030	-0.459387886
## 425	8.460411	8.506050	8.465697	8.546402	-0.045638753
## 436	8.734560	8.596862	8.540880	8.652844	0.137697745
## 438	7.961021	7.945214	7.886451	8.003977	0.015807474
## 448	8.619389	8.526753	8.478492	8.575014	0.092635434
## 451	8.492491	8.578435	8.505485	8.651386	-0.085944804
## 452	8.137396	7.960472	7.903705	8.017238	0.176924200
## 453	8.667852	8.417294	8.348875	8.485712	0.250558307
## 454	8.610137	8.505098	8.450183	8.560014	0.105038475
## 456	9.895102	10.125318	10.048523	10.202114	-0.230215945
## 459	7.633370	7.976896	7.920548	8.033244	-0.343525988
## 461	7.646354	7.972401	7.904551	8.040252	-0.326047752
## 465	7.798523	7.892910	7.810297	7.975523	-0.094386796
## 466	8.279951	7.967294	7.903981	8.030607	0.312656856
## 467	7.880048	8.024367	7.972265	8.076469	-0.144318792
## 473	9.491375	9.042609	8.975988	9.109230	0.448766764
## 474	8.146709	8.045648	7.995456	8.095839	0.101061293
## 479	7.989560	8.030907	7.962738	8.099076	-0.041346514
## 480	9.528358	9.145374	9.078506	9.212243	0.382983295
## 482	7.764721	8.037263	7.981745	8.092780	-0.272542042
## 488	7.976252	7.948720	7.899200	7.998239	0.027532251
## 492	9.733885	9.695976	9.626450	9.765502	0.037908661
## 494	9.060215	9.045435	8.986158	9.104711	0.014780275
## 496	9.699350	9.704508	9.601831	9.807185	-0.005158161
## 511	8.583543	8.550005	8.492233	8.607776	0.033537923
## 516	8.609225	8.506246	8.453051	8.559441	0.102979221
## 521	7.845024	7.882758	7.829086	7.936431	-0.037734025
## 527	8.518392	8.629925	8.572620	8.687231	-0.111532840
## 530	8.509766	7.987379	7.902914	8.071844	0.522386693
## 532	8.826881	8.575310	8.520658	8.629961	0.251571509
## 540	8.547722	8.555616	8.495391	8.615840	-0.007893104
## 547	8.909641	9.085486	8.983980	9.186993	-0.175845766
## 550	7.685703	7.977688	7.930324	8.025052	-0.291985343
## 565	8.251403	7.966878	7.918791	8.014966	0.284524767
## 566	7.798113	8.088967	8.032644	8.145290	-0.290854434
## 567	7.685244	8.442362	8.386457	8.498268	-0.757118870
## 573	8.829665	8.591515	8.527515	8.655515	0.238150428
## 584	8.471987	8.612285	8.549463	8.675107	-0.140298349
## 596	8.303257	8.633584	8.574078	8.693089	-0.330326404
## 601	7.617268	7.795775	7.727016	7.864535	-0.178507310
## 603	9.342771	9.121202	9.055102	9.187302	0.221568981
## 604	8.049108	8.122623	8.054660	8.190586	-0.073515515
## 608	8.631414	8.536846	8.461652	8.612041	0.094568159
## 618	8.604105	8.639491	8.579060	8.699921	-0.035386093
## 626	7.830823	7.997529	7.942884	8.052174	-0.166705966
## 627	8.333751	8.573763	8.518480	8.629047	-0.240012281
## 628	9.350972	9.157412	9.092470	9.222354	0.193559646
## 636	7.773174	7.915866	7.849353	7.982378	-0.142692060
## 639	7.910224	8.063327	8.009233	8.117422	-0.153103564

```

## 653 9.510371      9.161862      9.070704      9.253020  0.348509225
## 654 9.433804      9.077906      9.016152      9.139661  0.355897426
## 665 8.426831      8.462513      8.399283      8.525743 -0.035682361
## 667 8.976894      9.067502      8.975468      9.159536 -0.090608401
## 674 7.611842      7.807985      7.714909      7.901061 -0.196142606
## 680 7.753194      7.982490      7.921412      8.043569 -0.229296131
## 681 8.356085      8.491377      8.447125      8.535630 -0.135292302
## 688 7.871693      7.926996      7.868668      7.985323 -0.055302884
## 695 9.161675      8.468708      8.411985      8.525432  0.692966789
## 696 8.099858      8.030768      7.967130      8.094406  0.069089896
## 697 9.629182      9.524507      9.443085      9.605930  0.104675125
## 698 8.685078      8.649222      8.571560      8.726884  0.035855853
## 700 9.856448      10.199405     10.116694     10.282115 -0.342956343
## 703 9.247347      9.099828      9.001157      9.198498  0.147519143
## 712 9.555206      9.578079      9.503491      9.652666 -0.022872860
## 719 8.429673      8.486215      8.406981      8.565448 -0.056542068
## 727 7.997327      8.005171      7.933966      8.076375 -0.007843706
## 731 8.469053      8.503688      8.444014      8.563361 -0.034634771
## 732 8.563695      8.446912      8.377362      8.516462  0.116783204
## 738 8.550821      8.478442      8.424813      8.532071  0.072379216
## 740 8.210940      8.523533      8.474837      8.572230 -0.312593414
## 752 7.741534      7.844400      7.767128      7.921673 -0.102866594
## 755 9.514068      9.248486      9.174739      9.322233  0.265582291
## 756 8.218248      7.868120      7.792447      7.943793  0.350127969
## 768 9.299450      8.963555      8.895998      9.031111  0.335894990
## 769 8.906393      8.440645      8.393979      8.487311  0.465748088
## 772 9.254644      9.049846      8.963681      9.136011  0.204798446
## 774 8.127995      7.806765      7.731078      7.882452  0.321229916
## 776 8.161946      7.944364      7.888101      8.000626  0.217581877
## 778 7.946971      7.834270      7.772207      7.896333  0.112701710
## 788 8.505323      8.400571      8.326119      8.475023  0.104752319
## 799 7.527794      7.792505      7.707240      7.877769 -0.264710623
## 803 9.744961      9.586900      9.510106      9.663693  0.158061042
## 804 9.167642      9.032283      8.950960      9.113605  0.135359096
## 809 7.959276      7.926738      7.851627      8.001850  0.032537626
## 814 9.886240      10.087663     10.005624     10.169702 -0.201423222
## 816 7.930566      8.014770      7.943098      8.086443 -0.084204528
## 818 9.366575      9.045013      8.984624      9.105402  0.321562038
## 821 8.105308      7.960850      7.917636      8.004064  0.144457066
## 825 8.447414      8.615757      8.549850      8.681663 -0.168342424
## 831 8.197814      8.488664      8.407863      8.569465 -0.290849530
## 834 7.844633      7.889768      7.845892      7.933644 -0.045135423
## 845 8.704336      8.539190      8.482226      8.596154  0.165146403
## 852 7.698936      7.878667      7.793303      7.964031 -0.179731003
## 854 8.641356      8.531477      8.473134      8.589820  0.109879022
## 864 9.530248      9.586472      9.454749      9.718195 -0.056224549
##      SquaredResidual
## 6      8.774892e-03
## 27     4.227581e-01
## 32     1.801850e-01

```

```
## 35      3.900426e-01
## 40      3.225497e-05
## 45      5.514295e-01
## 48      2.889683e-03
## 49      8.992044e-02
## 53      1.765804e-01
## 55      1.902009e-02
## 57      2.105048e-04
## 58      1.278517e-01
## 65      4.992842e-03
## 82      6.725671e-02
## 83      7.158308e-03
## 86      2.572866e-02
## 94      2.221578e-02
## 95      1.033807e-01
## 97      4.579610e-03
## 103     4.897968e-02
## 107     3.349960e-02
## 109     5.184510e-01
## 114     1.825151e-02
## 118     1.170159e-01
## 124     3.308297e-02
## 125     1.963559e-02
## 127     1.634304e-01
## 137     5.482609e-03
## 160     1.647691e-01
## 162     8.863786e-03
## 166     2.867360e-02
## 176     1.350149e-01
## 181     1.606491e-02
## 182     5.223979e-02
## 187     4.980630e-03
## 191     1.126561e-02
## 192     1.693322e-02
## 202     4.631333e-02
## 204     9.603815e-02
## 216     2.697743e-02
## 217     4.401002e-01
## 224     3.743082e-01
## 225     2.480472e-01
## 228     6.260185e-02
## 245     1.890394e-03
## 253     1.654046e-02
## 254     7.039373e-02
## 261     1.417970e-02
## 272     1.056141e-03
## 273     1.441486e-01
## 278     1.986724e-02
## 279     6.922875e-02
## 280     5.626225e-02
```

```
## 283 6.757362e-02
## 284 1.547817e-01
## 289 2.266214e-03
## 295 9.503734e-03
## 297 3.810925e-01
## 308 2.068409e-02
## 311 9.159393e-04
## 312 3.430594e-02
## 318 5.796287e-03
## 324 9.697386e-02
## 328 1.658152e-03
## 333 2.833397e-03
## 338 2.261040e-01
## 340 2.121858e-02
## 368 7.456445e-03
## 369 8.139615e-02
## 377 1.066938e-03
## 379 1.556212e-01
## 387 5.703418e-05
## 388 1.596561e-02
## 389 9.911879e-03
## 400 3.225003e-03
## 406 9.098222e-03
## 407 2.829621e-03
## 417 3.404481e-03
## 424 2.110372e-01
## 425 2.082896e-03
## 436 1.896067e-02
## 438 2.498762e-04
## 448 8.581324e-03
## 451 7.386509e-03
## 452 3.130217e-02
## 453 6.277947e-02
## 454 1.103308e-02
## 456 5.299938e-02
## 459 1.180101e-01
## 461 1.063071e-01
## 465 8.908867e-03
## 466 9.775431e-02
## 467 2.082791e-02
## 473 2.013916e-01
## 474 1.021338e-02
## 479 1.709534e-03
## 480 1.466762e-01
## 482 7.427916e-02
## 488 7.580249e-04
## 492 1.437067e-03
## 494 2.184565e-04
## 496 2.660663e-05
## 511 1.124792e-03
```

```
## 516    1.060472e-02
## 521    1.423857e-03
## 527    1.243957e-02
## 530    2.728879e-01
## 532    6.328822e-02
## 540    6.230109e-05
## 547    3.092173e-02
## 550    8.525544e-02
## 565    8.095434e-02
## 566    8.459630e-02
## 567    5.732290e-01
## 573    5.671563e-02
## 584    1.968363e-02
## 596    1.091155e-01
## 601    3.186486e-02
## 603    4.909281e-02
## 604    5.404531e-03
## 608    8.943137e-03
## 618    1.252176e-03
## 626    2.779088e-02
## 627    5.760590e-02
## 628    3.746534e-02
## 636    2.036102e-02
## 639    2.344070e-02
## 653    1.214587e-01
## 654    1.266630e-01
## 665    1.273231e-03
## 667    8.209882e-03
## 674    3.847192e-02
## 680    5.257672e-02
## 681    1.830401e-02
## 688    3.058409e-03
## 695    4.802030e-01
## 696    4.773414e-03
## 697    1.095688e-02
## 698    1.285642e-03
## 700    1.176191e-01
## 703    2.176190e-02
## 712    5.231677e-04
## 719    3.197006e-03
## 727    6.152373e-05
## 731    1.199567e-03
## 732    1.363832e-02
## 738    5.238751e-03
## 740    9.771464e-02
## 752    1.058154e-02
## 755    7.053395e-02
## 756    1.225896e-01
## 768    1.128254e-01
## 769    2.169213e-01
```

```
## 772      4.194240e-02
## 774      1.031887e-01
## 776      4.734187e-02
## 778      1.270168e-02
## 788      1.097305e-02
## 799      7.007171e-02
## 803      2.498329e-02
## 804      1.832208e-02
## 809      1.058697e-03
## 814      4.057131e-02
## 816      7.090403e-03
## 818      1.034021e-01
## 821      2.086784e-02
## 825      2.833917e-02
## 831      8.459345e-02
## 834      2.037206e-03
## 845      2.727333e-02
## 852      3.230323e-02
## 854      1.207340e-02
## 864      3.161200e-03

mean(MSPE$SquaredResidual)

## [1] 0.06832213

reg.bck=regsubsets(log(Monthly.Income)~.,data=EmplTrain,method="backward",nvm
ax=29)
k<-ols_step_backward_aic(Model_Null, details = TRUE)

## Backward Elimination Method
## -----
##
## Candidate Terms:
##
## 1 . Age
## 2 . Attrition
## 3 . BusinessTravel
## 4 . Daily.Rate
## 5 . Distance.From.Home
## 6 . Education
## 7 . EducationField
## 8 . Environment.Satisfaction
## 9 . Gender
## 10 . Hourly.Rate
## 11 . Job.Involvement
## 12 . Job.Level
## 13 . Job.Satisfaction
## 14 . Marital.Status
## 15 . Monthly.Rate
## 16 . Num.Companies.Worked
## 17 . OverTime
```

```
## 18 . Percent.Salary.Hike
## 19 . Performance.Rating
## 20 . Relationship.Satisfaction
## 21 . Stock.Option.Level
## 22 . Total.Working.Years
## 23 . Training.Times.Last.Year
## 24 . Work.Life.Balance
## 25 . Years.At.Company
## 26 . Years.In.Current.Role
## 27 . Years.Since.Last.Promotion
## 28 . Years.With.Curr.Manager
##
## Step 0: AIC = 55.75066
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Dis
tance.From.Home + Education + EducationField + Environment.Satisfaction + Gen
der + Hourly.Rate + Job.Involvement + Job.Level + Job.Satisfaction + Marital.
Status + Monthly.Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hike
+ Performance.Rating + Relationship.Satisfaction + Stock.Option.Level + Total
.Working.Years + Training.Times.Last.Year + Work.Life.Balance + Years.At.Comp
any + Years.In.Current.Role + Years.Since.Last.Promotion + Years.With.Curr.Ma
nager
##
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Gender                  1      53.752      0.000      39.401      0.870
0.863
## Distance.From.Home      1      53.762      0.001      39.401      0.870
0.863
## Education               1      53.769      0.001      39.402      0.870
0.863
## Total.Working.Years     1      53.770      0.001      39.402      0.870
0.863
## Training.Times.Last.Year 1      53.786      0.002      39.403      0.870
0.863
## Stock.Option.Level      1      53.816      0.004      39.404      0.870
0.863
## Years.Since.Last.Promotion 1      53.907      0.009      39.410      0.870
0.863
## Job.Satisfaction        1      53.927      0.010      39.411      0.870
0.863
## Marital.Status          1      51.968      0.012      39.413      0.870
0.864
## Work.Life.Balance       1      54.031      0.016      39.417      0.870
0.863
## Job.Involvement         1      54.271      0.030      39.430      0.870
0.863
```

## Hourly.Rate 0.863	1	54.307	0.032	39.432	0.870
## Age 0.863	1	54.532	0.045	39.445	0.870
## Performance.Rating 0.863	1	54.668	0.053	39.453	0.870
## Percent.Salary.Hike 0.863	1	55.246	0.086	39.486	0.870
## Relationship.Satisfaction 0.863	1	55.853	0.120	39.521	0.870
## Monthly.Rate 0.863	1	56.246	0.143	39.544	0.869
## Years.At.Company 0.863	1	56.496	0.157	39.558	0.869
## Years.With.Curr.Manager 0.863	1	57.034	0.188	39.589	0.869
## Environment.Satisfaction 0.862	1	59.318	0.320	39.720	0.869
## OverTime 0.862	1	59.486	0.329	39.730	0.869
## BusinessTravel 0.862	1	57.775	0.346	39.747	0.869
## Daily.Rate 0.862	1	60.773	0.404	39.804	0.869
## Years.In.Current.Role 0.862	1	60.800	0.405	39.806	0.869
## Num.Companies.Worked 0.862	1	61.009	0.417	39.818	0.869
## EducationField 0.863	1	53.667	0.455	39.856	0.868
## Attrition 0.861	1	68.005	0.824	40.224	0.867
## Job.Level 0.576	1	834.191	82.902	122.302	0.596

```

## -----
##
##
## Variables Removed:
##
## - Marital.Status
##
##
## Step 1 : AIC = 51.96847
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Dis
tance.From.Home + Education + EducationField + Environment.Satisfaction + Gen
der + Hourly.Rate + Job.Involvement + Job.Level + Job.Satisfaction + Monthly.
Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Ra
ting + Relationship.Satisfaction + Stock.Option.Level + Total.Working.Years +
Training.Times.Last.Year + Work.Life.Balance + Years.At.Company + Years.In.Cu

```



```

rrent.Role + Years.Since.Last.Promotion + Years.With.Curr.Manager
##
## -----
-----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Gender                  1      49.972      0.000      39.413      0.870
0.864
## Distance.From.Home      1      49.977      0.000      39.414      0.870
0.864
## Total.Working.Years      1      49.984      0.001      39.414      0.870
0.864
## Education               1      49.989      0.001      39.414      0.870
0.864
## Training.Times.Last.Year 1      49.996      0.002      39.415      0.870
0.864
## Job.Satisfaction         1      50.120      0.009      39.422      0.870
0.864
## Years.Since.Last.Promotion 1      50.132      0.009      39.422      0.870
0.864
## Work.Life.Balance        1      50.250      0.016      39.429      0.870
0.864
## Job.Involvement          1      50.476      0.029      39.442      0.870
0.864
## Stock.Option.Level       1      50.518      0.031      39.444      0.870
0.864
## Hourly.Rate              1      50.529      0.032      39.445      0.870
0.864
## Age                     1      50.839      0.050      39.463      0.870
0.864
## Performance.Rating       1      50.891      0.053      39.466      0.870
0.864
## Percent.Salary.Hike      1      51.482      0.087      39.500      0.870
0.863
## Relationship.Satisfaction 1      52.183      0.127      39.540      0.870
0.863
## Monthly.Rate             1      52.502      0.145      39.558      0.869
0.863
## Years.At.Company         1      52.675      0.155      39.568      0.869
0.863
## Years.With.Curr.Manager   1      53.189      0.185      39.598      0.869
0.863
## Environment.Satisfaction 1      55.586      0.323      39.736      0.869
0.863
## OverTime                 1      55.778      0.334      39.747      0.869
0.863
## BusinessTravel           1      53.989      0.346      39.759      0.869
0.863

```

```

## Years.In.Current.Role      1      57.037      0.406      39.819      0.869
0.862
## Daily.Rate                 1      57.130      0.412      39.825      0.869
0.862
## Num.Companies.Worked       1      57.189      0.415      39.828      0.869
0.862
## EducationField             1      49.962      0.460      39.873      0.868
0.863
## Attrition                  1      65.127      0.877      40.290      0.867
0.861
## Job.Level                  1     831.188     83.066     122.479      0.596
0.577
## -----
##
## - EducationField
##
##
## Step 2 : AIC = 49.96191
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Dis
tance.From.Home + Education + Environment.Satisfaction + Gender + Hourly.Rate
+ Job.Involvement + Job.Level + Job.Satisfaction + Monthly.Rate + Num.Compani
es.Worked + OverTime + Percent.Salary.Hike + Performance.Rating + Relationshi
p.Satisfaction + Stock.Option.Level + Total.Working.Years + Training.Times.La
st.Year + Work.Life.Balance + Years.At.Company + Years.In.Current.Role + Year
s.Since.Last.Promotion + Years.With.Curr.Manager
##
## -----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Distance.From.Home      1      47.962      0.000      39.873      0.868
0.863
## Total.Working.Years      1      47.963      0.000      39.873      0.868
0.863
## Gender                   1      47.963      0.000      39.873      0.868
0.863
## Education                1      47.967      0.000      39.873      0.868
0.863
## Training.Times.Last.Year  1      47.977      0.001      39.874      0.868
0.863
## Years.Since.Last.Promotion 1      48.063      0.006      39.879      0.868
0.863
## Job.Satisfaction         1      48.127      0.010      39.883      0.868
0.863
## Work.Life.Balance        1      48.256      0.017      39.890      0.868
0.863
## Job.Involvement          1      48.390      0.025      39.898      0.868
0.868

```

```

0.863
## Hourly.Rate          1      48.390      0.025      39.898      0.868
0.863
## Stock.Option.Level   1      48.433      0.027      39.900      0.868
0.863
## Performance.Rating   1      48.854      0.052      39.925      0.868
0.863
## Age                  1      48.951      0.057      39.930      0.868
0.863
## Percent.Salary.Hike   1      49.495      0.089      39.962      0.868
0.863
## Monthly.Rate         1      50.072      0.122      39.995      0.868
0.863
## Relationship.Satisfaction 1      50.195      0.129      40.002      0.868
0.863
## Years.At.Company      1      51.153      0.185      40.058      0.868
0.863
## Years.With.Curr.Manager 1      51.733      0.219      40.092      0.868
0.862
## Environment.Satisfaction 1      53.367      0.314      40.187      0.867
0.862
## OverTime             1      53.992      0.350      40.223      0.867
0.862
## BusinessTravel       1      52.479      0.379      40.252      0.867
0.862
## Daily.Rate           1      54.761      0.395      40.268      0.867
0.862
## Num.Companies.Worked  1      54.783      0.397      40.270      0.867
0.862
## Years.In.Current.Role 1      55.211      0.422      40.295      0.867
0.862
## Attrition            1      63.356      0.901      40.774      0.865
0.860
## Job.Level            1      837.800      85.595      125.468      0.586
0.570
## -----
-----
##
## - Distance.From.Home
##
##
## Step 3 : AIC = 47.96249
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Edu
cation + Environment.Satisfaction + Gender + Hourly.Rate + Job.Involvement +
Job.Level + Job.Satisfaction + Monthly.Rate + Num.Companies.Worked + OverTime
+ Percent.Salary.Hike + Performance.Rating + Relationship.Satisfaction + Stoc
k.Option.Level + Total.Working.Years + Training.Times.Last.Year + Work.Life.B
alance + Years.At.Company + Years.In.Current.Role + Years.Since.Last.Promotio
n + Years.With.Curr.Manager
##

```

##	DF	AIC	Sum Sq	RSS	R-Sq
## Variable					
Adj. R-Sq					
##					
## Total.Working.Years	1	45.963	0.000	39.873	0.868
0.863					
## Gender	1	45.963	0.000	39.873	0.868
0.863					
## Education	1	45.967	0.000	39.873	0.868
0.863					
## Training.Times.Last.Year	1	45.977	0.001	39.874	0.868
0.863					
## Years.Since.Last.Promotion	1	46.064	0.006	39.879	0.868
0.863					
## Job.Satisfaction	1	46.128	0.010	39.883	0.868
0.863					
## Work.Life.Balance	1	46.257	0.017	39.890	0.868
0.863					
## Hourly.Rate	1	46.390	0.025	39.898	0.868
0.863					
## Job.Involvement	1	46.391	0.025	39.898	0.868
0.863					
## Stock.Option.Level	1	46.434	0.027	39.900	0.868
0.863					
## Performance.Rating	1	46.854	0.052	39.925	0.868
0.863					
## Age	1	46.952	0.057	39.930	0.868
0.863					
## Percent.Salary.Hike	1	47.495	0.089	39.962	0.868
0.863					
## Monthly.Rate	1	48.077	0.123	39.996	0.868
0.863					
## Relationship.Satisfaction	1	48.210	0.130	40.003	0.868
0.863					
## Years.At.Company	1	49.153	0.185	40.058	0.868
0.863					
## Years.With.Curr.Manager	1	49.740	0.219	40.092	0.868
0.863					
## Environment.Satisfaction	1	51.373	0.314	40.187	0.867
0.862					
## OverTime	1	52.001	0.351	40.224	0.867
0.862					
## BusinessTravel	1	50.512	0.381	40.254	0.867
0.862					
## Daily.Rate	1	52.762	0.395	40.268	0.867
0.862					
## Num.Companies.Worked	1	52.821	0.399	40.272	0.867
0.862					

```

## Years.In.Current.Role      1      53.212      0.422      40.295      0.867
0.862
## Attrition                  1      61.404      0.904      40.777      0.865
0.860
## Job.Level                  1     837.085     85.829     125.702      0.585
0.570
## -----
##
## - Total.Working.Years
##
##
## Step 4 : AIC = 45.9631
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Edu
cation + Environment.Satisfaction + Gender + Hourly.Rate + Job.Involvement +
Job.Level + Job.Satisfaction + Monthly.Rate + Num.Companies.Worked + OverTime
+ Percent.Salary.Hike + Performance.Rating + Relationship.Satisfaction + Stoc
k.Option.Level + Training.Times.Last.Year + Work.Life.Balance + Years.At.Comp
any + Years.In.Current.Role + Years.Since.Last.Promotion + Years.With.Curr.Ma
nager
##
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Gender                  1      43.964      0.000      39.873      0.86
8      0.864
## Education              1      43.968      0.000      39.873      0.86
8      0.864
## Training.Times.Last.Year 1      43.978      0.001      39.874      0.86
8      0.864
## Years.Since.Last.Promotion 1      44.067      0.006      39.879      0.86
8      0.864
## Job.Satisfaction        1      44.129      0.010      39.883      0.86
8      0.864
## Work.Life.Balance       1      44.257      0.017      39.890      0.86
8      0.864
## Job.Involvement         1      44.391      0.025      39.898      0.86
8      0.864
## Hourly.Rate             1      44.392      0.025      39.898      0.86
8      0.864
## Stock.Option.Level      1      44.434      0.027      39.900      0.86
8      0.864
## Performance.Rating      1      44.855      0.052      39.925      0.86
8      0.863
## Age                     1      45.269      0.076      39.949      0.86
8      0.863
## Percent.Salary.Hike     1      45.495      0.089      39.962      0.86

```

```

8      0.863
## Monthly.Rate      1      46.079      0.123      39.996      0.86
8      0.863
## Relationship.Satisfaction      1      46.229      0.131      40.004      0.86
8      0.863
## Years.At.Company      1      47.391      0.199      40.072      0.86
8      0.863
## Years.With.Curr.Manager      1      47.741      0.219      40.092      0.86
8      0.863
## Environment.Satisfaction      1      49.385      0.315      40.188      0.86
7      0.863
## OverTime      1      50.001      0.351      40.224      0.86
7      0.862
## BusinessTravel      1      48.547      0.383      40.256      0.86
7      0.863
## Daily.Rate      1      50.764      0.396      40.269      0.86
7      0.862
## Years.In.Current.Role      1      51.215      0.422      40.295      0.86
7      0.862
## Num.Companies.Worked      1      51.521      0.440      40.313      0.86
7      0.862
## Attrition      1      59.512      0.910      40.783      0.86
5      0.861
## Job.Level      1      1071.657      137.326      177.199      0.41
5      0.394
## -----
-----
##
## - Gender
##
##
## Step 5 : AIC = 43.96385
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Edu
cation + Environment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level
+ Job.Satisfaction + Monthly.Rate + Num.Companies.Worked + OverTime + Percent
.Salary.Hike + Performance.Rating + Relationship.Satisfaction + Stock.Option.
Level + Training.Times.Last.Year + Work.Life.Balance + Years.At.Company + Yea
rs.In.Current.Role + Years.Since.Last.Promotion + Years.With.Curr.Manager
##
## -----
-----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Education      1      41.968      0.000      39.873      0.86
8      0.864
## Training.Times.Last.Year      1      41.979      0.001      39.874      0.86
8      0.864
## Years.Since.Last.Promotion      1      42.068      0.006      39.879      0.86

```

```

8      0.864
## Job.Satisfaction      1      42.129      0.010      39.883      0.86
8      0.864
## Work.Life.Balance     1      42.258      0.017      39.890      0.86
8      0.864
## Hourly.Rate           1      42.392      0.025      39.898      0.86
8      0.864
## Job.Involvement       1      42.393      0.025      39.898      0.86
8      0.864
## Stock.Option.Level    1      42.434      0.027      39.900      0.86
8      0.864
## Performance.Rating    1      42.855      0.052      39.925      0.86
8      0.864
## Age                   1      43.270      0.076      39.949      0.86
8      0.864
## Percent.Salary.Hike   1      43.497      0.089      39.962      0.86
8      0.864
## Monthly.Rate          1      44.083      0.123      39.996      0.86
8      0.863
## Relationship.Satisfaction 1      44.232      0.131      40.005      0.86
8      0.863
## Years.At.Company      1      45.392      0.199      40.072      0.86
8      0.863
## Years.With.Curr.Manager 1      45.747      0.220      40.093      0.86
8      0.863
## Environment.Satisfaction 1      47.394      0.315      40.189      0.86
7      0.863
## OverTime              1      48.001      0.351      40.224      0.86
7      0.863
## BusinessTravel        1      46.553      0.383      40.256      0.86
7      0.863
## Daily.Rate            1      48.778      0.396      40.269      0.86
7      0.863
## Years.In.Current.Role 1      49.218      0.422      40.295      0.86
7      0.862
## Num.Companies.Worked  1      49.528      0.440      40.313      0.86
7      0.862
## Attrition             1      57.518      0.910      40.783      0.86
5      0.861
## Job.Level             1      1069.965      137.405      177.278      0.41
5      0.395
## -----
-----
##
## - Education
##
##
## Step 6 : AIC = 41.96847
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level + Job.Satis

```

```
faction + Monthly.Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Rating + Relationship.Satisfaction + Stock.Option.Level + Training.Times.Last.Year + Work.Life.Balance + Years.At.Company + Years.In.Current.Role + Years.Since.Last.Promotion + Years.With.Curr.Manager
```

```
##
```

```
## -----
```

```
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
```

```
## -----
```

```
## Training.Times.Last.Year      1      39.983      0.001      39.874      0.86
8      0.864
## Years.Since.Last.Promotion    1      40.075      0.006      39.879      0.86
8      0.864
## Job.Satisfaction              1      40.137      0.010      39.883      0.86
8      0.864
## Work.Life.Balance            1      40.262      0.017      39.890      0.86
8      0.864
## Hourly.Rate                  1      40.397      0.025      39.898      0.86
8      0.864
## Job.Involvement              1      40.398      0.025      39.898      0.86
8      0.864
## Stock.Option.Level           1      40.442      0.027      39.901      0.86
8      0.864
## Performance.Rating           1      40.867      0.052      39.925      0.86
8      0.864
## Age                          1      41.312      0.078      39.951      0.86
8      0.864
## Percent.Salary.Hike          1      41.513      0.089      39.963      0.86
8      0.864
## Monthly.Rate                 1      42.085      0.123      39.996      0.86
8      0.864
## Relationship.Satisfaction     1      42.243      0.132      40.005      0.86
8      0.864
## Years.At.Company             1      43.417      0.200      40.073      0.86
8      0.863
## Years.With.Curr.Manager      1      43.781      0.221      40.095      0.86
8      0.863
## Environment.Satisfaction     1      45.413      0.316      40.190      0.86
7      0.863
## OverTime                     1      46.003      0.351      40.224      0.86
7      0.863
## BusinessTravel               1      44.566      0.384      40.257      0.86
7      0.863
## Daily.Rate                   1      46.780      0.396      40.269      0.86
7      0.863
## Years.In.Current.Role        1      47.223      0.422      40.295      0.86
7      0.863
## Num.Companies.Worked         1      47.707      0.450      40.324      0.86
```



```

7      0.863
## Attrition      1      55.527      0.911      40.784      0.86
5      0.861
## Job.Level      1     1068.682     137.590     177.463      0.41
4      0.395
## -----
##
## - Training.Times.Last.Year
##
##
## Step 7 : AIC = 39.9828
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level + Job.Satis
faction + Monthly.Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hik
e + Performance.Rating + Relationship.Satisfaction + Stock.Option.Level + Wor
k.Life.Balance + Years.At.Company + Years.In.Current.Role + Years.Since.Last.
Promotion + Years.With.Curr.Manager
##
## -----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Years.Since.Last.Promotion      1      38.085      0.006      39.880      0.86
8      0.864
## Job.Satisfaction      1      38.145      0.009      39.884      0.86
8      0.864
## Work.Life.Balance      1      38.274      0.017      39.891      0.86
8      0.864
## Job.Involvement      1      38.406      0.024      39.899      0.86
8      0.864
## Hourly.Rate      1      38.414      0.025      39.899      0.86
8      0.864
## Stock.Option.Level      1      38.455      0.027      39.901      0.86
8      0.864
## Performance.Rating      1      38.884      0.052      39.926      0.86
8      0.864
## Age      1      39.321      0.078      39.952      0.86
8      0.864
## Percent.Salary.Hike      1      39.527      0.089      39.964      0.86
8      0.864
## Monthly.Rate      1      40.100      0.123      39.997      0.86
8      0.864
## Relationship.Satisfaction      1      40.258      0.132      40.006      0.86
8      0.864
## Years.At.Company      1      41.418      0.199      40.073      0.86
8      0.864
## Years.With.Curr.Manager      1      41.801      0.222      40.096      0.86

```

```

8      0.864
## Environment.Satisfaction      1      43.419      0.316      40.190      0.86
7      0.863
## OverTime                      1      44.006      0.350      40.224      0.86
7      0.863
## BusinessTravel               1      42.592      0.384      40.258      0.86
7      0.863
## Daily.Rate                   1      44.789      0.396      40.270      0.86
7      0.863
## Years.In.Current.Role        1      45.223      0.421      40.295      0.86
7      0.863
## Num.Companies.Worked         1      45.713      0.450      40.324      0.86
7      0.863
## Attrition                    1      53.623      0.915      40.790      0.86
5      0.861
## Job.Level                    1     1067.762     137.867     177.741      0.41
3      0.395
## -----
-----
##
## - Years.Since.Last.Promotion
##
##
## Step 8 : AIC = 38.08461
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level + Job.Satis
faction + Monthly.Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hik
e + Performance.Rating + Relationship.Satisfaction + Stock.Option.Level + Wor
k.Life.Balance + Years.At.Company + Years.In.Current.Role + Years.With.Curr.M
anager
##
## -----
-----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Job.Satisfaction         1      36.234      0.009      39.889      0.868
0.864
## Work.Life.Balance        1      36.357      0.016      39.896      0.868
0.864
## Hourly.Rate              1      36.514      0.025      39.905      0.868
0.864
## Job.Involvement          1      36.515      0.025      39.905      0.868
0.864
## Stock.Option.Level       1      36.553      0.027      39.907      0.868
0.864
## Performance.Rating       1      37.007      0.053      39.933      0.868
0.864
## Age                      1      37.482      0.081      39.961      0.868

```

```

0.864
## Percent.Salary.Hike          1      37.644      0.090      39.970      0.868
0.864
## Monthly.Rate                 1      38.202      0.123      40.003      0.868
0.864
## Relationship.Satisfaction     1      38.330      0.130      40.010      0.868
0.864
## Years.At.Company             1      39.500      0.198      40.078      0.868
0.864
## Years.With.Curr.Manager      1      39.957      0.225      40.105      0.868
0.864
## Environment.Satisfaction     1      41.458      0.312      40.192      0.867
0.863
## OverTime                     1      42.048      0.347      40.227      0.867
0.863
## BusinessTravel               1      40.621      0.380      40.260      0.867
0.863
## Daily.Rate                   1      42.874      0.395      40.275      0.867
0.863
## Years.In.Current.Role        1      43.531      0.433      40.313      0.867
0.863
## Num.Companies.Worked         1      43.775      0.448      40.328      0.867
0.863
## Attrition                    1      51.632      0.910      40.790      0.865
0.861
## Job.Level                    1     1065.779     137.865     177.745      0.413
0.396
## -----
-----
##
## - Job.Satisfaction
##
##
## Step 9 : AIC = 36.23422
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level + Monthly.R
ate + Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Rat
ing + Relationship.Satisfaction + Stock.Option.Level + Work.Life.Balance + Ye
ars.At.Company + Years.In.Current.Role + Years.With.Curr.Manager
##
## -----
-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Work.Life.Balance      1      34.525      0.017      39.906      0.868
0.865
## Hourly.Rate            1      34.622      0.022      39.911      0.868
0.865

```

```

## Job.Involvement          1      34.635      0.023      39.912      0.868
0.865
## Stock.Option.Level       1      34.693      0.027      39.915      0.868
0.865
## Performance.Rating       1      35.183      0.055      39.944      0.868
0.864
## Age                      1      35.630      0.081      39.970      0.868
0.864
## Percent.Salary.Hike      1      35.817      0.092      39.980      0.868
0.864
## Monthly.Rate             1      36.372      0.124      40.013      0.868
0.864
## Relationship.Satisfaction 1      36.520      0.133      40.021      0.868
0.864
## Years.At.Company         1      37.604      0.196      40.084      0.868
0.864
## Years.With.Curr.Manager  1      38.160      0.228      40.117      0.868
0.864
## Environment.Satisfaction 1      39.708      0.318      40.207      0.867
0.864
## OverTime                 1      40.282      0.352      40.240      0.867
0.863
## BusinessTravel           1      38.735      0.378      40.267      0.867
0.864
## Daily.Rate               1      41.037      0.396      40.284      0.867
0.863
## Years.In.Current.Role    1      41.597      0.429      40.317      0.867
0.863
## Num.Companies.Worked     1      41.860      0.444      40.333      0.867
0.863
## Attrition                1      50.498      0.953      40.841      0.865
0.861
## Job.Level                1     1065.642     138.338     178.227      0.412
0.395
## -----
##
## - Work.Life.Balance
##
##
## Step 10 : AIC = 34.52468
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Involvement + Job.Level + Monthly.R
ate + Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Rat
ing + Relationship.Satisfaction + Stock.Option.Level + Years.At.Company + Yea
rs.In.Current.Role + Years.With.Curr.Manager
##
## -----
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq

```

```

Adj. R-Sq
## -----
-----
## Job.Involvement          1      32.923      0.023      39.929      0.868
0.865
## Hourly.Rate              1      32.933      0.024      39.929      0.868
0.865
## Stock.Option.Level       1      32.952      0.025      39.930      0.868
0.865
## Performance.Rating       1      33.494      0.056      39.962      0.868
0.865
## Age                      1      33.958      0.083      39.989      0.868
0.864
## Percent.Salary.Hike      1      34.130      0.093      39.999      0.868
0.864
## Monthly.Rate             1      34.693      0.126      40.031      0.868
0.864
## Relationship.Satisfaction 1      34.854      0.135      40.041      0.868
0.864
## Years.At.Company         1      35.864      0.194      40.099      0.868
0.864
## Years.With.Curr.Manager   1      36.540      0.233      40.139      0.868
0.864
## Environment.Satisfaction 1      38.270      0.334      40.240      0.867
0.864
## OverTime                 1      38.545      0.350      40.256      0.867
0.864
## BusinessTravel           1      37.044      0.379      40.285      0.867
0.864
## Daily.Rate               1      39.440      0.403      40.308      0.867
0.863
## Years.In.Current.Role    1      39.736      0.420      40.325      0.867
0.863
## Num.Companies.Worked     1      40.042      0.438      40.343      0.867
0.863
## Attrition                1      48.574      0.940      40.846      0.865
0.862
## Job.Level                1     1063.721     138.342     178.247      0.412
0.396
## -----
-----
##
## - Job.Involvement
##
##
## Step 11 : AIC = 32.92323
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Hourly.Rate + Job.Level + Monthly.Rate + Num.Companie
s.Worked + OverTime + Percent.Salary.Hike + Performance.Rating + Relationship
.Satisfaction + Stock.Option.Level + Years.At.Company + Years.In.Current.Role

```

```

+ Years.With.Curr.Manager
##
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
## Adj. R-Sq
## -----
## Hourly.Rate        1       31.373      0.026      39.955      0.868
0.865
## Stock.Option.Level  1       31.380      0.026      39.955      0.868
0.865
## Performance.Rating  1       31.856      0.054      39.983      0.868
0.865
## Age                 1       32.352      0.083      40.011      0.868
0.865
## Percent.Salary.Hike 1       32.489      0.091      40.019      0.868
0.865
## Monthly.Rate        1       33.055      0.124      40.052      0.868
0.864
## Relationship.Satisfaction 1       33.299      0.138      40.067      0.868
0.864
## Years.At.Company    1       34.525      0.209      40.138      0.868
0.864
## Years.With.Curr.Manager 1       35.150      0.246      40.174      0.867
0.864
## Environment.Satisfaction 1       36.802      0.342      40.271      0.867
0.864
## OverTime            1       37.006      0.354      40.283      0.867
0.864
## BusinessTravel      1       35.576      0.387      40.316      0.867
0.864
## Daily.Rate          1       37.915      0.407      40.336      0.867
0.864
## Years.In.Current.Role 1       38.257      0.427      40.356      0.867
0.863
## Num.Companies.Worked 1       38.516      0.442      40.371      0.867
0.863
## Attrition           1       48.410      1.026      40.955      0.865
0.861
## Job.Level           1      1061.747     138.325     178.254      0.412
0.397
## -----
##
##
## - Hourly.Rate
##
##
## Step 12 : AIC = 31.37264
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env

```

```

environment.Satisfaction + Job.Level + Monthly.Rate + Num.Companies.Worked + OverTime + Percent.Salary.Hike + Performance.Rating + Relationship.Satisfaction + Stock.Option.Level + Years.At.Company + Years.In.Current.Role + Years.With.Curr.Manager

```

```
##
```

```
## -----
```

```
-----
```

```
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
```

```
## -----
```

```
-----
```

```
## Stock.Option.Level      1      29.894      0.030      39.985      0.868
```

```
0.865
```

```
## Performance.Rating      1      30.246      0.051      40.005      0.868
```

```
0.865
```

```
## Percent.Salary.Hike      1      30.851      0.086      40.041      0.868
```

```
0.865
```

```
## Age                      1      30.886      0.088      40.043      0.868
```

```
0.865
```

```
## Monthly.Rate            1      31.418      0.119      40.073      0.868
```

```
0.865
```

```
## Relationship.Satisfaction 1      31.673      0.134      40.088      0.868
```

```
0.865
```

```
## Years.At.Company        1      33.064      0.215      40.169      0.867
```

```
0.864
```

```
## Years.With.Curr.Manager  1      33.639      0.248      40.203      0.867
```

```
0.864
```

```
## OverTime                1      35.419      0.352      40.307      0.867
```

```
0.864
```

```
## Environment.Satisfaction 1      35.422      0.352      40.307      0.867
```

```
0.864
```

```
## BusinessTravel          1      33.970      0.384      40.339      0.867
```

```
0.864
```

```
## Daily.Rate              1      36.622      0.423      40.377      0.867
```

```
0.864
```

```
## Years.In.Current.Role    1      36.796      0.433      40.387      0.867
```

```
0.864
```

```
## Num.Companies.Worked     1      36.896      0.439      40.393      0.867
```

```
0.864
```

```
## Attrition                1      46.585      1.011      40.965      0.865
```

```
0.862
```

```
## Job.Level                1     1059.748     138.300     178.254      0.412
```

```
0.398
```

```
## -----
```

```
-----
```

```
##
```

```
## - Stock.Option.Level
```

```
##
```

```
##
```

```
## Step 13 : AIC = 29.8942
```

```
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
environment.Satisfaction + Job.Level + Monthly.Rate + Num.Companies.Worked + Ove
rTime + Percent.Salary.Hike + Performance.Rating + Relationship.Satisfaction
+ Years.At.Company + Years.In.Current.Role + Years.With.Curr.Manager
##
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Performance.Rating      1      28.807      0.053      40.038      0.868
0.865
## Age                     1      29.423      0.089      40.074      0.868
0.865
## Percent.Salary.Hike     1      29.432      0.089      40.074      0.868
0.865
## Monthly.Rate            1      29.829      0.112      40.097      0.868
0.865
## Relationship.Satisfaction 1      30.357      0.143      40.128      0.868
0.865
## Years.At.Company        1      31.697      0.221      40.206      0.867
0.864
## Years.With.Curr.Manager 1      32.102      0.245      40.230      0.867
0.864
## Environment.Satisfaction 1      33.871      0.348      40.333      0.867
0.864
## OverTime                1      34.054      0.359      40.344      0.867
0.864
## BusinessTravel          1      32.456      0.383      40.368      0.867
0.864
## Daily.Rate              1      35.151      0.423      40.408      0.867
0.864
## Num.Companies.Worked    1      35.427      0.440      40.424      0.867
0.864
## Years.In.Current.Role   1      35.703      0.456      40.441      0.867
0.864
## Attrition               1      46.066      1.069      41.054      0.865
0.861
## Job.Level               1     1057.871     138.301     178.286      0.412
0.398
## -----
##
## - Performance.Rating
##
## Step 14 : AIC = 28.80719
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
environment.Satisfaction + Job.Level + Monthly.Rate + Num.Companies.Worked + Ove
```



```

rTime + Percent.Salary.Hike + Relationship.Satisfaction + Years.At.Company +
Years.In.Current.Role + Years.With.Curr.Manager
##
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Percent.Salary.Hike      1      27.432      0.036      40.074      0.868
0.865
## Age                      1      28.445      0.095      40.133      0.868
0.865
## Monthly.Rate             1      28.750      0.113      40.151      0.867
0.865
## Relationship.Satisfaction  1      29.273      0.144      40.181      0.867
0.865
## Years.At.Company         1      30.594      0.221      40.259      0.867
0.864
## Years.With.Curr.Manager   1      30.837      0.235      40.273      0.867
0.864
## Environment.Satisfaction  1      32.930      0.357      40.395      0.867
0.864
## OverTime                 1      33.219      0.374      40.412      0.867
0.864
## BusinessTravel           1      31.355      0.382      40.420      0.867
0.864
## Daily.Rate               1      34.288      0.437      40.475      0.866
0.864
## Num.Companies.Worked     1      34.362      0.441      40.479      0.866
0.864
## Years.In.Current.Role     1      34.675      0.460      40.498      0.866
0.864
## Attrition                 1      45.145      1.080      41.118      0.864
0.861
## Job.Level                1     1055.930     138.263     178.301      0.412
0.399
## -----
##
## - Percent.Salary.Hike
##
##
## Step 15 : AIC = 27.43173
## log(Monthly.Income) ~ Age + Attrition + BusinessTravel + Daily.Rate + Env
ironment.Satisfaction + Job.Level + Monthly.Rate + Num.Companies.Worked + Ove
rTime + Relationship.Satisfaction + Years.At.Company + Years.In.Current.Role
+ Years.With.Curr.Manager
##
## -----

```

```

-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
##
## Age              1       27.040      0.094      40.168      0.867
0.865
## Monthly.Rate     1       27.335      0.111      40.185      0.867
0.865
## Relationship.Satisfaction 1       28.004      0.150      40.224      0.867
0.865
## Years.At.Company 1       29.327      0.227      40.301      0.867
0.864
## Years.With.Curr.Manager 1       29.386      0.231      40.305      0.867
0.864
## Environment.Satisfaction 1       31.639      0.363      40.437      0.867
0.864
## OverTime         1       31.802      0.372      40.447      0.867
0.864
## BusinessTravel   1       29.805      0.372      40.447      0.867
0.864
## Num.Companies.Worked 1       32.935      0.439      40.513      0.866
0.864
## Daily.Rate       1       33.021      0.444      40.518      0.866
0.864
## Years.In.Current.Role 1       33.443      0.469      40.543      0.866
0.864
## Attrition        1       43.722      1.078      41.152      0.864
0.862
## Job.Level        1      1053.963     138.235     178.310      0.412
0.400
## -----
##
##
## - Age
##
##
## Step 16 : AIC = 27.04041
## log(Monthly.Income) ~ Attrition + BusinessTravel + Daily.Rate + Environme
nt.Satisfaction + Job.Level + Monthly.Rate + Num.Companies.Worked + OverTime
+ Relationship.Satisfaction + Years.At.Company + Years.In.Current.Role + Year
s.With.Curr.Manager
##
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Monthly.Rate     1       27.150      0.123      40.291      0.867

```

```

0.865
## Relationship.Satisfaction      1      27.729      0.157      40.325      0.867
0.865
## Years.At.Company              1      28.502      0.202      40.370      0.867
0.864
## Years.With.Curr.Manager       1      28.761      0.218      40.385      0.867
0.864
## Environment.Satisfaction      1      31.350      0.370      40.537      0.866
0.864
## BusinessTravel                1      29.427      0.374      40.542      0.866
0.864
## OverTime                     1      31.719      0.391      40.559      0.866
0.864
## Daily.Rate                   1      32.607      0.444      40.611      0.866
0.864
## Years.In.Current.Role        1      33.022      0.468      40.636      0.866
0.864
## Num.Companies.Worked         1      35.305      0.603      40.771      0.865
0.863
## Attrition                    1      44.833      1.171      41.339      0.864
0.861
## Job.Level                    1     1126.180     158.421     198.589      0.345
0.333
## -----
-----
##
##
## No more variables to be removed.
##
## Variables Removed:
##
## - Marital.Status
## - EducationField
## - Distance.From.Home
## - Total.Working.Years
## - Gender
## - Education
## - Training.Times.Last.Year
## - Years.Since.Last.Promotion
## - Job.Satisfaction
## - Work.Life.Balance
## - Job.Involvement
## - Hourly.Rate
## - Stock.Option.Level
## - Performance.Rating
## - Percent.Salary.Hike
## - Age
##
##
## Final Model Output

```

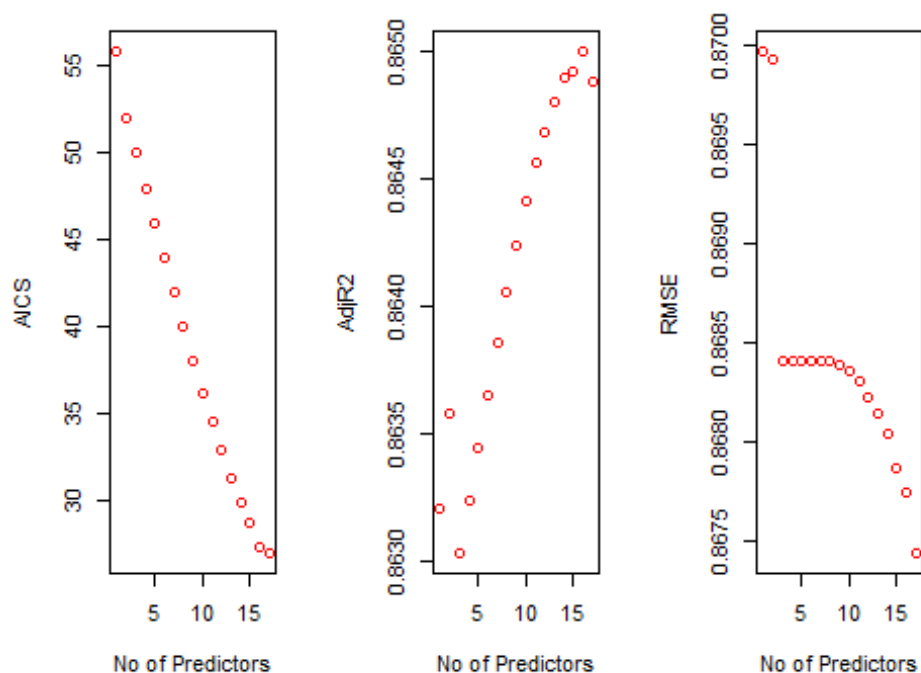
```

## -----
##
##                               Model Summary
## -----
## R                               0.931          RMSE                0.244
## R-Squared                       0.867          Coef. Var          2.861
## Adj. R-Squared                   0.865          MSE                0.060
## Pred R-Squared                   0.862          MAE                0.187
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##                               ANOVA
## -----
##                               Sum of
##                               Squares      DF      Mean Square      F      Sig.
## -----
## Regression      262.837           13           20.218      339.757      0.0000
## Residual        40.168           675           0.060
## Total          303.005           688
## -----
##
##                               Parameter Estimates
## -----
## -----
##                               model      Beta      Std. Error      Std. Beta
## t      Sig      lower      upper
## -----
##                               (Intercept)      7.306      0.055      13
## 1.814      0.000      7.197      7.415
##                               AttritionYes      -0.126      0.028      -0.067      -
## 4.435      0.000      -0.182      -0.070
## BusinessTravelTravel_Frequently      0.046      0.035      0.026
## 1.296      0.195      -0.024      0.116
## BusinessTravelTravel_Rarely      0.072      0.030      0.049
## 2.425      0.016      0.014      0.130
##                               Daily.Rate      0.000      0.000      0.039
## 2.730      0.006      0.000      0.000
##                               Environment.Satisfaction      -0.021      0.009      -0.035      -
## 2.492      0.013      -0.038      -0.005
##                               Job.Level      0.544      0.011      0.888      5
## 1.596      0.000      0.523      0.565
##                               Monthly.Rate      0.000      0.000      0.020
## 1.439      0.151      0.000      0.000
##                               Num.Companies.Worked      0.012      0.004      0.047
## 3.183      0.002      0.005      0.020
##                               OverTimeYes      0.055      0.021      0.038
## 2.564      0.011      0.013      0.097

```

```
## Relationship.Satisfaction -0.014 0.008 -0.023 -
1.625 0.105 -0.030 0.003
## Years.At.Company -0.006 0.003 -0.053 -
1.844 0.066 -0.013 0.000
## Years.In.Current.Role 0.013 0.004 0.068
2.804 0.005 0.004 0.021
## Years.With.Curr.Manager 0.008 0.004 0.044
1.912 0.056 0.000 0.017
## -----
-----
```

```
par(mfrow=c(1,3))
plot(k$aics,xlab="No of Predictors",ylab="AICS", col = "red")
plot(k$arsq,xlab="No of Predictors",ylab="AdjR2", col = "red")
plot(k$rsq,xlab="No of Predictors",ylab="RMSE", col = "red")
```



```
k$predictors
```

```
## [1] "Marital.Status" "EducationField"
## [3] "Distance.From.Home" "Total.Working.Years"
## [5] "Gender" "Education"
## [7] "Training.Times.Last.Year" "Years.Since.Last.Promotion"
## [9] "Job.Satisfaction" "Work.Life.Balance"
## [11] "Job.Involvement" "Hourly.Rate"
## [13] "Stock.Option.Level" "Performance.Rating"
## [15] "Percent.Salary.Hike" "Age"
```

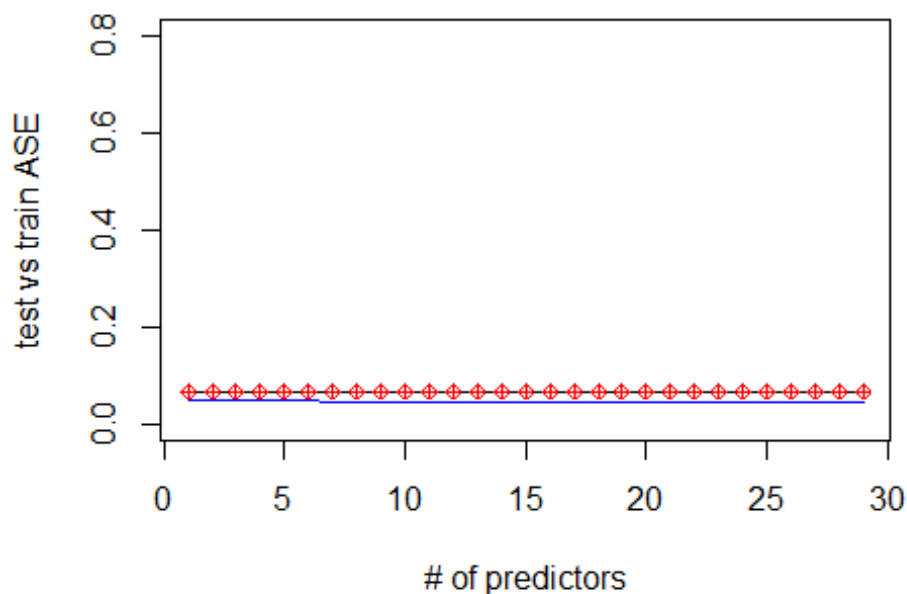
```

for (i in 1:29){
  predictions<-predict(object=Model_BCK,newdata=EmplTest,id=i)
  testASEbwd[i]<-mean((log(EmplTest$Monthly.Income)-predictions)^2)
}

dim(EmplTest)
## [1] 173 29

par(mfrow=c(1,1))
plot(1:29,testASEbwd,type="l",xlab="# of predictors",ylab="test vs train ASE",
ylim=c(0,0.8))
index<-which(testASEbwd==min(testASEbwd))
points(index,testASEbwd[index],col="red",pch=10)
rss<-summary(reg.fwd)$rss
lines(index,rss/869,col="blue") #Dividing by 869 since ASE=RSS/sample size

```



```

##### Stepwise Model #####
Model_Step<-stepAIC(Model_Null,trace=FALSE)
summary(Model_Step)

##
## Call:
## lm(formula = log(Monthly.Income) ~ Attrition + BusinessTravel +
##     Daily.Rate + Environment.Satisfaction + Job.Level + Monthly.Rate +
##     Num.Companies.Worked + OverTime + Relationship.Satisfaction +
##     Years.At.Company + Years.In.Current.Role + Years.With.Curr.Manager,

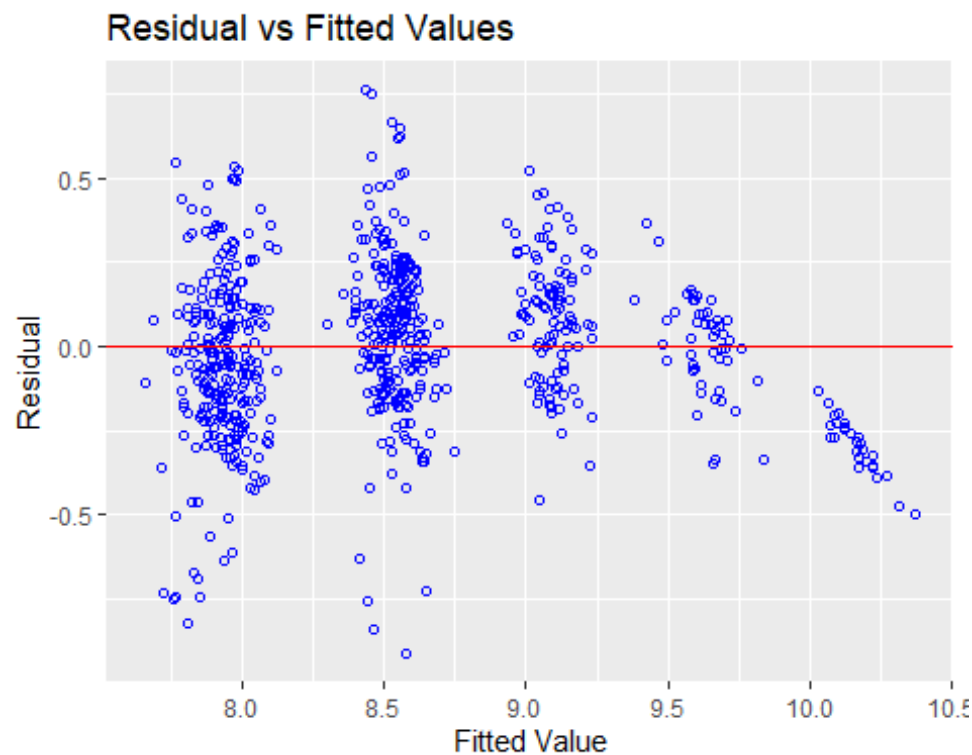
```

```
##      data = EmplTrain)
##
## Residuals:
##      Min        1Q    Median        3Q        Max
## -0.9123 -0.1503  0.0086  0.1490  0.7614
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)    7.306e+00  5.543e-02 131.814 < 2e-16 ***
## AttritionYes   -1.263e-01  2.847e-02  -4.435 1.07e-05 ***
## BusinessTravelTravel_Frequently  4.593e-02  3.545e-02   1.296  0.19546
## BusinessTravelTravel_Rarely      7.170e-02  2.957e-02   2.425  0.01558 *
## Daily.Rate      6.372e-05  2.334e-05   2.730  0.00650 **
## Environment.Satisfaction -2.143e-02  8.598e-03  -2.492  0.01294 *
## Job.Level       5.440e-01  1.054e-02  51.596 < 2e-16 ***
## Monthly.Rate    1.916e-06  1.332e-06   1.439  0.15071
## Num.Companies.Worked  1.250e-02  3.927e-03   3.183  0.00152 **
## OverTimeYes      5.503e-02  2.146e-02   2.564  0.01056 *
## Relationship.Satisfaction -1.377e-02  8.474e-03  -1.625  0.10470
## Years.At.Company  -6.108e-03  3.313e-03  -1.844  0.06565 .
## Years.In.Current.Role  1.253e-02  4.466e-03   2.804  0.00518 **
## Years.With.Curr.Manager  8.286e-03  4.334e-03   1.912  0.05632 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2439 on 675 degrees of freedom
## Multiple R-squared:  0.8674, Adjusted R-squared:  0.8649
## F-statistic: 339.8 on 13 and 675 DF,  p-value: < 2.2e-16

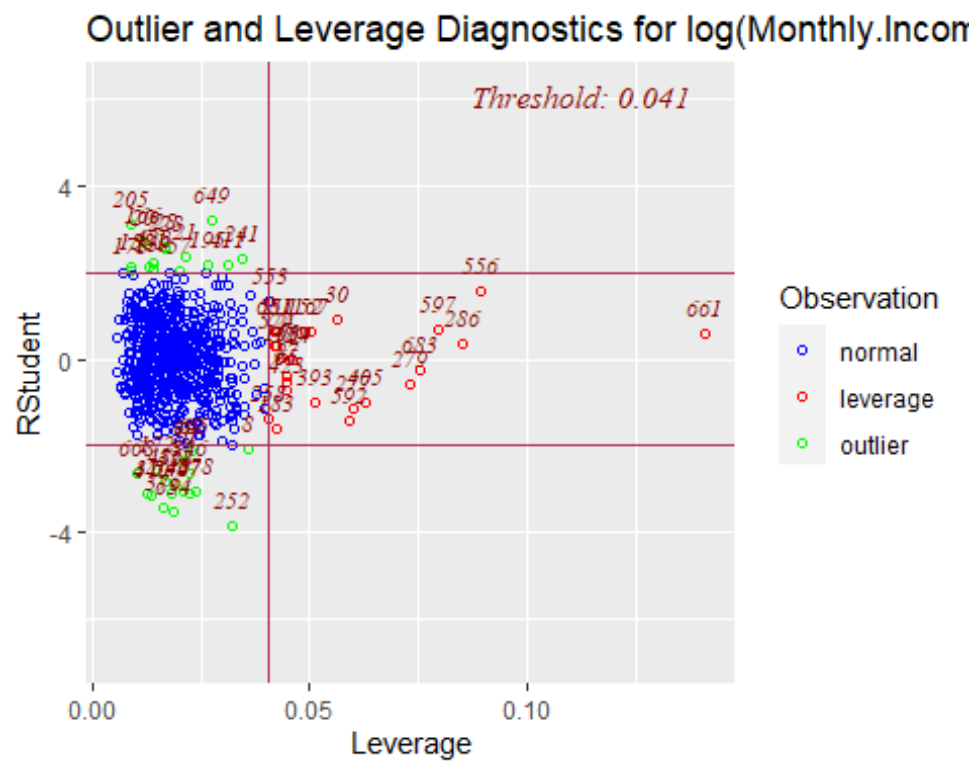
vif(Model_Step)

##              GVIF Df GVIF^(1/(2*Df))
## Attrition      1.173884  1      1.083459
## BusinessTravel  1.031317  2      1.007739
## Daily.Rate      1.017393  1      1.008659
## Environment.Satisfaction  1.028015  1      1.013911
## Job.Level       1.506902  1      1.227559
## Monthly.Rate    1.015982  1      1.007959
## Num.Companies.Worked  1.112172  1      1.054596
## OverTime        1.105066  1      1.051221
## Relationship.Satisfaction  1.014559  1      1.007253
## Years.At.Company  4.208867  1      2.051552
## Years.In.Current.Role  3.007399  1      1.734185
## Years.With.Curr.Manager  2.747785  1      1.657644

#Residual Plots
par(mfrow=c(1,5))
ols_plot_resid_fit(Model_Step)
```

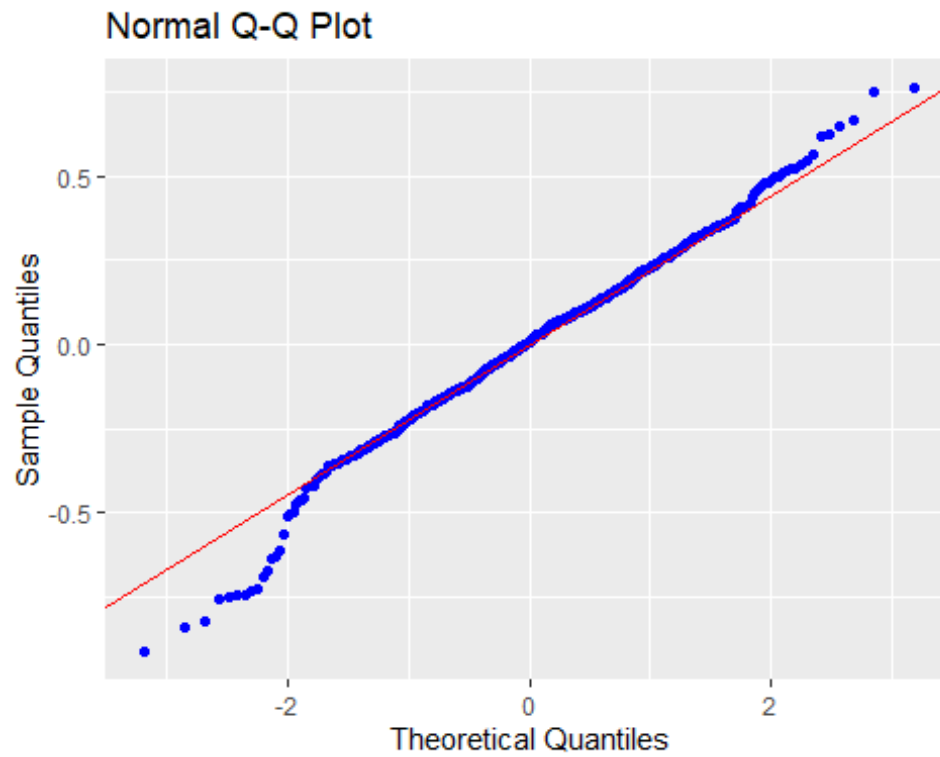


```
ols_plot_resid_lev(Model_Step)
```

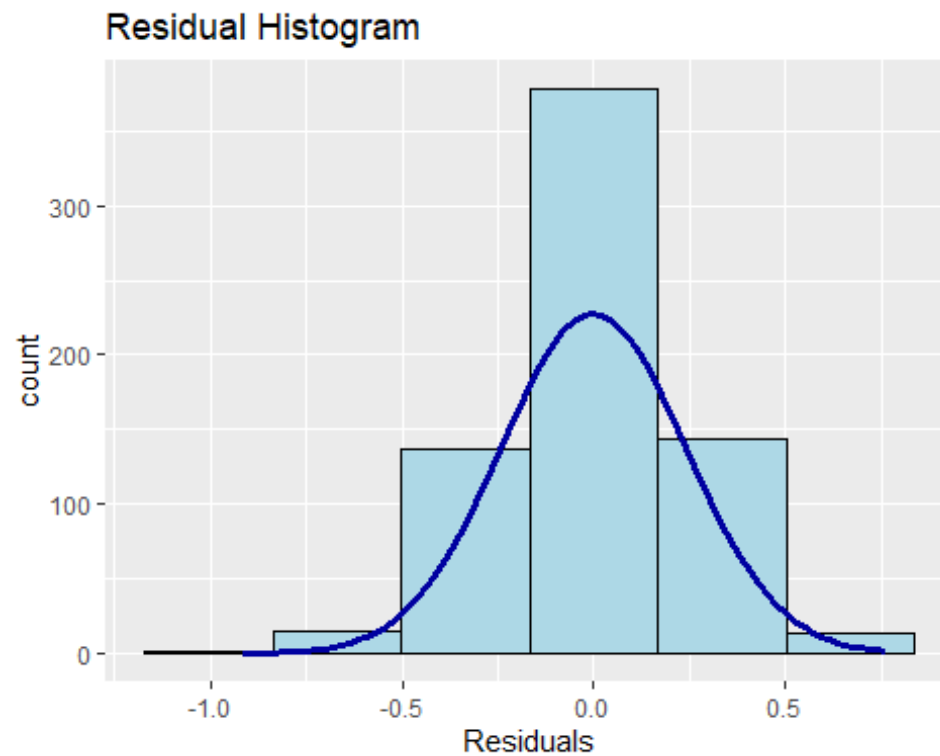


```
ols_plot_resid_qq(Model_Step)
```





```
ols_plot_resid_hist(Model_Step)
```



```
ols_plot_cooksd_bar(Model_Step)
```



## 53	8.026602	7.968008	8.085196
## 55	8.532713	8.487919	8.577507
## 57	7.908115	7.834244	7.981985
## 58	8.102636	8.034502	8.170770
## 65	7.771408	7.694686	7.848129
## 82	8.577471	8.520739	8.634202
## 83	8.494810	8.431211	8.558408
## 86	9.687449	9.621792	9.753105
## 94	8.573856	8.514424	8.633288
## 95	10.221309	10.146156	10.296463
## 97	9.649847	9.551718	9.747975
## 103	8.564073	8.484016	8.644130
## 107	8.553808	8.470394	8.637222
## 109	8.376688	8.299596	8.453780
## 114	8.400524	8.323661	8.477387
## 118	8.642356	8.579083	8.705629
## 124	8.482912	8.421636	8.544189
## 125	8.563888	8.497321	8.630456
## 127	7.869327	7.787131	7.951522
## 137	7.822936	7.758623	7.887249
## 160	9.081372	9.000796	9.161949
## 162	8.979456	8.885426	9.073487
## 166	7.791997	7.722677	7.861316
## 176	8.002748	7.944223	8.061272
## 181	9.110624	9.067932	9.153316
## 182	8.609701	8.561259	8.658144
## 187	8.486994	8.423389	8.550598
## 191	8.555154	8.497281	8.613027
## 192	9.043237	8.972586	9.113889
## 202	8.520320	8.468572	8.572068
## 204	8.013359	7.927260	8.099458
## 216	7.924289	7.885741	7.962836
## 217	8.529183	8.476867	8.581499
## 224	7.966170	7.907285	8.025054
## 225	7.972268	7.926539	8.017996
## 228	8.002968	7.943675	8.062262
## 245	8.571810	8.514008	8.629611
## 253	7.857905	7.801166	7.914645
## 254	7.726274	7.651843	7.800705
## 261	7.812925	7.737238	7.888611
## 272	8.567748	8.517683	8.617813
## 273	8.551551	8.499023	8.604079
## 278	7.946833	7.876524	8.017143
## 279	8.392798	8.319306	8.466289
## 280	8.539958	8.483983	8.595934
## 283	8.521606	8.479116	8.564097
## 284	8.535482	8.480401	8.590564
## 289	9.136186	9.064453	9.207919
## 295	9.609803	9.533756	9.685850
## 297	8.546655	8.484463	8.608848

## 308	7.855523	7.788204	7.922843
## 311	8.639855	8.578378	8.701331
## 312	9.675990	9.589232	9.762747
## 318	8.513634	8.478010	8.549258
## 324	8.748473	8.658760	8.838187
## 328	8.555284	8.501692	8.608876
## 333	7.811990	7.745173	7.878807
## 338	8.480718	8.416545	8.544892
## 340	7.903999	7.847562	7.960437
## 368	8.521231	8.457242	8.585221
## 369	7.922052	7.875469	7.968636
## 377	7.949472	7.857190	8.041753
## 379	8.076049	8.009477	8.142621
## 387	9.088808	9.024795	9.152822
## 388	8.483849	8.433263	8.534435
## 389	8.511835	8.469519	8.554152
## 400	9.174236	9.102509	9.245963
## 406	9.623399	9.547570	9.699227
## 407	8.553474	8.495313	8.611635
## 417	7.907672	7.838770	7.976573
## 424	7.843998	7.775967	7.912030
## 425	8.506050	8.465697	8.546402
## 436	8.596862	8.540880	8.652844
## 438	7.945214	7.886451	8.003977
## 448	8.526753	8.478492	8.575014
## 451	8.578435	8.505485	8.651386
## 452	7.960472	7.903705	8.017238
## 453	8.417294	8.348875	8.485712
## 454	8.505098	8.450183	8.560014
## 456	10.125318	10.048523	10.202114
## 459	7.976896	7.920548	8.033244
## 461	7.972401	7.904551	8.040252
## 465	7.892910	7.810297	7.975523
## 466	7.967294	7.903981	8.030607
## 467	8.024367	7.972265	8.076469
## 473	9.042609	8.975988	9.109230
## 474	8.045648	7.995456	8.095839
## 479	8.030907	7.962738	8.099076
## 480	9.145374	9.078506	9.212243
## 482	8.037263	7.981745	8.092780
## 488	7.948720	7.899200	7.998239
## 492	9.695976	9.626450	9.765502
## 494	9.045435	8.986158	9.104711
## 496	9.704508	9.601831	9.807185
## 511	8.550005	8.492233	8.607776
## 516	8.506246	8.453051	8.559441
## 521	7.882758	7.829086	7.936431
## 527	8.629925	8.572620	8.687231
## 530	7.987379	7.902914	8.071844
## 532	8.575310	8.520658	8.629961

## 540	8.555616	8.495391	8.615840
## 547	9.085486	8.983980	9.186993
## 550	7.977688	7.930324	8.025052
## 565	7.966878	7.918791	8.014966
## 566	8.088967	8.032644	8.145290
## 567	8.442362	8.386457	8.498268
## 573	8.591515	8.527515	8.655515
## 584	8.612285	8.549463	8.675107
## 596	8.633584	8.574078	8.693089
## 601	7.795775	7.727016	7.864535
## 603	9.121202	9.055102	9.187302
## 604	8.122623	8.054660	8.190586
## 608	8.536846	8.461652	8.612041
## 618	8.639491	8.579060	8.699921
## 626	7.997529	7.942884	8.052174
## 627	8.573763	8.518480	8.629047
## 628	9.157412	9.092470	9.222354
## 636	7.915866	7.849353	7.982378
## 639	8.063327	8.009233	8.117422
## 653	9.161862	9.070704	9.253020
## 654	9.077906	9.016152	9.139661
## 665	8.462513	8.399283	8.525743
## 667	9.067502	8.975468	9.159536
## 674	7.807985	7.714909	7.901061
## 680	7.982490	7.921412	8.043569
## 681	8.491377	8.447125	8.535630
## 688	7.926996	7.868668	7.985323
## 695	8.468708	8.411985	8.525432
## 696	8.030768	7.967130	8.094406
## 697	9.524507	9.443085	9.605930
## 698	8.649222	8.571560	8.726884
## 700	10.199405	10.116694	10.282115
## 703	9.099828	9.001157	9.198498
## 712	9.578079	9.503491	9.652666
## 719	8.486215	8.406981	8.565448
## 727	8.005171	7.933966	8.076375
## 731	8.503688	8.444014	8.563361
## 732	8.446912	8.377362	8.516462
## 738	8.478442	8.424813	8.532071
## 740	8.523533	8.474837	8.572230
## 752	7.844400	7.767128	7.921673
## 755	9.248486	9.174739	9.322233
## 756	7.868120	7.792447	7.943793
## 768	8.963555	8.895998	9.031111
## 769	8.440645	8.393979	8.487311
## 772	9.049846	8.963681	9.136011
## 774	7.806765	7.731078	7.882452
## 776	7.944364	7.888101	8.000626
## 778	7.834270	7.772207	7.896333
## 788	8.400571	8.326119	8.475023

```
## 799 7.792505 7.707240 7.877769
## 803 9.586900 9.510106 9.663693
## 804 9.032283 8.950960 9.113605
## 809 7.926738 7.851627 8.001850
## 814 10.087663 10.005624 10.169702
## 816 8.014770 7.943098 8.086443
## 818 9.045013 8.984624 9.105402
## 821 7.960850 7.917636 8.004064
## 825 8.615757 8.549850 8.681663
## 831 8.488664 8.407863 8.569465
## 834 7.889768 7.845892 7.933644
## 845 8.539190 8.482226 8.596154
## 852 7.878667 7.793303 7.964031
## 854 8.531477 8.473134 8.589820
## 864 9.586472 9.454749 9.718195
```

```
MSPE = data.frame(Observed = log(EmlTest$Monthly.Income), Predicted = Pred_S
TP)
```

```
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
```

```
MSPE$SquaredResidual = MSPE$Residual^2
```

```
MSPE
```

```
##      Observed Predicted.fit Predicted.lwr Predicted.upr      Residual
## 6  9.081711      8.988037      8.919905      9.056169  0.093674392
## 27 9.202711      8.552513      8.500865      8.604161  0.650198529
## 32 7.614805      8.039287      7.964812      8.113763 -0.424482004
## 35 9.177714      8.553180      8.490666      8.615694  0.624533880
## 40 7.934155      7.939835      7.873789      8.005881 -0.005679346
## 45 7.109062      7.851645      7.798060      7.905231 -0.742583014
## 48 9.075665      9.129421      9.067715      9.191127 -0.053755769
## 49 7.537963      7.837830      7.762353      7.913307 -0.299867363
## 53 7.606387      8.026602      7.968008      8.085196 -0.420214729
## 55 8.394800      8.532713      8.487919      8.577507 -0.137913347
## 57 7.922624      7.908115      7.834244      7.981985  0.014508783
## 58 8.460199      8.102636      8.034502      8.170770  0.357563580
## 65 7.700748      7.771408      7.694686      7.848129 -0.070660044
## 82 8.836810      8.577471      8.520739      8.634202  0.259338983
## 83 8.579417      8.494810      8.431211      8.558408  0.084606786
## 86 9.527047      9.687449      9.621792      9.753105 -0.160401552
## 94 8.722906      8.573856      8.514424      8.633288  0.149049592
## 95 9.899781     10.221309     10.146156     10.296463 -0.321528759
## 97 9.717519      9.649847      9.551718      9.747975  0.067672813
## 103 8.785387      8.564073      8.484016      8.644130  0.221313538
## 107 8.370779      8.553808      8.470394      8.637222 -0.183028948
## 109 9.096724      8.376688      8.299596      8.453780  0.720035435
## 114 8.535622      8.400524      8.323661      8.477387  0.135098137
## 118 8.300280      8.642356      8.579083      8.705629 -0.342075843
## 124 8.301025      8.482912      8.421636      8.544189 -0.181887232
## 125 8.423761      8.563888      8.497321      8.630456 -0.140127065
## 127 8.273592      7.869327      7.787131      7.951522  0.404265289
```

## 137	7.748891	7.822936	7.758623	7.887249	-0.074044639
## 160	9.487290	9.081372	9.000796	9.161949	0.405917629
## 162	9.073604	8.979456	8.885426	9.073487	0.094147682
## 166	7.622664	7.791997	7.722677	7.861316	-0.169332814
## 176	7.635304	8.002748	7.944223	8.061272	-0.367443742
## 181	9.237372	9.110624	9.067932	9.153316	0.126747431
## 182	8.838262	8.609701	8.561259	8.658144	0.228560265
## 187	8.557567	8.486994	8.423389	8.550598	0.070573576
## 191	8.661294	8.555154	8.497281	8.613027	0.106139580
## 192	9.173365	9.043237	8.972586	9.113889	0.130127705
## 202	8.735525	8.520320	8.468572	8.572068	0.215205320
## 204	7.703459	8.013359	7.927260	8.099458	-0.309900233
## 216	7.760041	7.924289	7.885741	7.962836	-0.164248071
## 217	9.192584	8.529183	8.476867	8.581499	0.663400457
## 224	7.354362	7.966170	7.907285	8.025054	-0.611807358
## 225	8.470311	7.972268	7.926539	8.017996	0.498043372
## 228	7.752765	8.002968	7.943675	8.062262	-0.250203608
## 245	8.528331	8.571810	8.514008	8.629611	-0.043478664
## 253	7.729296	7.857905	7.801166	7.914645	-0.128609724
## 254	7.991592	7.726274	7.651843	7.800705	0.265318171
## 261	7.932003	7.812925	7.737238	7.888611	0.119078558
## 272	8.600247	8.567748	8.517683	8.617813	0.032498315
## 273	8.171882	8.551551	8.499023	8.604079	-0.379669013
## 278	7.805882	7.946833	7.876524	8.017143	-0.140951185
## 279	8.655911	8.392798	8.319306	8.466289	0.263113569
## 280	8.302762	8.539958	8.483983	8.595934	-0.237196653
## 283	8.781555	8.521606	8.479116	8.564097	0.259949265
## 284	8.928905	8.535482	8.480401	8.590564	0.393423090
## 289	9.183791	9.136186	9.064453	9.207919	0.047604773
## 295	9.707290	9.609803	9.533756	9.685850	0.097487097
## 297	9.163982	8.546655	8.484463	8.608848	0.617326918
## 308	7.999343	7.855523	7.788204	7.922843	0.143819641
## 311	8.609590	8.639855	8.578378	8.701331	-0.030264489
## 312	9.490771	9.675990	9.589232	9.762747	-0.185218615
## 318	8.437500	8.513634	8.478010	8.549258	-0.076133353
## 324	8.437067	8.748473	8.658760	8.838187	-0.311406264
## 328	8.596004	8.555284	8.501692	8.608876	0.040720407
## 333	7.758761	7.811990	7.745173	7.878807	-0.053229658
## 338	8.956222	8.480718	8.416545	8.544892	0.475503916
## 340	7.758333	7.903999	7.847562	7.960437	-0.145665972
## 368	8.607582	8.521231	8.457242	8.585221	0.086350707
## 369	7.636752	7.922052	7.875469	7.968636	-0.285300102
## 377	7.916807	7.949472	7.857190	8.041753	-0.032664013
## 379	7.681560	8.076049	8.009477	8.142621	-0.394488483
## 387	9.081256	9.088808	9.024795	9.152822	-0.007552098
## 388	8.357494	8.483849	8.433263	8.534435	-0.126355105
## 389	8.412277	8.511835	8.469519	8.554152	-0.099558418
## 400	9.231025	9.174236	9.102509	9.245963	0.056789113
## 406	9.718783	9.623399	9.547570	9.699227	0.095384598
## 407	8.606668	8.553474	8.495313	8.611635	0.053194180



## 417	7.849324	7.907672	7.838770	7.976573	-0.058347930
## 424	7.384610	7.843998	7.775967	7.912030	-0.459387886
## 425	8.460411	8.506050	8.465697	8.546402	-0.045638753
## 436	8.734560	8.596862	8.540880	8.652844	0.137697745
## 438	7.961021	7.945214	7.886451	8.003977	0.015807474
## 448	8.619389	8.526753	8.478492	8.575014	0.092635434
## 451	8.492491	8.578435	8.505485	8.651386	-0.085944804
## 452	8.137396	7.960472	7.903705	8.017238	0.176924200
## 453	8.667852	8.417294	8.348875	8.485712	0.250558307
## 454	8.610137	8.505098	8.450183	8.560014	0.105038475
## 456	9.895102	10.125318	10.048523	10.202114	-0.230215945
## 459	7.633370	7.976896	7.920548	8.033244	-0.343525988
## 461	7.646354	7.972401	7.904551	8.040252	-0.326047752
## 465	7.798523	7.892910	7.810297	7.975523	-0.094386796
## 466	8.279951	7.967294	7.903981	8.030607	0.312656856
## 467	7.880048	8.024367	7.972265	8.076469	-0.144318792
## 473	9.491375	9.042609	8.975988	9.109230	0.448766764
## 474	8.146709	8.045648	7.995456	8.095839	0.101061293
## 479	7.989560	8.030907	7.962738	8.099076	-0.041346514
## 480	9.528358	9.145374	9.078506	9.212243	0.382983295
## 482	7.764721	8.037263	7.981745	8.092780	-0.272542042
## 488	7.976252	7.948720	7.899200	7.998239	0.027532251
## 492	9.733885	9.695976	9.626450	9.765502	0.037908661
## 494	9.060215	9.045435	8.986158	9.104711	0.014780275
## 496	9.699350	9.704508	9.601831	9.807185	-0.005158161
## 511	8.583543	8.550005	8.492233	8.607776	0.033537923
## 516	8.609225	8.506246	8.453051	8.559441	0.102979221
## 521	7.845024	7.882758	7.829086	7.936431	-0.037734025
## 527	8.518392	8.629925	8.572620	8.687231	-0.111532840
## 530	8.509766	7.987379	7.902914	8.071844	0.522386693
## 532	8.826881	8.575310	8.520658	8.629961	0.251571509
## 540	8.547722	8.555616	8.495391	8.615840	-0.007893104
## 547	8.909641	9.085486	8.983980	9.186993	-0.175845766
## 550	7.685703	7.977688	7.930324	8.025052	-0.291985343
## 565	8.251403	7.966878	7.918791	8.014966	0.284524767
## 566	7.798113	8.088967	8.032644	8.145290	-0.290854434
## 567	7.685244	8.442362	8.386457	8.498268	-0.757118870
## 573	8.829665	8.591515	8.527515	8.655515	0.238150428
## 584	8.471987	8.612285	8.549463	8.675107	-0.140298349
## 596	8.303257	8.633584	8.574078	8.693089	-0.330326404
## 601	7.617268	7.795775	7.727016	7.864535	-0.178507310
## 603	9.342771	9.121202	9.055102	9.187302	0.221568981
## 604	8.049108	8.122623	8.054660	8.190586	-0.073515515
## 608	8.631414	8.536846	8.461652	8.612041	0.094568159
## 618	8.604105	8.639491	8.579060	8.699921	-0.035386093
## 626	7.830823	7.997529	7.942884	8.052174	-0.166705966
## 627	8.333751	8.573763	8.518480	8.629047	-0.240012281
## 628	9.350972	9.157412	9.092470	9.222354	0.193559646
## 636	7.773174	7.915866	7.849353	7.982378	-0.142692060
## 639	7.910224	8.063327	8.009233	8.117422	-0.153103564



```

## 653 9.510371      9.161862      9.070704      9.253020  0.348509225
## 654 9.433804      9.077906      9.016152      9.139661  0.355897426
## 665 8.426831      8.462513      8.399283      8.525743 -0.035682361
## 667 8.976894      9.067502      8.975468      9.159536 -0.090608401
## 674 7.611842      7.807985      7.714909      7.901061 -0.196142606
## 680 7.753194      7.982490      7.921412      8.043569 -0.229296131
## 681 8.356085      8.491377      8.447125      8.535630 -0.135292302
## 688 7.871693      7.926996      7.868668      7.985323 -0.055302884
## 695 9.161675      8.468708      8.411985      8.525432  0.692966789
## 696 8.099858      8.030768      7.967130      8.094406  0.069089896
## 697 9.629182      9.524507      9.443085      9.605930  0.104675125
## 698 8.685078      8.649222      8.571560      8.726884  0.035855853
## 700 9.856448      10.199405     10.116694     10.282115 -0.342956343
## 703 9.247347      9.099828      9.001157      9.198498  0.147519143
## 712 9.555206      9.578079      9.503491      9.652666 -0.022872860
## 719 8.429673      8.486215      8.406981      8.565448 -0.056542068
## 727 7.997327      8.005171      7.933966      8.076375 -0.007843706
## 731 8.469053      8.503688      8.444014      8.563361 -0.034634771
## 732 8.563695      8.446912      8.377362      8.516462  0.116783204
## 738 8.550821      8.478442      8.424813      8.532071  0.072379216
## 740 8.210940      8.523533      8.474837      8.572230 -0.312593414
## 752 7.741534      7.844400      7.767128      7.921673 -0.102866594
## 755 9.514068      9.248486      9.174739      9.322233  0.265582291
## 756 8.218248      7.868120      7.792447      7.943793  0.350127969
## 768 9.299450      8.963555      8.895998      9.031111  0.335894990
## 769 8.906393      8.440645      8.393979      8.487311  0.465748088
## 772 9.254644      9.049846      8.963681      9.136011  0.204798446
## 774 8.127995      7.806765      7.731078      7.882452  0.321229916
## 776 8.161946      7.944364      7.888101      8.000626  0.217581877
## 778 7.946971      7.834270      7.772207      7.896333  0.112701710
## 788 8.505323      8.400571      8.326119      8.475023  0.104752319
## 799 7.527794      7.792505      7.707240      7.877769 -0.264710623
## 803 9.744961      9.586900      9.510106      9.663693  0.158061042
## 804 9.167642      9.032283      8.950960      9.113605  0.135359096
## 809 7.959276      7.926738      7.851627      8.001850  0.032537626
## 814 9.886240      10.087663     10.005624     10.169702 -0.201423222
## 816 7.930566      8.014770      7.943098      8.086443 -0.084204528
## 818 9.366575      9.045013      8.984624      9.105402  0.321562038
## 821 8.105308      7.960850      7.917636      8.004064  0.144457066
## 825 8.447414      8.615757      8.549850      8.681663 -0.168342424
## 831 8.197814      8.488664      8.407863      8.569465 -0.290849530
## 834 7.844633      7.889768      7.845892      7.933644 -0.045135423
## 845 8.704336      8.539190      8.482226      8.596154  0.165146403
## 852 7.698936      7.878667      7.793303      7.964031 -0.179731003
## 854 8.641356      8.531477      8.473134      8.589820  0.109879022
## 864 9.530248      9.586472      9.454749      9.718195 -0.056224549
##      SquaredResidual
## 6      8.774892e-03
## 27     4.227581e-01
## 32     1.801850e-01

```

```
## 35      3.900426e-01
## 40      3.225497e-05
## 45      5.514295e-01
## 48      2.889683e-03
## 49      8.992044e-02
## 53      1.765804e-01
## 55      1.902009e-02
## 57      2.105048e-04
## 58      1.278517e-01
## 65      4.992842e-03
## 82      6.725671e-02
## 83      7.158308e-03
## 86      2.572866e-02
## 94      2.221578e-02
## 95      1.033807e-01
## 97      4.579610e-03
## 103     4.897968e-02
## 107     3.349960e-02
## 109     5.184510e-01
## 114     1.825151e-02
## 118     1.170159e-01
## 124     3.308297e-02
## 125     1.963559e-02
## 127     1.634304e-01
## 137     5.482609e-03
## 160     1.647691e-01
## 162     8.863786e-03
## 166     2.867360e-02
## 176     1.350149e-01
## 181     1.606491e-02
## 182     5.223979e-02
## 187     4.980630e-03
## 191     1.126561e-02
## 192     1.693322e-02
## 202     4.631333e-02
## 204     9.603815e-02
## 216     2.697743e-02
## 217     4.401002e-01
## 224     3.743082e-01
## 225     2.480472e-01
## 228     6.260185e-02
## 245     1.890394e-03
## 253     1.654046e-02
## 254     7.039373e-02
## 261     1.417970e-02
## 272     1.056141e-03
## 273     1.441486e-01
## 278     1.986724e-02
## 279     6.922875e-02
## 280     5.626225e-02
```

```
## 283    6.757362e-02
## 284    1.547817e-01
## 289    2.266214e-03
## 295    9.503734e-03
## 297    3.810925e-01
## 308    2.068409e-02
## 311    9.159393e-04
## 312    3.430594e-02
## 318    5.796287e-03
## 324    9.697386e-02
## 328    1.658152e-03
## 333    2.833397e-03
## 338    2.261040e-01
## 340    2.121858e-02
## 368    7.456445e-03
## 369    8.139615e-02
## 377    1.066938e-03
## 379    1.556212e-01
## 387    5.703418e-05
## 388    1.596561e-02
## 389    9.911879e-03
## 400    3.225003e-03
## 406    9.098222e-03
## 407    2.829621e-03
## 417    3.404481e-03
## 424    2.110372e-01
## 425    2.082896e-03
## 436    1.896067e-02
## 438    2.498762e-04
## 448    8.581324e-03
## 451    7.386509e-03
## 452    3.130217e-02
## 453    6.277947e-02
## 454    1.103308e-02
## 456    5.299938e-02
## 459    1.180101e-01
## 461    1.063071e-01
## 465    8.908867e-03
## 466    9.775431e-02
## 467    2.082791e-02
## 473    2.013916e-01
## 474    1.021338e-02
## 479    1.709534e-03
## 480    1.466762e-01
## 482    7.427916e-02
## 488    7.580249e-04
## 492    1.437067e-03
## 494    2.184565e-04
## 496    2.660663e-05
## 511    1.124792e-03
```

```
## 516    1.060472e-02
## 521    1.423857e-03
## 527    1.243957e-02
## 530    2.728879e-01
## 532    6.328822e-02
## 540    6.230109e-05
## 547    3.092173e-02
## 550    8.525544e-02
## 565    8.095434e-02
## 566    8.459630e-02
## 567    5.732290e-01
## 573    5.671563e-02
## 584    1.968363e-02
## 596    1.091155e-01
## 601    3.186486e-02
## 603    4.909281e-02
## 604    5.404531e-03
## 608    8.943137e-03
## 618    1.252176e-03
## 626    2.779088e-02
## 627    5.760590e-02
## 628    3.746534e-02
## 636    2.036102e-02
## 639    2.344070e-02
## 653    1.214587e-01
## 654    1.266630e-01
## 665    1.273231e-03
## 667    8.209882e-03
## 674    3.847192e-02
## 680    5.257672e-02
## 681    1.830401e-02
## 688    3.058409e-03
## 695    4.802030e-01
## 696    4.773414e-03
## 697    1.095688e-02
## 698    1.285642e-03
## 700    1.176191e-01
## 703    2.176190e-02
## 712    5.231677e-04
## 719    3.197006e-03
## 727    6.152373e-05
## 731    1.199567e-03
## 732    1.363832e-02
## 738    5.238751e-03
## 740    9.771464e-02
## 752    1.058154e-02
## 755    7.053395e-02
## 756    1.225896e-01
## 768    1.128254e-01
## 769    2.169213e-01
```

```
## 772    4.194240e-02
## 774    1.031887e-01
## 776    4.734187e-02
## 778    1.270168e-02
## 788    1.097305e-02
## 799    7.007171e-02
## 803    2.498329e-02
## 804    1.832208e-02
## 809    1.058697e-03
## 814    4.057131e-02
## 816    7.090403e-03
## 818    1.034021e-01
## 821    2.086784e-02
## 825    2.833917e-02
## 831    8.459345e-02
## 834    2.037206e-03
## 845    2.727333e-02
## 852    3.230323e-02
## 854    1.207340e-02
## 864    3.161200e-03

mean(MSPE$SquaredResidual)

## [1] 0.06832213

reg.stp=regsubsets(log(Monthly.Income)~.,data=EmplTrain,method="seqrep",nvmax
=29)
k<-ols_step_both_aic(Model_Null, details = TRUE)

## Stepwise Selection Method
## -----
##
## Candidate Terms:
##
## 1 . Age
## 2 . Attrition
## 3 . BusinessTravel
## 4 . Daily.Rate
## 5 . Distance.From.Home
## 6 . Education
## 7 . EducationField
## 8 . Environment.Satisfaction
## 9 . Gender
## 10 . Hourly.Rate
## 11 . Job.Involvement
## 12 . Job.Level
## 13 . Job.Satisfaction
## 14 . Marital.Status
## 15 . Monthly.Rate
## 16 . Num.Companies.Worked
## 17 . OverTime
```

```
## 18 . Percent.Salary.Hike
## 19 . Performance.Rating
## 20 . Relationship.Satisfaction
## 21 . Stock.Option.Level
## 22 . Total.Working.Years
## 23 . Training.Times.Last.Year
## 24 . Work.Life.Balance
## 25 . Years.At.Company
## 26 . Years.In.Current.Role
## 27 . Years.Since.Last.Promotion
## 28 . Years.With.Curr.Manager
##
## Step 0: AIC = 1393.29
## log(Monthly.Income) ~ 1
##
##
## Variables Entered/Removed:
##
##                               Enter New Variables
## -----
## Variable                      DF      AIC      Sum Sq      RSS      R-Sq
## Adj. R-Sq
## -----
## Job.Level                     1       75.972    258.352    44.653    0.85
## 3      0.852
## Total.Working.Years           1      822.312    171.092    131.913    0.56
## 5      0.564
## Years.At.Company              1     1209.933     71.471    231.534    0.23
## 6      0.235
## Age                           1     1214.403     69.964    233.041    0.23
## 1      0.230
## Years.In.Current.Role         1     1271.951     49.664    253.342    0.16
## 4      0.163
## Years.With.Curr.Manager       1     1297.264     40.183    262.822    0.13
## 3      0.131
## Years.Since.Last.Promotion    1     1323.485     29.988    273.017    0.09
## 9      0.098
## Attrition                     1     1357.267     16.268    286.737    0.05
## 4      0.052
## Num.Companies.Worked          1     1371.338     10.353    292.653    0.03
## 4      0.033
## Education                     1     1380.446      6.458    296.547    0.02
## 1      0.020
## Marital.Status                1     1385.871      4.980    298.025    0.01
## 6      0.014
## EducationField                1     1392.075      4.892    298.113    0.01
## 6      0.009
## Monthly.Rate                  1     1389.858      2.379    300.626    0.00
```

```

8      0.006
## Training.Times.Last.Year      1      1392.177      1.366      301.639      0.00
5      0.003
## BusinessTravel                1      1394.576      1.191      301.814      0.00
4      0.001
## Stock.Option.Level            1      1393.377      0.840      302.165      0.00
3      0.001
## Performance.Rating            1      1393.953      0.587      302.418      0.00
2      0.000
## Percent.Salary.Hike           1      1394.202      0.478      302.527      0.00
2      0.000
## Distance.From.Home            1      1394.448      0.370      302.635      0.00
1      0.000
## Gender                        1      1394.496      0.349      302.656      0.00
1      0.000
## Relationship.Satisfaction      1      1394.523      0.337      302.668      0.00
1      0.000
## Daily.Rate                    1      1394.597      0.304      302.701      0.00
1      0.000
## Work.Life.Balance             1      1394.647      0.283      302.723      0.00
1      -0.001
## Job.Satisfaction              1      1394.809      0.211      302.794      0.00
1      -0.001
## Environment.Satisfaction      1      1395.099      0.084      302.921      0.00
0      -0.001
## Job.Involvement              1      1395.264      0.011      302.994      0.00
0      -0.001
## OverTime                      1      1395.271      0.008      302.997      0.00
0      -0.001
## Hourly.Rate                   1      1395.280      0.004      303.001      0.00
0      -0.001
## -----
-----
##
## - Job.Level added
##
##
## Step 1 : AIC = 75.97176
## log(Monthly.Income) ~ Job.Level
##
##                                     Enter New Variables
## -----
-----
## Variable                        DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Attrition                      1      63.193      259.300      43.705      0.856
0.855
## Years.In.Current.Role          1      65.003      259.185      43.820      0.855

```

0.855					
## Years.With.Curr.Manager	1	68.934	258.934	44.071	0.855
0.854					
## EducationField	1	76.977	258.931	44.074	0.855
0.853					
## Daily.Rate	1	69.246	258.914	44.091	0.854
0.854					
## Total.Working.Years	1	71.568	258.765	44.240	0.854
0.854					
## BusinessTravel	1	73.586	258.764	44.241	0.854
0.853					
## Age	1	71.740	258.754	44.251	0.854
0.854					
## Num.Companies.Worked	1	72.437	258.710	44.296	0.854
0.853					
## Marital.Status	1	76.001	258.609	44.396	0.853
0.853					
## Job.Involvement	1	74.203	258.596	44.409	0.853
0.853					
## Environment.Satisfaction	1	75.281	258.526	44.479	0.853
0.853					
## Relationship.Satisfaction	1	75.559	258.508	44.497	0.853
0.853					
## Stock.Option.Level	1	75.563	258.508	44.497	0.853
0.853					
## Monthly.Rate	1	75.878	258.488	44.517	0.853
0.853					
## Years.At.Company	1	75.893	258.487	44.518	0.853
0.853					
## Education	1	76.562	258.444	44.562	0.853
0.853					
## OverTime	1	76.759	258.431	44.574	0.853
0.852					
## Years.Since.Last.Promotion	1	77.138	258.406	44.599	0.853
0.852					
## Job.Satisfaction	1	77.331	258.394	44.611	0.853
0.852					
## Hourly.Rate	1	77.457	258.386	44.620	0.853
0.852					
## Percent.Salary.Hike	1	77.524	258.381	44.624	0.853
0.852					
## Gender	1	77.671	258.372	44.633	0.853
0.852					
## Work.Life.Balance	1	77.813	258.363	44.643	0.853
0.852					
## Distance.From.Home	1	77.831	258.361	44.644	0.853
0.852					
## Training.Times.Last.Year	1	77.888	258.358	44.648	0.853
0.852					
## Performance.Rating	1	77.899	258.357	44.648	0.853



```

0.852
## -----
##
## - Attrition added
##
## Step 2 : AIC = 63.19317
## log(Monthly.Income) ~ Job.Level + Attrition
##
##                      Remove Existing Variables
## -----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq      Adj. R-Sq
## -----
## Attrition      1      75.972    258.352    44.653    0.853      0.852
## Job.Level      1    1357.267     16.268    286.737    0.054      0.052
## -----
##
##                      Enter New Variables
## -----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
## Adj. R-Sq
## -----
## Years.In.Current.Role      1     54.224    259.990    43.015    0.858
0.857
## EducationField      1     64.934    259.821    43.185    0.857
0.856
## Daily.Rate      1     57.053    259.813    43.192    0.857
0.857
## Num.Companies.Worked      1     57.956    259.756    43.249    0.857
0.857
## Years.With.Curr.Manager      1     58.267    259.737    43.268    0.857
0.857
## BusinessTravel      1     60.717    259.709    43.296    0.857
0.856
## OverTime      1     59.814    259.640    43.365    0.857
0.856
## Total.Working.Years      1     60.340    259.607    43.399    0.857
0.856
## Age      1     60.372    259.605    43.401    0.857
0.856
## Environment.Satisfaction      1     61.068    259.561    43.444    0.857
0.856
## Relationship.Satisfaction      1     62.195    259.490    43.516    0.856
0.856
## Marital.Status      1     65.341    259.417    43.588    0.856
0.855
## Monthly.Rate      1     63.420    259.412    43.593    0.856

```

```

0.856
## Job.Involvement          1    63.544    259.404    43.601    0.856
0.855
## Years.At.Company        1    63.816    259.387    43.618    0.856
0.855
## Education               1    63.928    259.380    43.625    0.856
0.855
## Stock.Option.Level      1    63.952    259.378    43.627    0.856
0.855
## Years.Since.Last.Promotion 1    64.198    259.363    43.642    0.856
0.855
## Hourly.Rate             1    64.365    259.352    43.653    0.856
0.855
## Percent.Salary.Hike     1    64.674    259.333    43.672    0.856
0.855
## Work.Life.Balance       1    64.714    259.330    43.675    0.856
0.855
## Gender                  1    64.939    259.316    43.689    0.856
0.855
## Training.Times.Last.Year 1    64.959    259.315    43.691    0.856
0.855
## Job.Satisfaction        1    65.074    259.307    43.698    0.856
0.855
## Performance.Rating      1    65.146    259.303    43.702    0.856
0.855
## Distance.From.Home      1    65.179    259.301    43.704    0.856
0.855
## -----
##
## - Years.In.Current.Role added
##
##
## Step 3 : AIC = 54.22357
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role
##
##                                Remove Existing Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Years.In.Current.Role  1      63.193    259.300    43.705    0.856
0.855
## Attrition             1      65.003    259.185    43.820    0.855
0.855
## Job.Level             1    1249.168     58.614    244.391    0.193
0.191
## -----

```

```

-----
##
##                                     Enter New Variables
## -----
## Variable                        DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Num.Companies.Worked          1      45.248      260.670      42.335      0.860
0.859
## Daily.Rate                    1      47.549      260.528      42.477      0.860
0.859
## EducationField                1      55.669      260.521      42.484      0.860
0.858
## BusinessTravel               1      52.030      260.375      42.630      0.859
0.858
## OverTime                     1      50.733      260.332      42.674      0.859
0.858
## Environment.Satisfaction      1      51.338      260.294      42.711      0.859
0.858
## Age                          1      51.705      260.271      42.734      0.859
0.858
## Years.At.Company             1      52.161      260.243      42.762      0.859
0.858
## Relationship.Satisfaction     1      53.425      260.164      42.841      0.859
0.858
## Total.Working.Years          1      54.519      260.096      42.909      0.858
0.858
## Monthly.Rate                 1      54.536      260.095      42.910      0.858
0.858
## Job.Involvement              1      54.576      260.093      42.912      0.858
0.858
## Marital.Status               1      56.767      260.081      42.924      0.858
0.857
## Education                    1      55.036      260.064      42.941      0.858
0.857
## Stock.Option.Level           1      55.384      260.043      42.963      0.858
0.857
## Hourly.Rate                  1      55.479      260.037      42.969      0.858
0.857
## Work.Life.Balance            1      55.556      260.032      42.973      0.858
0.857
## Percent.Salary.Hike          1      55.599      260.029      42.976      0.858
0.857
## Years.Since.Last.Promotion   1      55.600      260.029      42.976      0.858
0.857
## Years.With.Curr.Manager      1      55.920      260.009      42.996      0.858
0.857
## Training.Times.Last.Year     1      56.030      260.002      43.003      0.858

```

```

0.857
## Job.Satisfaction          1    56.124    259.996    43.009    0.858
0.857
## Gender                    1    56.143    259.995    43.010    0.858
0.857
## Performance.Rating       1    56.169    259.994    43.012    0.858
0.857
## Distance.From.Home       1    56.222    259.990    43.015    0.858
0.857
## -----
##
## - Num.Companies.Worked added
##
##
## Step 4 : AIC = 45.24834
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked
##
##                               Remove Existing Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Num.Companies.Worked    1      54.224    259.990    43.015    0.858
0.857
## Attrition               1      57.739    259.770    43.235    0.857
0.857
## Years.In.Current.Role   1      57.956    259.756    43.249    0.857
0.857
## Job.Level               1     1205.008     74.451    228.554    0.246
0.242
## -----
##
##                               Enter New Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField         1      46.626    261.196    41.809    0.862
0.860
## Daily.Rate             1      39.237    261.159    41.846    0.862
0.861
## BusinessTravel         1      42.733    261.068    41.937    0.862
0.860

```

```

## OverTime          1    41.492    261.022    41.983    0.861
0.860
## Environment.Satisfaction  1    41.633    261.014    41.992    0.861
0.860
## Relationship.Satisfaction  1    44.296    260.851    42.154    0.861
0.860
## Years.At.Company      1    45.331    260.788    42.218    0.861
0.860
## Age                  1    45.532    260.775    42.230    0.861
0.860
## Monthly.Rate         1    45.654    260.768    42.237    0.861
0.860
## Job.Involvement      1    45.840    260.756    42.249    0.861
0.860
## Marital.Status       1    47.847    260.756    42.249    0.861
0.859
## Work.Life.Balance    1    46.298    260.728    42.277    0.860
0.859
## Years.With.Curr.Manager 1    46.339    260.726    42.279    0.860
0.859
## Hourly.Rate         1    46.498    260.716    42.289    0.860
0.859
## Stock.Option.Level   1    46.505    260.716    42.290    0.860
0.859
## Percent.Salary.Hike  1    46.592    260.710    42.295    0.860
0.859
## Education            1    46.941    260.689    42.316    0.860
0.859
## Years.Since.Last.Promotion 1    46.949    260.688    42.317    0.860
0.859
## Job.Satisfaction     1    46.996    260.685    42.320    0.860
0.859
## Total.Working.Years  1    47.140    260.677    42.329    0.860
0.859
## Gender              1    47.202    260.673    42.332    0.860
0.859
## Performance.Rating   1    47.219    260.672    42.333    0.860
0.859
## Training.Times.Last.Year 1    47.225    260.671    42.334    0.860
0.859
## Distance.From.Home   1    47.237    260.671    42.335    0.860
0.859
## -----
-----
##
## - Daily.Rate added
##
##
## Step 5 : AIC = 39.23693
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num

```

```
.Companies.Worked + Daily.Rate
```

```
##
```

```
##
```

```
Remove Existing Variables
```

```
## -----
```

```
-----
```

```
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
```

```
Adj. R-Sq
```

```
## -----
```

```
-----
```

```
## Daily.Rate                1      45.248    260.670    42.335    0.860
```

```
0.859
```

```
## Num.Companies.Worked      1      47.549    260.528    42.477    0.860
```

```
0.859
```

```
## Attrition                 1      51.055    260.312    42.694    0.859
```

```
0.858
```

```
## Years.In.Current.Role     1      52.399    260.228    42.777    0.859
```

```
0.858
```

```
## Job.Level                 1    1206.426     74.644    228.361    0.246
```

```
0.242
```

```
## -----
```

```
-----
```

```
##
```

```
##
```

```
Enter New Variables
```

```
## -----
```

```
-----
```

```
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
```

```
Adj. R-Sq
```

```
## -----
```

```
-----
```

```
## EducationField            1      40.326    261.697    41.308    0.864
```

```
0.862
```

```
## BusinessTravel            1      36.260    261.581    41.424    0.863
```

```
0.862
```

```
## Environment.Satisfaction  1      35.811    261.488    41.518    0.863
```

```
0.862
```

```
## OverTime                  1      35.938    261.480    41.525    0.863
```

```
0.862
```

```
## Relationship.Satisfaction  1      38.385    261.332    41.673    0.862
```

```
0.861
```

```
## Monthly.Rate              1      39.301    261.277    41.728    0.862
```

```
0.861
```

```
## Age                       1      39.440    261.268    41.737    0.862
```

```
0.861
```

```
## Years.At.Company          1      39.868    261.242    41.763    0.862
```

```
0.861
```

```
## Job.Involvement           1      40.012    261.234    41.772    0.862
```

```
0.861
```

```
## Years.With.Curr.Manager   1      40.081    261.229    41.776    0.862
```

```
0.861
```

```
## Marital.Status            1      42.152    261.225    41.780    0.862
```

```

0.861
## Work.Life.Balance          1    40.475    261.206    41.800    0.862
0.861
## Stock.Option.Level        1    40.552    261.201    41.804    0.862
0.861
## Percent.Salary.Hike       1    40.713    261.191    41.814    0.862
0.861
## Hourly.Rate               1    40.771    261.188    41.818    0.862
0.861
## Education                 1    40.904    261.180    41.826    0.862
0.861
## Job.Satisfaction          1    40.971    261.175    41.830    0.862
0.861
## Total.Working.Years       1    41.000    261.174    41.831    0.862
0.861
## Years.Since.Last.Promotion 1    41.052    261.171    41.835    0.862
0.861
## Performance.Rating        1    41.213    261.161    41.844    0.862
0.861
## Gender                   1    41.218    261.160    41.845    0.862
0.861
## Training.Times.Last.Year  1    41.227    261.160    41.845    0.862
0.861
## Distance.From.Home        1    41.237    261.159    41.846    0.862
0.861
## -----
##
## - Environment.Satisfaction added
##
##
## Step 6 : AIC = 35.81099
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction
##
##                                Remove Existing Variables
## -----
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Environment.Satisfaction  1      39.237    261.159    41.846    0.862
0.861
## Daily.Rate              1      41.633    261.014    41.992    0.861
0.860
## Num.Companies.Worked    1      44.826    260.819    42.187    0.861
0.860
## Attrition              1      49.247    260.547    42.458    0.860
0.859

```

```

## Years.In.Current.Role      1      50.030      260.499      42.507      0.860
0.859
## Job.Level                  1      1207.239      75.037      227.968      0.248
0.242
## -----
##
##                               Enter New Variables
## -----
## Variable                   DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField             1      36.833      262.025      40.980      0.865
0.863
## BusinessTravel             1      32.989      261.897      41.109      0.864
0.863
## OverTime                   1      31.524      261.865      41.140      0.864
0.863
## Relationship.Satisfaction   1      34.850      261.666      41.340      0.864
0.862
## Monthly.Rate               1      35.745      261.612      41.393      0.863
0.862
## Age                       1      36.082      261.592      41.414      0.863
0.862
## Years.At.Company           1      36.202      261.584      41.421      0.863
0.862
## Marital.Status             1      38.661      261.557      41.448      0.863
0.862
## Job.Involvement            1      36.776      261.550      41.455      0.863
0.862
## Years.With.Curr.Manager    1      36.932      261.540      41.465      0.863
0.862
## Stock.Option.Level         1      37.022      261.535      41.470      0.863
0.862
## Percent.Salary.Hike        1      37.343      261.516      41.489      0.863
0.862
## Work.Life.Balance          1      37.388      261.513      41.492      0.863
0.862
## Hourly.Rate                1      37.480      261.508      41.498      0.863
0.862
## Education                  1      37.565      261.502      41.503      0.863
0.862
## Job.Satisfaction            1      37.639      261.498      41.507      0.863
0.862
## Total.Working.Years        1      37.656      261.497      41.508      0.863
0.862
## Years.Since.Last.Promotion  1      37.687      261.495      41.510      0.863
0.862

```



```

## Performance.Rating          1    37.789    261.489    41.516    0.863
0.862
## Distance.From.Home          1    37.803    261.488    41.517    0.863
0.862
## Gender                       1    37.807    261.488    41.517    0.863
0.862
## Training.Times.Last.Year     1    37.808    261.488    41.517    0.863
0.862
## -----
##
## - OverTime added
##
##
## Step 7 : AIC = 31.52424
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime
##
##                               Remove Existing Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## OverTime          1      35.811    261.488    41.518    0.863
0.862
## Environment.Satisfaction  1      35.938    261.480    41.525    0.863
0.862
## Daily.Rate        1      36.837    261.426    41.579    0.863
0.862
## Num.Companies.Worked  1      40.906    261.179    41.826    0.862
0.861
## Years.In.Current.Role  1      46.034    260.867    42.138    0.861
0.860
## Attrition          1      49.751    260.639    42.366    0.860
0.859
## Job.Level          1     1204.650     76.550    226.455    0.253
0.246
## -----
##
##                               Enter New Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      32.746    262.385    40.620    0.866

```

```

0.864
## BusinessTravel          1    29.193    262.241    40.764    0.865
0.864
## Relationship.Satisfaction  1    30.265    262.059    40.946    0.865
0.863
## Monthly.Rate            1    31.421    261.990    41.015    0.865
0.863
## Years.At.Company        1    31.637    261.977    41.028    0.865
0.863
## Age                    1    32.107    261.949    41.056    0.865
0.863
## Marital.Status         1    34.561    261.922    41.083    0.864
0.863
## Job.Involvement        1    32.561    261.922    41.083    0.864
0.863
## Years.With.Curr.Manager  1    32.564    261.922    41.083    0.864
0.863
## Stock.Option.Level      1    32.854    261.905    41.101    0.864
0.863
## Percent.Salary.Hike     1    33.003    261.896    41.109    0.864
0.863
## Work.Life.Balance       1    33.064    261.892    41.113    0.864
0.863
## Hourly.Rate            1    33.165    261.886    41.119    0.864
0.863
## Education              1    33.275    261.880    41.126    0.864
0.863
## Total.Working.Years     1    33.411    261.871    41.134    0.864
0.863
## Job.Satisfaction        1    33.428    261.870    41.135    0.864
0.863
## Years.Since.Last.Promotion 1    33.442    261.870    41.136    0.864
0.863
## Distance.From.Home      1    33.478    261.867    41.138    0.864
0.863
## Gender                 1    33.512    261.865    41.140    0.864
0.863
## Performance.Rating      1    33.523    261.865    41.140    0.864
0.863
## Training.Times.Last.Year 1    33.524    261.865    41.140    0.864
0.863
## -----
##
## - BusinessTravel added
##
##
## Step 8 : AIC = 29.19285
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine

```

```

ssTravel
##
##                                     Remove Existing Variables
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## OverTime                1       32.989    261.897    41.109    0.864
0.863
## Environment.Satisfaction 1       33.393    261.872    41.133    0.864
0.863
## BusinessTravel          1       31.524    261.865    41.140    0.864
0.863
## Daily.Rate              1       34.948    261.780    41.226    0.864
0.862
## Num.Companies.Worked    1       38.873    261.544    41.461    0.863
0.862
## Years.In.Current.Role   1       43.321    261.276    41.730    0.862
0.861
## Attrition              1       47.264    261.036    41.969    0.861
0.860
## Job.Level              1    1206.360     77.302    225.704    0.255
0.246
## -----
##
##                                     Enter New Variables
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField          1     30.905    262.728    40.277    0.867
0.864
## Relationship.Satisfaction 1     28.180    262.419    40.586    0.866
0.864
## Monthly.Rate            1     29.006    262.370    40.635    0.866
0.864
## Years.At.Company        1     29.602    262.335    40.670    0.866
0.864
## Age                    1     29.773    262.325    40.680    0.866
0.864
## Years.With.Curr.Manager 1     29.875    262.319    40.686    0.866
0.864
## Marital.Status          1     32.159    262.302    40.703    0.866
0.863
## Job.Involvement         1     30.391    262.288    40.717    0.866

```

```

0.864
## Percent.Salary.Hike          1    30.503    262.282    40.723    0.866
0.864
## Stock.Option.Level          1    30.506    262.282    40.724    0.866
0.864
## Work.Life.Balance           1    30.746    262.267    40.738    0.866
0.864
## Hourly.Rate                 1    30.782    262.265    40.740    0.866
0.864
## Education                   1    30.967    262.254    40.751    0.866
0.864
## Job.Satisfaction            1    31.049    262.249    40.756    0.865
0.864
## Total.Working.Years         1    31.128    262.245    40.760    0.865
0.863
## Years.Since.Last.Promotion  1    31.181    262.242    40.764    0.865
0.863
## Gender                      1    31.188    262.241    40.764    0.865
0.863
## Distance.From.Home          1    31.189    262.241    40.764    0.865
0.863
## Performance.Rating          1    31.190    262.241    40.764    0.865
0.863
## Training.Times.Last.Year    1    31.192    262.241    40.764    0.865
0.863
## -----
##
##
## - Relationship.Satisfaction added
##
##
## Step 9 : AIC = 28.18003
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine
ssTravel + Relationship.Satisfaction
##
##                                Remove Existing Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Relationship.Satisfaction  1      29.193    262.241    40.764    0.865
0.864
## OverTime                 1      32.242    262.060    40.945    0.865
0.863
## BusinessTravel           1      30.265    262.059    40.946    0.865
0.863
## Environment.Satisfaction  1      32.547    262.042    40.963    0.865

```

```

0.863
## Daily.Rate          1      33.842      261.965      41.040      0.865
0.863
## Num.Companies.Worked  1      38.058      261.713      41.292      0.864
0.862
## Years.In.Current.Role  1      42.049      261.473      41.532      0.863
0.861
## Attrition            1      47.148      261.165      41.840      0.862
0.860
## Job.Level            1     1207.359       77.629     225.376      0.256
0.246
## -----
##
##                               Enter New Variables
## -----
## Variable              DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField          1      29.941      262.901      40.104      0.868
0.865
## Monthly.Rate            1      27.963      262.549      40.456      0.866
0.864
## Years.At.Company        1      28.736      262.504      40.501      0.866
0.864
## Age                     1      28.853      262.497      40.508      0.866
0.864
## Years.With.Curr.Manager  1      28.915      262.493      40.512      0.866
0.864
## Marital.Status          1      31.432      262.463      40.542      0.866
0.864
## Job.Involvement         1      29.465      262.461      40.544      0.866
0.864
## Percent.Salary.Hike     1      29.604      262.453      40.552      0.866
0.864
## Stock.Option.Level      1      29.678      262.448      40.557      0.866
0.864
## Hourly.Rate             1      29.695      262.447      40.558      0.866
0.864
## Work.Life.Balance       1      29.782      262.442      40.563      0.866
0.864
## Education               1      30.008      262.429      40.576      0.866
0.864
## Job.Satisfaction         1      30.075      262.425      40.580      0.866
0.864
## Total.Working.Years     1      30.153      262.420      40.585      0.866
0.864
## Gender                  1      30.178      262.419      40.586      0.866

```

```

0.864
## Distance.From.Home          1    30.179    262.419    40.586    0.866
0.864
## Years.Since.Last.Promotion  1    30.179    262.419    40.586    0.866
0.864
## Training.Times.Last.Year    1    30.179    262.419    40.586    0.866
0.864
## Performance.Rating          1    30.180    262.419    40.586    0.866
0.864
## -----
##
## - Monthly.Rate added
##
##
## Step 10 : AIC = 27.96347
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + Daily.Rate + Environment.Satisfaction + OverTime + Busine
ssTravel + Relationship.Satisfaction + Monthly.Rate
##
##                               Remove Existing Variables
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Monthly.Rate          1      28.180      262.419      40.586      0.866
0.864
## Relationship.Satisfaction  1      29.006      262.370      40.635      0.866
0.864
## OverTime              1      32.056      262.190      40.815      0.865
0.863
## BusinessTravel        1      30.144      262.185      40.820      0.865
0.863
## Environment.Satisfaction  1      32.484      262.165      40.841      0.865
0.863
## Daily.Rate            1      33.993      262.075      40.930      0.865
0.863
## Num.Companies.Worked    1      37.731      261.852      41.153      0.864
0.862
## Years.In.Current.Role   1      41.699      261.615      41.391      0.863
0.861
## Attrition              1      46.585      261.320      41.685      0.862
0.860
## Job.Level              1     1206.008       78.723     224.282      0.260
0.249
## -----
##

```

```

##                                     Enter New Variables
## -----
## Variable                           DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField                     1      29.278      263.056      39.949      0.868
0.865
## Years.With.Curr.Manager            1      28.502      262.635      40.370      0.867
0.864
## Years.At.Company                   1      28.761      262.620      40.385      0.867
0.864
## Age                                1      28.802      262.617      40.388      0.867
0.864
## Marital.Status                     1      31.168      262.596      40.409      0.867
0.864
## Job.Involvement                    1      29.194      262.594      40.411      0.867
0.864
## Stock.Option.Level                 1      29.343      262.586      40.420      0.867
0.864
## Percent.Salary.Hike                1      29.354      262.585      40.420      0.867
0.864
## Hourly.Rate                        1      29.376      262.584      40.421      0.867
0.864
## Work.Life.Balance                  1      29.598      262.571      40.434      0.867
0.864
## Education                          1      29.778      262.560      40.445      0.867
0.864
## Job.Satisfaction                   1      29.877      262.554      40.451      0.867
0.864
## Total.Working.Years                 1      29.942      262.550      40.455      0.866
0.864
## Distance.From.Home                 1      29.956      262.550      40.456      0.866
0.864
## Training.Times.Last.Year           1      29.963      262.549      40.456      0.866
0.864
## Performance.Rating                 1      29.963      262.549      40.456      0.866
0.864
## Gender                             1      29.963      262.549      40.456      0.866
0.864
## Years.Since.Last.Promotion          1      29.963      262.549      40.456      0.866
0.864
## -----
##
##
## No more variables to be added or removed.
##
## Final Model Output

```

```

## -----
##
##                               Model Summary
## -----
## R                0.931          RMSE                0.244
## R-Squared        0.866          Coef. Var            2.867
## Adj. R-Squared   0.864          MSE                0.060
## Pred R-Squared   0.862          MAE                0.188
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##                               ANOVA
## -----
##                               Sum of
##                               Squares          DF          Mean Square          F          Sig.
## -----
## Regression        262.549             11             23.868        399.415        0.0000
## Residual           40.456             677             0.060
## Total              303.005             688
## -----
##
##                               Parameter Estimates
## -----
## -----
##                               model          Beta          Std. Error          Std. Beta
## t          Sig          lower          upper
## -----
##                               (Intercept)          7.316          0.055          13
## 3.445      0.000          7.209          7.424
##                               Job.Level          0.538          0.010          0.878          5
## 5.463      0.000          0.519          0.557
##                               AttritionYes          -0.129          0.028          -0.069          -
## 4.535      0.000          -0.185          -0.073
##                               Years.In.Current.Role          0.011          0.003          0.062
## 3.955      0.000          0.006          0.017
##                               Num.Companies.Worked          0.013          0.004          0.050
## 3.415      0.001          0.006          0.021
##                               Daily.Rate          0.000          0.000          0.040
## 2.817      0.005          0.000          0.000
##                               Environment.Satisfaction          -0.022          0.009          -0.036          -
## 2.537      0.011          -0.039          -0.005
##                               OverTimeYes          0.053          0.021          0.036
## 2.452      0.014          0.010          0.095
## BusinessTravelTravel_Frequently          0.047          0.036          0.027
## 1.314      0.189          -0.023          0.116
## BusinessTravelTravel_Rarely          0.071          0.030          0.049
## 2.398      0.017          0.013          0.129

```



```
##      Relationship.Satisfaction    -0.015      0.008      -0.024      -
1.731    0.084    -0.031    0.002
##              Monthly.Rate      0.000      0.000      0.021
1.477    0.140    0.000    0.000
## -----
-----

par(mfrow=c(1,3))
#plot(k$aics,xlab="No of Predictors",ylab="AICS", col = "red")
plot(k$arsq,xlab="No of Predictors",ylab="AdjR2", col = "red")
plot(k$rsq,xlab="No of Predictors",ylab="RMSE", col = "red")
k$predictors

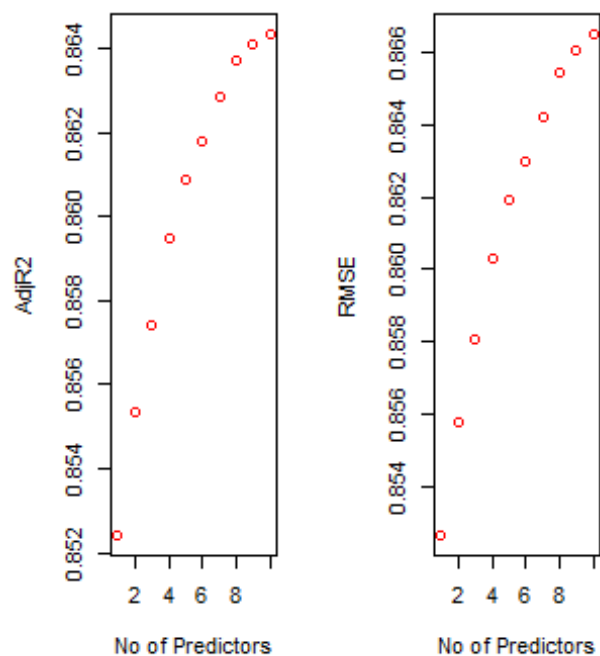
## [1] "Job.Level"          "Attrition"
## [3] "Years.In.Current.Role" "Num.Companies.Worked"
## [5] "Daily.Rate"          "Environment.Satisfaction"
## [7] "OverTime"           "BusinessTravel"
## [9] "Relationship.Satisfaction" "Monthly.Rate"

#Plot for AISC
for (i in 1:29){
  predictions<-predict(object=Model_Step,newdata=EmplTest,id=i)
  testASEstp[i]<-mean((log(EmplTest$Monthly.Income)-predictions)^2)
}

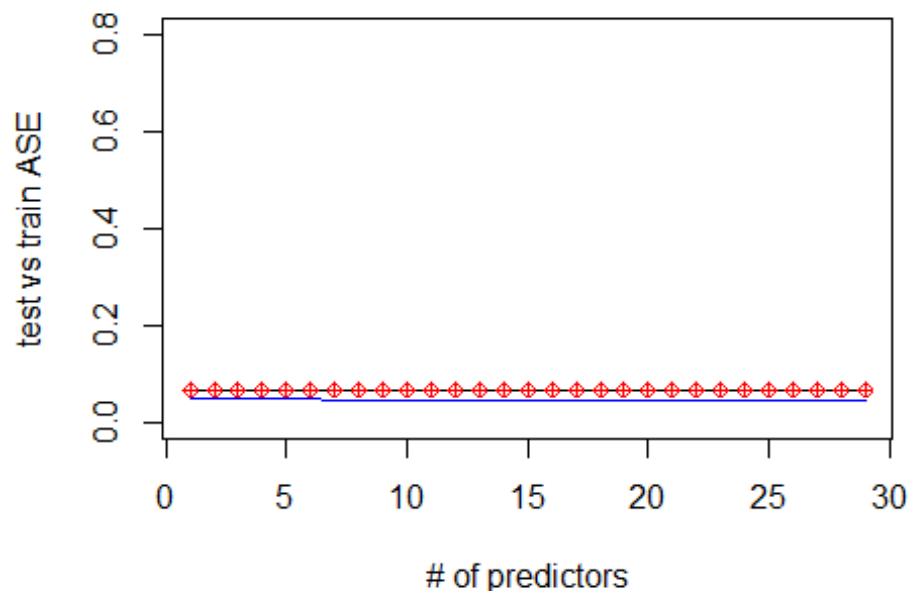
dim(EmplTest)

## [1] 173  29

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



```
plot(1:29,testASEstp,type="l",xlab="# of predictors",ylab="test vs train ASE",
ylim=c(0,0.8))
index<-which(testASEstp==min(testASEstp))
points(index,testASEstp[index],col="red",pch=10)
rss<-summary(reg.fwd)$rss
lines(index,rss/869,col="blue") #Dividing by 869 since ASE=RSS/sample size
```



#### ##### Simple Model1 ##### Using Squared variable

```
EmplTrainSimp1<-Train%>%select(Age,Attrition,BusinessTravel,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,Num.Companies.Worked,OverTime,Performance.Rating,Relationship.Satisfaction,(Total.Working.Years),Work.Life.Balance,Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
EmplTestSimp1<-Test%>%select(Age,Attrition,BusinessTravel,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,Num.Companies.Worked,OverTime,Performance.Rating,Relationship.Satisfaction,(Total.Working.Years),Work.Life.Balance,Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
dim(EmplTrainSimp1)
```

```
## [1] 689 22
```

```
dim(EmplTestSimp1)
```

```
## [1] 173 22
```

```
Model_Simp1<-lm(log(Monthly.Income)~Age+Attrition+BusinessTravel+Distance.From.Home+Education+EducationField+Environment.Satisfaction+Gender+Job.Involvement+Job.Level+Job.Satisfaction+Marital.Status+Num.Companies.Worked+OverTime+Pe
```

```
rformance.Rating+Relationship.Satisfaction+(Total.Working.Years)+Work.Life.Ba
lance+Years.In.Current.Role+(Years.In.Current.Role)^2+Years.Since.Last.Promot
ion+Years.With.Curr.Manager,data=EmplTrainSimp1)
```

```
summary(Model_Simp1)
```

```
##
## Call:
## lm(formula = log(Monthly.Income) ~ Age + Attrition + BusinessTravel +
##     Distance.From.Home + Education + EducationField + Environment.Satisfac
tion +
##     Gender + Job.Involvement + Job.Level + Job.Satisfaction +
##     Marital.Status + Num.Companies.Worked + OverTime + Performance.Rating
+
##     Relationship.Satisfaction + (Total.Working.Years) + Work.Life.Balance
+
##     Years.In.Current.Role + (Years.In.Current.Role)^2 + Years.Since.Last.P
romotion +
##     Years.With.Curr.Manager, data = EmplTrainSimp1)
##
## Residuals:
```

	Min	1Q	Median	3Q	Max
	-0.88626	-0.15290	0.00928	0.15780	0.79523

```
##
## Coefficients:
```

	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	7.253e+00	1.499e-01	48.392	< 2e-16	***
Age	1.629e-03	1.461e-03	1.115	0.265276	
AttritionYes	-1.183e-01	3.111e-02	-3.802	0.000157	***
BusinessTravelTravel_Frequently	4.014e-02	3.630e-02	1.106	0.269146	
BusinessTravelTravel_Rarely	6.552e-02	3.026e-02	2.165	0.030725	*
Distance.From.Home	3.406e-06	1.174e-03	0.003	0.997686	
Education	-5.722e-04	9.605e-03	-0.060	0.952510	
EducationFieldLife Sciences	8.540e-02	7.715e-02	1.107	0.268739	
EducationFieldMarketing	1.291e-01	8.050e-02	1.604	0.109283	
EducationFieldMedical	7.150e-02	7.769e-02	0.920	0.357753	
EducationFieldOther	1.279e-01	8.473e-02	1.509	0.131715	
EducationFieldTechnical Degree	4.399e-02	8.182e-02	0.538	0.590995	
Environment.Satisfaction	-2.068e-02	8.834e-03	-2.341	0.019512	*
GenderMale	-6.612e-04	1.957e-02	-0.034	0.973052	
Job.Involvement	1.276e-02	1.392e-02	0.917	0.359464	
Job.Level	5.369e-01	1.449e-02	37.046	< 2e-16	***
Job.Satisfaction	2.687e-03	8.690e-03	0.309	0.757256	
Marital.StatusMarried	-2.212e-03	2.486e-02	-0.089	0.929113	
Marital.StatusSingle	-2.214e-02	2.724e-02	-0.813	0.416720	
Num.Companies.Worked	1.350e-02	4.283e-03	3.152	0.001692	**
OverTimeYes	5.176e-02	2.195e-02	2.358	0.018655	*
Performance.Rating	-7.403e-04	2.662e-02	-0.028	0.977823	
Relationship.Satisfaction	-1.315e-02	8.724e-03	-1.507	0.132271	
Total.Working.Years	-1.195e-03	2.699e-03	-0.443	0.658198	

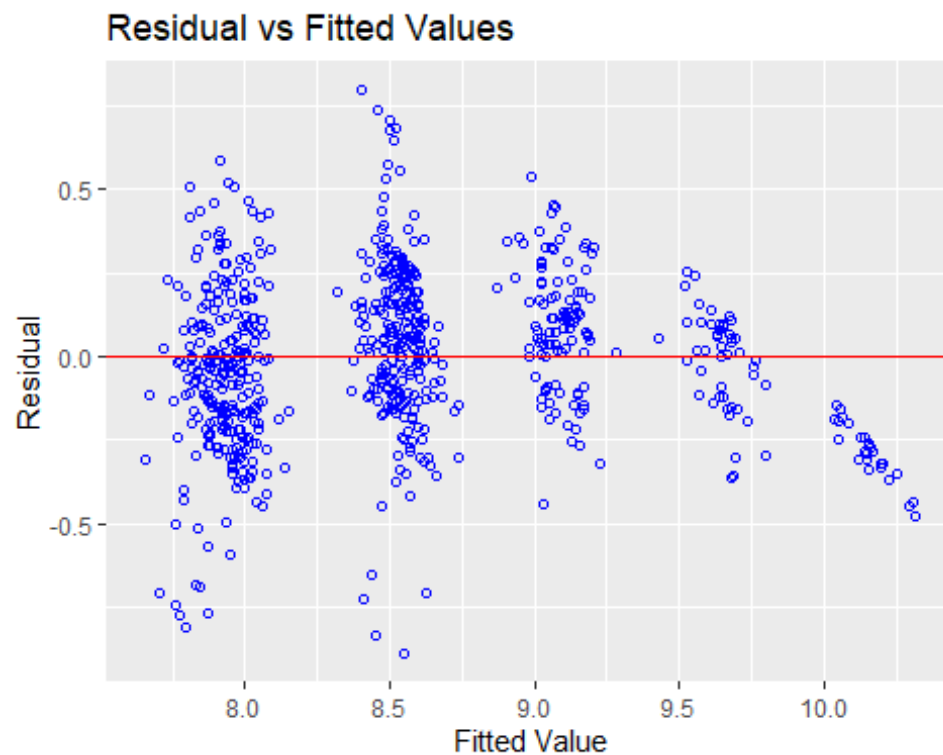
```
## Work.Life.Balance          -8.438e-03  1.366e-02  -0.618  0.536886
## Years.In.Current.Role      9.332e-03  4.092e-03   2.281  0.022885 *
## Years.Since.Last.Promotion -7.058e-04  3.930e-03  -0.180  0.857516
## Years.With.Curr.Manager    3.997e-03  4.049e-03   0.987  0.323924
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2469 on 661 degrees of freedom
## Multiple R-squared:  0.867, Adjusted R-squared:  0.8616
## F-statistic: 159.6 on 27 and 661 DF,  p-value: < 2.2e-16
```

```
vif(Model_Simp1)
```

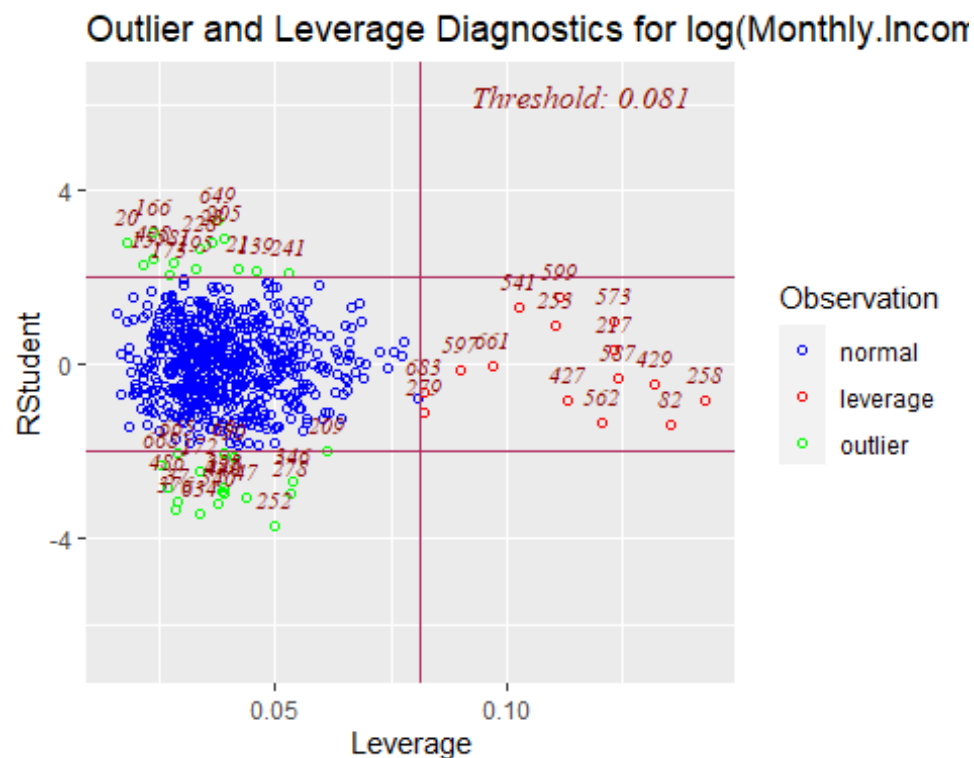
```
##              GVIF Df GVIF^(1/(2*Df))
## Age          1.930471  1      1.389414
## Attrition    1.368305  1      1.169746
## BusinessTravel 1.081383  2      1.019753
## Distance.From.Home 1.052780  1      1.026051
## Education    1.099600  1      1.048618
## EducationField 1.179348  5      1.016633
## Environment.Satisfaction 1.059429  1      1.029286
## Gender       1.036601  1      1.018136
## Job.Involvement 1.056592  1      1.027906
## Job.Level    2.779449  1      1.667168
## Job.Satisfaction 1.060734  1      1.029919
## Marital.Status 1.158564  2      1.037481
## Num.Companies.Worked 1.291672  1      1.136517
## OverTime     1.128762  1      1.062432
## Performance.Rating 1.018445  1      1.009181
## Relationship.Satisfaction 1.050021  1      1.024705
## Total.Working.Years 4.580563  1      2.140225
## Work.Life.Balance 1.035847  1      1.017766
## Years.In.Current.Role 2.464362  1      1.569829
## Years.Since.Last.Promotion 1.706672  1      1.306397
## Years.With.Curr.Manager 2.341068  1      1.530055
```

```
par(mfrow=c(1,5))
```

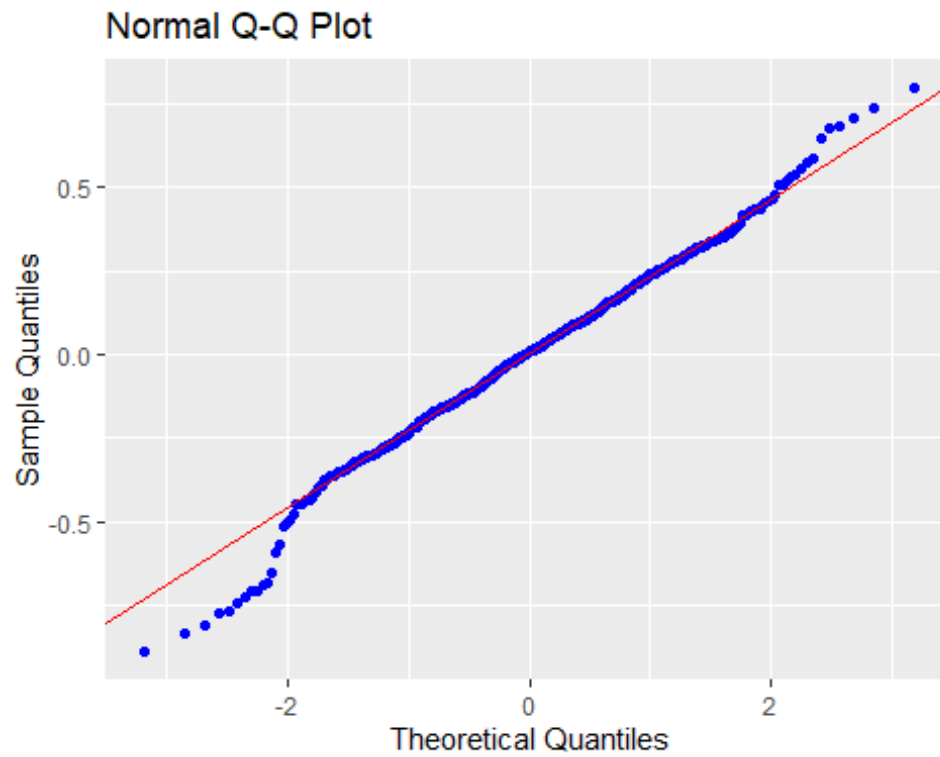
```
ols_plot_resid_fit(Model_Simp1)
```



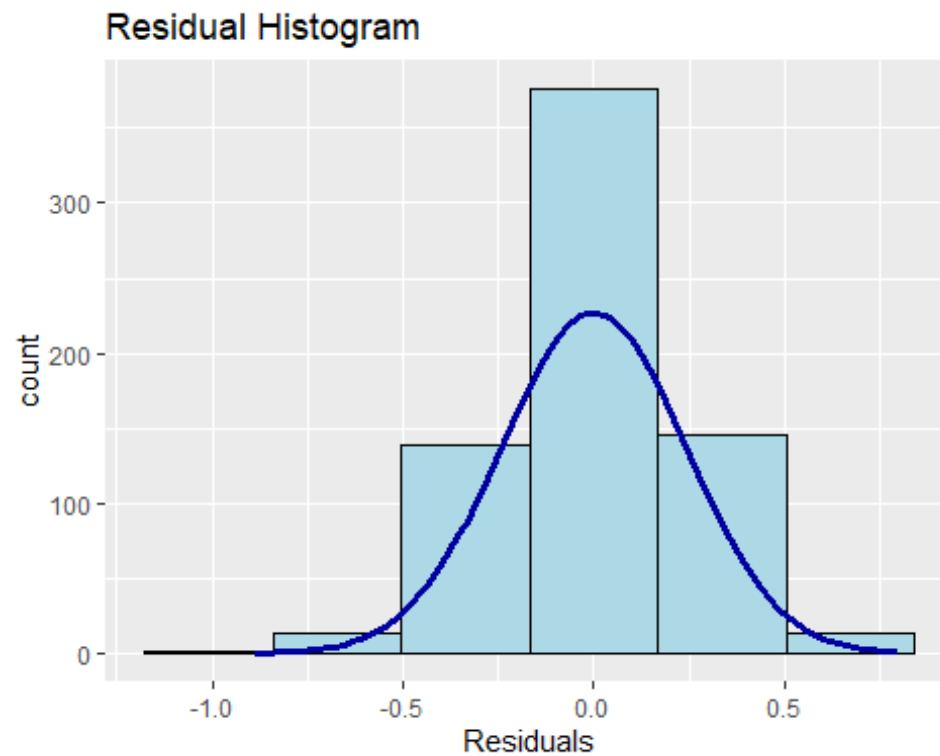
```
ols_plot_resid_lev(Model_Simp1)
```



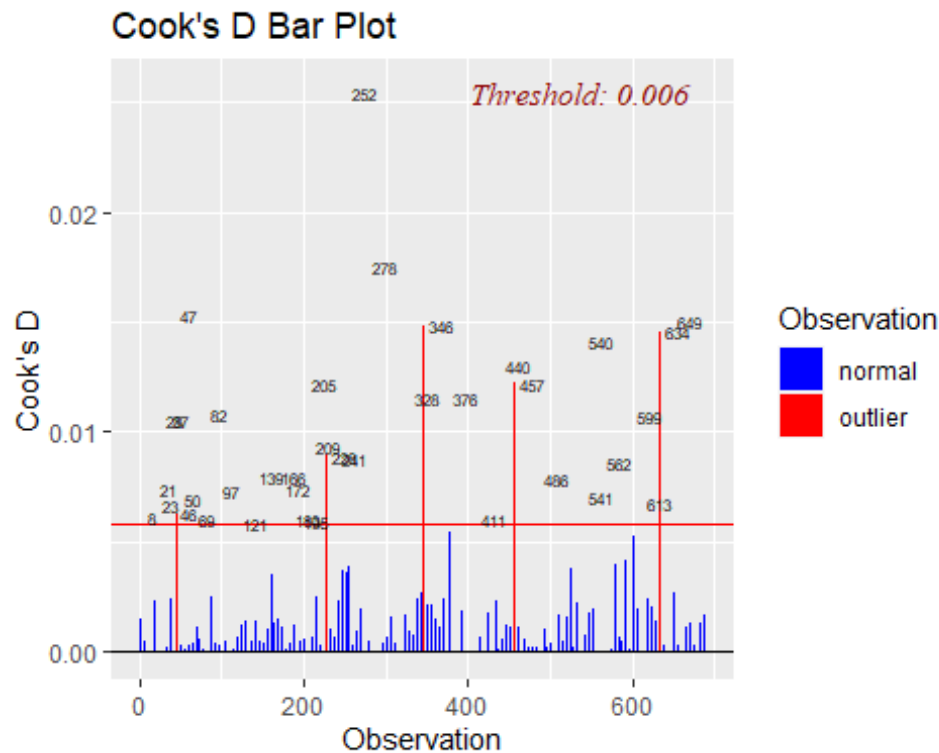
```
ols_plot_resid_qq(Model_Simp1)
```



```
ols_plot_resid_hist(Model_Simp1)
```



```
ols_plot_cooksd_bar(Model_Simp1)
```



*#Assumptions are met:*

*#The histogram shows a bell shape curve which suggests that there is enough evidence for normality.*

*#The QQ Plot shows a straight line which suggests that there is enough evidence for constant variance.*

*#The observations are considered to be independent as they are randomly assigned.*

*#Business Travel Rarely, Daily Rates, Job Level, Laboratory Technician, Research Director, Research Scientist, Sales Representative, Number of companies worked, overtime, Total Working Years, Years In Current Role are statistically significant.*

*#The outlier at 255 seems to be seen only in this model. Leaving it in the dataset for now.*

*#Prediction*

```
Pred_Simp1=predict(Model_Simp1, newdata = EmplTestSimp1, interval = "confidence")
```

```
as.data.frame(Pred_Simp1)
```

##	fit	lwr	upr
## 6	9.025450	8.924517	9.126383
## 27	8.522011	8.456510	8.587512
## 32	8.060779	7.961150	8.160407
## 35	8.501898	8.409211	8.594585
## 40	7.941871	7.856504	8.027238
## 45	7.873044	7.790253	7.955835
## 48	9.167598	9.079307	9.255890



## 49	7.832858	7.732652	7.933063
## 53	8.041673	7.944575	8.138770
## 55	8.506589	8.422669	8.590508
## 57	7.915701	7.813367	8.018034
## 58	8.026580	7.932427	8.120733
## 65	7.807507	7.707040	7.907973
## 82	8.539146	8.455867	8.622425
## 83	8.507668	8.417622	8.597714
## 86	9.650587	9.553005	9.748168
## 94	8.569802	8.495668	8.643937
## 95	10.139399	10.054397	10.224400
## 97	9.708235	9.603900	9.812571
## 103	8.590412	8.483023	8.697801
## 107	8.440080	8.331371	8.548790
## 109	8.418193	8.303627	8.532759
## 114	8.383650	8.273599	8.493702
## 118	8.604469	8.505382	8.703556
## 124	8.546485	8.444191	8.648779
## 125	8.553622	8.466603	8.640641
## 127	7.841606	7.723311	7.959901
## 137	7.836953	7.748025	7.925881
## 160	9.060157	8.952264	9.168051
## 162	8.867613	8.742491	8.992736
## 166	7.754726	7.665663	7.843789
## 176	7.871503	7.768497	7.974509
## 181	9.061688	8.986005	9.137372
## 182	8.577622	8.500953	8.654290
## 187	8.499387	8.405710	8.593065
## 191	8.505589	8.417018	8.594161
## 192	9.060314	8.959050	9.161577
## 202	8.548279	8.478125	8.618433
## 204	7.987434	7.881469	8.093400
## 216	7.932376	7.860616	8.004137
## 217	8.457854	8.382959	8.532749
## 224	7.945731	7.856468	8.034993
## 225	7.965477	7.885747	8.045207
## 228	8.001198	7.912698	8.089698
## 245	8.569642	8.485777	8.653507
## 253	7.914390	7.831092	7.997688
## 254	7.683347	7.507656	7.859038
## 261	7.813281	7.714131	7.912430
## 272	8.531096	8.457949	8.604244
## 273	8.522000	8.429477	8.614522
## 278	7.988960	7.901256	8.076665
## 279	8.417910	8.329147	8.506673
## 280	8.544594	8.447767	8.641421
## 283	8.527383	8.455161	8.599605
## 284	8.586510	8.497533	8.675488
## 289	9.027481	8.931668	9.123294
## 295	9.613188	9.518160	9.708216

## 297	8.517112	8.427815	8.606409
## 308	7.852685	7.765704	7.939667
## 311	8.621932	8.539725	8.704138
## 312	9.703162	9.612548	9.793776
## 318	8.483408	8.412065	8.554750
## 324	8.739807	8.620805	8.858809
## 328	8.599956	8.517767	8.682145
## 333	7.872623	7.773743	7.971504
## 338	8.480170	8.395784	8.564556
## 340	7.872662	7.787154	7.958169
## 368	8.482055	8.389638	8.574471
## 369	7.875766	7.785404	7.966129
## 377	7.939932	7.807924	8.071940
## 379	8.028150	7.932718	8.123582
## 387	9.099824	8.997105	9.202543
## 388	8.455379	8.360942	8.549816
## 389	8.549348	8.477070	8.621627
## 400	9.108337	9.013542	9.203131
## 406	9.677845	9.565249	9.790441
## 407	8.629863	8.532013	8.727713
## 417	7.889318	7.794958	7.983677
## 424	7.784879	7.686340	7.883418
## 425	8.469226	8.392504	8.545947
## 436	8.619486	8.535491	8.703481
## 438	7.926520	7.842620	8.010420
## 448	8.536788	8.461937	8.611638
## 451	8.584455	8.486535	8.682375
## 452	7.926434	7.848384	8.004484
## 453	8.440289	8.345379	8.535199
## 454	8.584263	8.499031	8.669496
## 456	10.157750	10.052121	10.263378
## 459	7.998378	7.883813	8.112944
## 461	8.008621	7.902173	8.115069
## 465	7.878526	7.768784	7.988267
## 466	8.015307	7.944127	8.086486
## 467	7.998512	7.909408	8.087616
## 473	9.106394	8.999313	9.213475
## 474	8.032521	7.939996	8.125046
## 479	8.152567	8.029410	8.275723
## 480	9.205554	9.113334	9.297774
## 482	8.026417	7.953914	8.098919
## 488	7.979225	7.887188	8.071261
## 492	9.635078	9.544651	9.725505
## 494	9.017323	8.922107	9.112539
## 496	9.754149	9.632199	9.876100
## 511	8.599515	8.529373	8.669657
## 516	8.468102	8.377338	8.558867
## 521	7.889700	7.811781	7.967618
## 527	8.623735	8.535815	8.711656
## 530	8.082063	7.973255	8.190871

## 532	8.539027	8.462058	8.615997
## 540	8.615864	8.520607	8.711121
## 547	9.228338	9.112624	9.344052
## 550	7.986864	7.895982	8.077745
## 565	7.913988	7.824385	8.003591
## 566	8.075377	7.994139	8.156614
## 567	8.408033	8.312108	8.503957
## 573	8.551092	8.465058	8.637126
## 584	8.659185	8.550206	8.768164
## 596	8.615915	8.515371	8.716459
## 601	7.817063	7.732955	7.901171
## 603	9.147286	9.060086	9.234486
## 604	8.046285	7.962030	8.130540
## 608	8.568387	8.450506	8.686267
## 618	8.678064	8.568744	8.787383
## 626	8.002075	7.934498	8.069652
## 627	8.505100	8.426290	8.583909
## 628	9.160152	9.075174	9.245131
## 636	7.937146	7.827805	8.046486
## 639	8.047865	7.965156	8.130573
## 653	9.175721	9.072678	9.278763
## 654	9.086471	8.973651	9.199292
## 665	8.480284	8.367659	8.592910
## 667	9.041890	8.932377	9.151404
## 674	7.879416	7.758938	7.999894
## 680	8.010605	7.924555	8.096656
## 681	8.513637	8.414499	8.612775
## 688	7.958488	7.870534	8.046442
## 695	8.444008	8.345690	8.542327
## 696	8.001608	7.904893	8.098322
## 697	9.528817	9.421995	9.635639
## 698	8.601903	8.508951	8.694855
## 700	10.147588	10.059067	10.236109
## 703	9.125460	9.000977	9.249944
## 712	9.644789	9.520602	9.768976
## 719	8.509150	8.381638	8.636661
## 727	7.984295	7.897238	8.071353
## 731	8.541826	8.445857	8.637794
## 732	8.428258	8.334980	8.521535
## 738	8.525072	8.432560	8.617583
## 740	8.558433	8.449795	8.667072
## 752	7.822286	7.725085	7.919487
## 755	9.200611	9.086622	9.314600
## 756	7.891714	7.789191	7.994237
## 768	8.961182	8.834388	9.087976
## 769	8.471715	8.379107	8.564322
## 772	9.187220	9.056566	9.317873
## 774	7.830451	7.740741	7.920160
## 776	7.936838	7.857246	8.016429
## 778	7.850837	7.760245	7.941429

```
## 788 8.417003 8.307055 8.526950
## 799 7.770599 7.656813 7.884385
## 803 9.652581 9.557414 9.747748
## 804 8.935463 8.820556 9.050370
## 809 7.981821 7.889743 8.073899
## 814 10.083076 9.984338 10.181814
## 816 8.062898 7.980901 8.144896
## 818 9.038456 8.965658 9.111254
## 821 8.030967 7.927840 8.134093
## 825 8.648941 8.567030 8.730851
## 831 8.533676 8.431036 8.636317
## 834 7.880418 7.798182 7.962655
## 845 8.495211 8.402834 8.587588
## 852 7.894588 7.800367 7.988809
## 854 8.475860 8.393428 8.558291
## 864 9.681386 9.542520 9.820253
```

```
MSPE = data.frame(Observed = log(EmplTestSimp1$Monthly.Income), Predicted = P
red_Simp1)
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
MSPE$SquaredResidual = MSPE$Residual^2
MSPE
```

##	Observed	Predicted.fit	Predicted.lwr	Predicted.upr	Residual
## 6	9.081711	9.025450	8.924517	9.126383	0.056261025
## 27	9.202711	8.522011	8.456510	8.587512	0.680700351
## 32	7.614805	8.060779	7.961150	8.160407	-0.445973336
## 35	9.177714	8.501898	8.409211	8.594585	0.675815812
## 40	7.934155	7.941871	7.856504	8.027238	-0.007715711
## 45	7.109062	7.873044	7.790253	7.955835	-0.763981840
## 48	9.075665	9.167598	9.079307	9.255890	-0.091932943
## 49	7.537963	7.832858	7.732652	7.933063	-0.294894982
## 53	7.606387	8.041673	7.944575	8.138770	-0.435285242
## 55	8.394800	8.506589	8.422669	8.590508	-0.111789297
## 57	7.922624	7.915701	7.813367	8.018034	0.006922958
## 58	8.460199	8.026580	7.932427	8.120733	0.433619287
## 65	7.700748	7.807507	7.707040	7.907973	-0.106758706
## 82	8.836810	8.539146	8.455867	8.622425	0.297663858
## 83	8.579417	8.507668	8.417622	8.597714	0.071748710
## 86	9.527047	9.650587	9.553005	9.748168	-0.123539570
## 94	8.722906	8.569802	8.495668	8.643937	0.153103338
## 95	9.899781	10.139399	10.054397	10.224400	-0.239618052
## 97	9.717519	9.708235	9.603900	9.812571	0.009284085
## 103	8.785387	8.590412	8.483023	8.697801	0.194974651
## 107	8.370779	8.440080	8.331371	8.548790	-0.069301269
## 109	9.096724	8.418193	8.303627	8.532759	0.678530264
## 114	8.535622	8.383650	8.273599	8.493702	0.151971844
## 118	8.300280	8.604469	8.505382	8.703556	-0.304188657
## 124	8.301025	8.546485	8.444191	8.648779	-0.245459739
## 125	8.423761	8.553622	8.466603	8.640641	-0.129860584

## 127	8.273592	7.841606	7.723311	7.959901	0.431985741
## 137	7.748891	7.836953	7.748025	7.925881	-0.088061834
## 160	9.487290	9.060157	8.952264	9.168051	0.427132973
## 162	9.073604	8.867613	8.742491	8.992736	0.205990383
## 166	7.622664	7.754726	7.665663	7.843789	-0.132061936
## 176	7.635304	7.871503	7.768497	7.974509	-0.236199182
## 181	9.237372	9.061688	8.986005	9.137372	0.175683419
## 182	8.838262	8.577622	8.500953	8.654290	0.260640090
## 187	8.557567	8.499387	8.405710	8.593065	0.058179887
## 191	8.661294	8.505589	8.417018	8.594161	0.155704085
## 192	9.173365	9.060314	8.959050	9.161577	0.113051581
## 202	8.735525	8.548279	8.478125	8.618433	0.187245860
## 204	7.703459	7.987434	7.881469	8.093400	-0.283975219
## 216	7.760041	7.932376	7.860616	8.004137	-0.172335426
## 217	9.192584	8.457854	8.382959	8.532749	0.734729497
## 224	7.354362	7.945731	7.856468	8.034993	-0.591368663
## 225	8.470311	7.965477	7.885747	8.045207	0.504834010
## 228	7.752765	8.001198	7.912698	8.089698	-0.248433312
## 245	8.528331	8.569642	8.485777	8.653507	-0.041310890
## 253	7.729296	7.914390	7.831092	7.997688	-0.185094049
## 254	7.991592	7.683347	7.507656	7.859038	0.308244983
## 261	7.932003	7.813281	7.714131	7.912430	0.118722578
## 272	8.600247	8.531096	8.457949	8.604244	0.069150305
## 273	8.171882	8.522000	8.429477	8.614522	-0.350117562
## 278	7.805882	7.988960	7.901256	8.076665	-0.183078415
## 279	8.655911	8.417910	8.329147	8.506673	0.238001345
## 280	8.302762	8.544594	8.447767	8.641421	-0.241832376
## 283	8.781555	8.527383	8.455161	8.599605	0.254172651
## 284	8.928905	8.586510	8.497533	8.675488	0.342395069
## 289	9.183791	9.027481	8.931668	9.123294	0.156310218
## 295	9.707290	9.613188	9.518160	9.708216	0.094102284
## 297	9.163982	8.517112	8.427815	8.606409	0.646870093
## 308	7.999343	7.852685	7.765704	7.939667	0.146657492
## 311	8.609590	8.621932	8.539725	8.704138	-0.012341473
## 312	9.490771	9.703162	9.612548	9.793776	-0.212390637
## 318	8.437500	8.483408	8.412065	8.554750	-0.045907118
## 324	8.437067	8.739807	8.620805	8.858809	-0.302740037
## 328	8.596004	8.599956	8.517767	8.682145	-0.003951571
## 333	7.758761	7.872623	7.773743	7.971504	-0.113862786
## 338	8.956222	8.480170	8.395784	8.564556	0.476051823
## 340	7.758333	7.872662	7.787154	7.958169	-0.114328119
## 368	8.607582	8.482055	8.389638	8.574471	0.125527621
## 369	7.636752	7.875766	7.785404	7.966129	-0.239014231
## 377	7.916807	7.939932	7.807924	8.071940	-0.023124419
## 379	7.681560	8.028150	7.932718	8.123582	-0.346589438
## 387	9.081256	9.099824	8.997105	9.202543	-0.018567593
## 388	8.357494	8.455379	8.360942	8.549816	-0.097885256
## 389	8.412277	8.549348	8.477070	8.621627	-0.137071391
## 400	9.231025	9.108337	9.013542	9.203131	0.122688184
## 406	9.718783	9.677845	9.565249	9.790441	0.040937994

## 407	8.606668	8.629863	8.532013	8.727713	-0.023194917
## 417	7.849324	7.889318	7.794958	7.983677	-0.039993720
## 424	7.384610	7.784879	7.686340	7.883418	-0.400268463
## 425	8.460411	8.469226	8.392504	8.545947	-0.008814344
## 436	8.734560	8.619486	8.535491	8.703481	0.115074561
## 438	7.961021	7.926520	7.842620	8.010420	0.034501327
## 448	8.619389	8.536788	8.461937	8.611638	0.082600960
## 451	8.492491	8.584455	8.486535	8.682375	-0.091964611
## 452	8.137396	7.926434	7.848384	8.004484	0.210961570
## 453	8.667852	8.440289	8.345379	8.535199	0.227563087
## 454	8.610137	8.584263	8.499031	8.669496	0.025873629
## 456	9.895102	10.157750	10.052121	10.263378	-0.262647065
## 459	7.633370	7.998378	7.883813	8.112944	-0.365008825
## 461	7.646354	8.008621	7.902173	8.115069	-0.362267157
## 465	7.798523	7.878526	7.768784	7.988267	-0.080002666
## 466	8.279951	8.015307	7.944127	8.086486	0.264644027
## 467	7.880048	7.998512	7.909408	8.087616	-0.118463874
## 473	9.491375	9.106394	8.999313	9.213475	0.384981522
## 474	8.146709	8.032521	7.939996	8.125046	0.114187598
## 479	7.989560	8.152567	8.029410	8.275723	-0.163006054
## 480	9.528358	9.205554	9.113334	9.297774	0.322803878
## 482	7.764721	8.026417	7.953914	8.098919	-0.261696049
## 488	7.976252	7.979225	7.887188	8.071261	-0.002972881
## 492	9.733885	9.635078	9.544651	9.725505	0.098807081
## 494	9.060215	9.017323	8.922107	9.112539	0.042891530
## 496	9.699350	9.754149	9.632199	9.876100	-0.054799643
## 511	8.583543	8.599515	8.529373	8.669657	-0.015972081
## 516	8.609225	8.468102	8.377338	8.558867	0.141123132
## 521	7.845024	7.889700	7.811781	7.967618	-0.044675170
## 527	8.518392	8.623735	8.535815	8.711656	-0.105342927
## 530	8.509766	8.082063	7.973255	8.190871	0.427702347
## 532	8.826881	8.539027	8.462058	8.615997	0.287853912
## 540	8.547722	8.615864	8.520607	8.711121	-0.068141368
## 547	8.909641	9.228338	9.112624	9.344052	-0.318697730
## 550	7.685703	7.986864	7.895982	8.077745	-0.301160747
## 565	8.251403	7.913988	7.824385	8.003591	0.337415061
## 566	7.798113	8.075377	7.994139	8.156614	-0.277263905
## 567	7.685244	8.408033	8.312108	8.503957	-0.722788951
## 573	8.829665	8.551092	8.465058	8.637126	0.278573625
## 584	8.471987	8.659185	8.550206	8.768164	-0.187198361
## 596	8.303257	8.615915	8.515371	8.716459	-0.312657975
## 601	7.617268	7.817063	7.732955	7.901171	-0.199795092
## 603	9.342771	9.147286	9.060086	9.234486	0.195484981
## 604	8.049108	8.046285	7.962030	8.130540	0.002822957
## 608	8.631414	8.568387	8.450506	8.686267	0.063027740
## 618	8.604105	8.678064	8.568744	8.787383	-0.073959007
## 626	7.830823	8.002075	7.934498	8.069652	-0.171251851
## 627	8.333751	8.505100	8.426290	8.583909	-0.171348680
## 628	9.350972	9.160152	9.075174	9.245131	0.190819241
## 636	7.773174	7.937146	7.827805	8.046486	-0.163971867



```

## 639 7.910224      8.047865      7.965156      8.130573 -0.137640863
## 653 9.510371      9.175721      9.072678      9.278763  0.334650126
## 654 9.433804      9.086471      8.973651      9.199292  0.347332467
## 665 8.426831      8.480284      8.367659      8.592910 -0.053453530
## 667 8.976894      9.041890      8.932377      9.151404 -0.064996220
## 674 7.611842      7.879416      7.758938      7.999894 -0.267573738
## 680 7.753194      8.010605      7.924555      8.096656 -0.257411100
## 681 8.356085      8.513637      8.414499      8.612775 -0.157552188
## 688 7.871693      7.958488      7.870534      8.046442 -0.086795183
## 695 9.161675      8.444008      8.345690      8.542327  0.717666719
## 696 8.099858      8.001608      7.904893      8.098322  0.098250268
## 697 9.629182      9.528817      9.421995      9.635639  0.100365178
## 698 8.685078      8.601903      8.508951      8.694855  0.083174487
## 700 9.856448      10.147588     10.059067     10.236109 -0.291139698
## 703 9.247347      9.125460      9.000977      9.249944  0.121886754
## 712 9.555206      9.644789      9.520602      9.768976 -0.089583239
## 719 8.429673      8.509150      8.381638      8.636661 -0.079477060
## 727 7.997327      7.984295      7.897238      8.071353  0.013031407
## 731 8.469053      8.541826      8.445857      8.637794 -0.072772690
## 732 8.563695      8.428258      8.334980      8.521535  0.135437433
## 738 8.550821      8.525072      8.432560      8.617583  0.025749462
## 740 8.210940      8.558433      8.449795      8.667072 -0.347493523
## 752 7.741534      7.822286      7.725085      7.919487 -0.080752708
## 755 9.514068      9.200611      9.086622      9.314600  0.313456814
## 756 8.218248      7.891714      7.789191      7.994237  0.326534063
## 768 9.299450      8.961182      8.834388      9.087976  0.338267540
## 769 8.906393      8.471715      8.379107      8.564322  0.434678899
## 772 9.254644      9.187220      9.056566      9.317873  0.067424458
## 774 8.127995      7.830451      7.740741      7.920160  0.297544520
## 776 8.161946      7.936838      7.857246      8.016429  0.225108051
## 778 7.946971      7.850837      7.760245      7.941429  0.096134720
## 788 8.505323      8.417003      8.307055      8.526950  0.088320173
## 799 7.527794      7.770599      7.656813      7.884385 -0.242804739
## 803 9.744961      9.652581      9.557414      9.747748  0.092379767
## 804 9.167642      8.935463      8.820556      9.050370  0.232178873
## 809 7.959276      7.981821      7.889743      8.073899 -0.022544761
## 814 9.886240      10.083076     9.984338     10.181814 -0.196836081
## 816 7.930566      8.062898      7.980901      8.144896 -0.132332455
## 818 9.366575      9.038456      8.965658      9.111254  0.328118396
## 821 8.105308      8.030967      7.927840      8.134093  0.074341010
## 825 8.447414      8.648941      8.567030      8.730851 -0.201526212
## 831 8.197814      8.533676      8.431036      8.636317 -0.335862204
## 834 7.844633      7.880418      7.798182      7.962655 -0.035785813
## 845 8.704336      8.495211      8.402834      8.587588  0.209125743
## 852 7.698936      7.894588      7.800367      7.988809 -0.195651977
## 854 8.641356      8.475860      8.393428      8.558291  0.165496207
## 864 9.530248      9.681386      9.542520      9.820253 -0.151138860
##      SquaredResidual
## 6      3.165303e-03
## 27     4.633530e-01

```

```
## 32      1.988922e-01
## 35      4.567270e-01
## 40      5.953220e-05
## 45      5.836683e-01
## 48      8.451666e-03
## 49      8.696305e-02
## 53      1.894732e-01
## 55      1.249685e-02
## 57      4.792735e-05
## 58      1.880257e-01
## 65      1.139742e-02
## 82      8.860377e-02
## 83      5.147877e-03
## 86      1.526203e-02
## 94      2.344063e-02
## 95      5.741681e-02
## 97      8.619424e-05
## 103     3.801511e-02
## 107     4.802666e-03
## 109     4.604033e-01
## 114     2.309544e-02
## 118     9.253074e-02
## 124     6.025048e-02
## 125     1.686377e-02
## 127     1.866117e-01
## 137     7.754887e-03
## 160     1.824426e-01
## 162     4.243204e-02
## 166     1.744035e-02
## 176     5.579005e-02
## 181     3.086466e-02
## 182     6.793326e-02
## 187     3.384899e-03
## 191     2.424376e-02
## 192     1.278066e-02
## 202     3.506101e-02
## 204     8.064193e-02
## 216     2.969950e-02
## 217     5.398274e-01
## 224     3.497169e-01
## 225     2.548574e-01
## 228     6.171911e-02
## 245     1.706590e-03
## 253     3.425981e-02
## 254     9.501497e-02
## 261     1.409505e-02
## 272     4.781765e-03
## 273     1.225823e-01
## 278     3.351771e-02
## 279     5.664464e-02
```



```
## 280    5.848290e-02
## 283    6.460374e-02
## 284    1.172344e-01
## 289    2.443288e-02
## 295    8.855240e-03
## 297    4.184409e-01
## 308    2.150842e-02
## 311    1.523120e-04
## 312    4.510978e-02
## 318    2.107463e-03
## 324    9.165153e-02
## 328    1.561491e-05
## 333    1.296473e-02
## 338    2.266253e-01
## 340    1.307092e-02
## 368    1.575718e-02
## 369    5.712780e-02
## 377    5.347387e-04
## 379    1.201242e-01
## 387    3.447555e-04
## 388    9.581523e-03
## 389    1.878857e-02
## 400    1.505239e-02
## 406    1.675919e-03
## 407    5.380042e-04
## 417    1.599498e-03
## 424    1.602148e-01
## 425    7.769266e-05
## 436    1.324215e-02
## 438    1.190342e-03
## 448    6.822919e-03
## 451    8.457490e-03
## 452    4.450478e-02
## 453    5.178496e-02
## 454    6.694447e-04
## 456    6.898348e-02
## 459    1.332314e-01
## 461    1.312375e-01
## 465    6.400427e-03
## 466    7.003646e-02
## 467    1.403369e-02
## 473    1.482108e-01
## 474    1.303881e-02
## 479    2.657097e-02
## 480    1.042023e-01
## 482    6.848482e-02
## 488    8.838020e-06
## 492    9.762839e-03
## 494    1.839683e-03
## 496    3.003001e-03
```

```
## 511    2.551074e-04
## 516    1.991574e-02
## 521    1.995871e-03
## 527    1.109713e-02
## 530    1.829293e-01
## 532    8.285987e-02
## 540    4.643246e-03
## 547    1.015682e-01
## 550    9.069780e-02
## 565    1.138489e-01
## 566    7.687527e-02
## 567    5.224239e-01
## 573    7.760326e-02
## 584    3.504323e-02
## 596    9.775501e-02
## 601    3.991808e-02
## 603    3.821438e-02
## 604    7.969085e-06
## 608    3.972496e-03
## 618    5.469935e-03
## 626    2.932720e-02
## 627    2.936037e-02
## 628    3.641198e-02
## 636    2.688677e-02
## 639    1.894501e-02
## 653    1.119907e-01
## 654    1.206398e-01
## 665    2.857280e-03
## 667    4.224509e-03
## 674    7.159571e-02
## 680    6.626047e-02
## 681    2.482269e-02
## 688    7.533404e-03
## 695    5.150455e-01
## 696    9.653115e-03
## 697    1.007317e-02
## 698    6.917995e-03
## 700    8.476232e-02
## 703    1.485638e-02
## 712    8.025157e-03
## 719    6.316603e-03
## 727    1.698176e-04
## 731    5.295864e-03
## 732    1.834330e-02
## 738    6.630348e-04
## 740    1.207517e-01
## 752    6.521000e-03
## 755    9.825517e-02
## 756    1.066245e-01
## 768    1.144249e-01
```

```
## 769    1.889457e-01
## 772    4.546057e-03
## 774    8.853274e-02
## 776    5.067363e-02
## 778    9.241884e-03
## 788    7.800453e-03
## 799    5.895414e-02
## 803    8.534021e-03
## 804    5.390703e-02
## 809    5.082662e-04
## 814    3.874444e-02
## 816    1.751188e-02
## 818    1.076617e-01
## 821    5.526586e-03
## 825    4.061281e-02
## 831    1.128034e-01
## 834    1.280624e-03
## 845    4.373358e-02
## 852    3.827970e-02
## 854    2.738899e-02
## 864    2.284296e-02
```

```
mean(MSPE$SquaredResidual)
```

```
## [1] 0.06924576
```

```
reg.smp1=regsubsets(log(Monthly.Income)~Age+Attrition+BusinessTravel+Distance
.From.Home+Education+EducationField+Environment.Satisfaction+Gender+Job.Invol
vement+Job.Level+Job.Satisfaction+Marital.Status+Num.Companies.Worked+OverTim
e+Performance.Rating+Relationship.Satisfaction+(Total.Working.Years)+Work.Lif
e.Balance+Years.In.Current.Role+(Years.In.Current.Role)^2+Years.Since.Last.Pr
omotion+Years.With.Curr.Manager,data=EmplTrainSimp1,method="forward",nvmax=29
)
```

```
k<-ols_step_forward_aic(Model_Simp1, details = TRUE)
```

```
## Forward Selection Method
## -----
##
## Candidate Terms:
##
## 1 . Age
## 2 . Attrition
## 3 . BusinessTravel
## 4 . Distance.From.Home
## 5 . Education
## 6 . EducationField
## 7 . Environment.Satisfaction
## 8 . Gender
## 9 . Job.Involvement
## 10 . Job.Level
```

```

## 11 . Job.Satisfaction
## 12 . Marital.Status
## 13 . Num.Companies.Worked
## 14 . OverTime
## 15 . Performance.Rating
## 16 . Relationship.Satisfaction
## 17 . Total.Working.Years
## 18 . Work.Life.Balance
## 19 . Years.In.Current.Role
## 20 . Years.Since.Last.Promotion
## 21 . Years.With.Curr.Manager
##
## Step 0: AIC = 1393.29
## log(Monthly.Income) ~ 1
##
## -----
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## -----
## Job.Level                1      75.972    258.352    44.653    0.85
3      0.852
## Total.Working.Years      1      822.312    171.092    131.913    0.56
5      0.564
## Age                      1     1214.403     69.964    233.041    0.23
1      0.230
## Years.In.Current.Role    1     1271.951     49.664    253.342    0.16
4      0.163
## Years.With.Curr.Manager  1     1297.264     40.183    262.822    0.13
3      0.131
## Years.Since.Last.Promotion 1     1323.485     29.988    273.017    0.09
9      0.098
## Attrition                1     1357.267     16.268    286.737    0.05
4      0.052
## Num.Companies.Worked     1     1371.338     10.353    292.653    0.03
4      0.033
## Education                1     1380.446      6.458    296.547    0.02
1      0.020
## Marital.Status           1     1385.871      4.980    298.025    0.01
6      0.014
## EducationField           1     1392.075      4.892    298.113    0.01
6      0.009
## BusinessTravel           1     1394.576      1.191    301.814    0.00
4      0.001
## Performance.Rating       1     1393.953      0.587    302.418    0.00
2      0.000
## Distance.From.Home       1     1394.448      0.370    302.635    0.00
1      0.000
## Gender                   1     1394.496      0.349    302.656    0.00

```

```

1      0.000
## Relationship.Satisfaction      1      1394.523      0.337      302.668      0.00
1      0.000
## Work.Life.Balance            1      1394.647      0.283      302.723      0.00
1     -0.001
## Job.Satisfaction             1      1394.809      0.211      302.794      0.00
1     -0.001
## Environment.Satisfaction     1      1395.099      0.084      302.921      0.00
0     -0.001
## Job.Involvement             1      1395.264      0.011      302.994      0.00
0     -0.001
## OverTime                    1      1395.271      0.008      302.997      0.00
0     -0.001
## -----
-----
##
##
## - Job.Level
##
##
## Step 1 : AIC = 75.97176
## log(Monthly.Income) ~ Job.Level
##
## -----
-----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Attrition                1      63.193      0.948      43.705      0.856
0.855
## Years.In.Current.Role    1      65.003      0.833      43.820      0.855
0.855
## Years.With.Curr.Manager  1      68.934      0.582      44.071      0.855
0.854
## EducationField           1      76.977      0.579      44.074      0.855
0.853
## Total.Working.Years      1      71.568      0.413      44.240      0.854
0.854
## BusinessTravel           1      73.586      0.412      44.241      0.854
0.853
## Age                      1      71.740      0.402      44.251      0.854
0.854
## Num.Companies.Worked     1      72.437      0.357      44.296      0.854
0.853
## Marital.Status           1      76.001      0.257      44.396      0.853
0.853
## Job.Involvement          1      74.203      0.244      44.409      0.853
0.853
## Environment.Satisfaction  1      75.281      0.174      44.479      0.853

```

```

0.853
## Relationship.Satisfaction      1      75.559      0.156      44.497      0.853
0.853
## Education                     1      76.562      0.091      44.562      0.853
0.853
## OverTime                     1      76.759      0.079      44.574      0.853
0.852
## Years.Since.Last.Promotion    1      77.138      0.054      44.599      0.853
0.852
## Job.Satisfaction              1      77.331      0.042      44.611      0.853
0.852
## Gender                       1      77.671      0.020      44.633      0.853
0.852
## Work.Life.Balance            1      77.813      0.010      44.643      0.853
0.852
## Distance.From.Home           1      77.831      0.009      44.644      0.853
0.852
## Performance.Rating           1      77.899      0.005      44.648      0.853
0.852
## -----
##
## - Attrition
##
##
## Step 2 : AIC = 63.19317
## log(Monthly.Income) ~ Job.Level + Attrition
##
## -----
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## -----
## Years.In.Current.Role      1      54.224      0.690      43.015      0.858
0.857
## EducationField              1      64.934      0.521      43.185      0.857
0.856
## Num.Companies.Worked        1      57.956      0.457      43.249      0.857
0.857
## Years.With.Curr.Manager     1      58.267      0.437      43.268      0.857
0.857
## BusinessTravel              1      60.717      0.409      43.296      0.857
0.856
## OverTime                    1      59.814      0.340      43.365      0.857
0.856
## Total.Working.Years         1      60.340      0.307      43.399      0.857
0.856
## Age                         1      60.372      0.305      43.401      0.857
0.856

```

```
## Environment.Satisfaction      1    61.068    0.261    43.444    0.857
0.856
## Relationship.Satisfaction      1    62.195    0.190    43.516    0.856
0.856
## Marital.Status                1    65.341    0.117    43.588    0.856
0.855
## Job.Involvement               1    63.544    0.105    43.601    0.856
0.855
## Education                    1    63.928    0.080    43.625    0.856
0.855
## Years.Since.Last.Promotion    1    64.198    0.063    43.642    0.856
0.855
## Work.Life.Balance            1    64.714    0.030    43.675    0.856
0.855
## Gender                       1    64.939    0.016    43.689    0.856
0.855
## Job.Satisfaction             1    65.074    0.008    43.698    0.856
0.855
## Performance.Rating           1    65.146    0.003    43.702    0.856
0.855
## Distance.From.Home           1    65.179    0.001    43.704    0.856
0.855
```

```
## -----
-----
```

```
##
## - Years.In.Current.Role
##
##
## Step 3 : AIC = 54.22357
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role
##
## -----
```

```
-----
## Variable                DF    AIC    Sum Sq    RSS    R-Sq
Adj. R-Sq
## -----
-----
## Num.Companies.Worked    1    45.248    0.680    42.335    0.860
0.859
## EducationField          1    55.669    0.531    42.484    0.860
0.858
## BusinessTravel          1    52.030    0.385    42.630    0.859
0.858
## OverTime                1    50.733    0.341    42.674    0.859
0.858
## Environment.Satisfaction 1    51.338    0.304    42.711    0.859
0.858
## Age                    1    51.705    0.281    42.734    0.859
0.858
## Relationship.Satisfaction 1    53.425    0.174    42.841    0.859
```

```

0.858
## Total.Working.Years      1    54.519    0.106    42.909    0.858
0.858
## Job.Involvement         1    54.576    0.103    42.912    0.858
0.858
## Marital.Status         1    56.767    0.091    42.924    0.858
0.857
## Education              1    55.036    0.074    42.941    0.858
0.857
## Work.Life.Balance       1    55.556    0.042    42.973    0.858
0.857
## Years.Since.Last.Promotion 1    55.600    0.039    42.976    0.858
0.857
## Years.With.Curr.Manager 1    55.920    0.019    42.996    0.858
0.857
## Job.Satisfaction        1    56.124    0.006    43.009    0.858
0.857
## Gender                 1    56.143    0.005    43.010    0.858
0.857
## Performance.Rating      1    56.169    0.003    43.012    0.858
0.857
## Distance.From.Home      1    56.222    0.000    43.015    0.858
0.857
## -----
##
##
## - Num.Companies.Worked
##
##
## Step 4 : AIC = 45.24834
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked
##
## -----
##
## -----
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      46.626      0.526      41.809      0.862
0.860
## BusinessTravel      1      42.733      0.398      41.937      0.862
0.860
## OverTime            1      41.492      0.352      41.983      0.861
0.860
## Environment.Satisfaction 1      41.633      0.344      41.992      0.861
0.860
## Relationship.Satisfaction 1      44.296      0.181      42.154      0.861
0.860
## Age                1      45.532      0.105      42.230      0.861

```



```

0.860
## Job.Involvement          1    45.840    0.086    42.249    0.861
0.860
## Marital.Status          1    47.847    0.086    42.249    0.861
0.859
## Work.Life.Balance       1    46.298    0.058    42.277    0.860
0.859
## Years.With.Curr.Manager  1    46.339    0.056    42.279    0.860
0.859
## Education               1    46.941    0.019    42.316    0.860
0.859
## Years.Since.Last.Promotion 1    46.949    0.018    42.317    0.860
0.859
## Job.Satisfaction        1    46.996    0.016    42.320    0.860
0.859
## Total.Working.Years     1    47.140    0.007    42.329    0.860
0.859
## Gender                  1    47.202    0.003    42.332    0.860
0.859
## Performance.Rating     1    47.219    0.002    42.333    0.860
0.859
## Distance.From.Home      1    47.237    0.001    42.335    0.860
0.859
## -----
##
##
## - OverTime
##
##
## Step 5 : AIC = 41.49172
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime
##
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField    1      43.092      0.509      41.474      0.863
0.861
## Environment.Satisfaction 1      36.837      0.404      41.579      0.863
0.862
## BusinessTravel    1      39.384      0.371      41.612      0.863
0.861
## Relationship.Satisfaction 1      40.270      0.196      41.787      0.862
0.861
## Age               1      42.064      0.087      41.896      0.862
0.861
## Job.Involvement   1      42.151      0.082      41.901      0.862

```

```

0.860
## Marital.Status          1    44.250    0.076    41.907    0.862
0.860
## Work.Life.Balance       1    42.455    0.063    41.920    0.862
0.860
## Years.With.Curr.Manager 1    42.472    0.062    41.921    0.862
0.860
## Education               1    43.173    0.019    41.964    0.862
0.860
## Years.Since.Last.Promotion 1    43.254    0.015    41.969    0.861
0.860
## Job.Satisfaction        1    43.321    0.010    41.973    0.861
0.860
## Total.Working.Years     1    43.409    0.005    41.978    0.861
0.860
## Gender                  1    43.424    0.004    41.979    0.861
0.860
## Distance.From.Home      1    43.492    0.000    41.983    0.861
0.860
## Performance.Rating      1    43.487    0.000    41.983    0.861
0.860
## -----
-----
##
## - Environment.Satisfaction
##
##
## Step 6 : AIC = 36.83674
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction
##
## -----
-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## EducationField      1      38.282      0.513      41.066      0.864
0.862
## BusinessTravel      1      34.948      0.354      41.226      0.864
0.862
## Relationship.Satisfaction 1      35.463      0.203      41.376      0.863
0.862
## Age                 1      37.500      0.081      41.499      0.863
0.862
## Marital.Status      1      39.589      0.075      41.504      0.863
0.861
## Job.Involvement     1      37.723      0.067      41.512      0.863
0.862
## Years.With.Curr.Manager 1      38.092      0.045      41.535      0.863

```

```

0.862
## Work.Life.Balance          1    38.238    0.036    41.543    0.863
0.861
## Education                  1    38.610    0.014    41.566    0.863
0.861
## Years.Since.Last.Promotion 1    38.682    0.009    41.570    0.863
0.861
## Job.Satisfaction           1    38.751    0.005    41.574    0.863
0.861
## Gender                     1    38.802    0.002    41.577    0.863
0.861
## Total.Working.Years        1    38.804    0.002    41.577    0.863
0.861
## Distance.From.Home         1    38.821    0.001    41.579    0.863
0.861
## Performance.Rating         1    38.834    0.000    41.579    0.863
0.861
## -----
-----
##
## - BusinessTravel
##
##
## Step 7 : AIC = 34.94774
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction + BusinessTravel
##
## -----
-----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## EducationField          1    36.895    0.479    40.747    0.866
0.863
## Relationship.Satisfaction 1    33.842    0.185    41.040    0.865
0.863
## Age                     1    35.606    0.080    41.145    0.864
0.862
## Marital.Status          1    37.669    0.076    41.149    0.864
0.862
## Years.With.Curr.Manager  1    35.897    0.063    41.163    0.864
0.862
## Job.Involvement         1    35.986    0.057    41.168    0.864
0.862
## Work.Life.Balance        1    36.364    0.035    41.191    0.864
0.862
## Education                1    36.741    0.012    41.213    0.864
0.862
## Job.Satisfaction         1    36.813    0.008    41.218    0.864

```

```

0.862
## Years.Since.Last.Promotion      1      36.899      0.003      41.223      0.864
0.862
## Gender                          1      36.924      0.001      41.224      0.864
0.862
## Total.Working.Years             1      36.937      0.001      41.225      0.864
0.862
## Distance.From.Home             1      36.947      0.000      41.226      0.864
0.862
## Performance.Rating             1      36.946      0.000      41.225      0.864
0.862
## -----
##
## - Relationship.Satisfaction
##
##
## Step 8 : AIC = 33.84238
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction + BusinessTravel + Re
lationship.Satisfaction
##
## -----
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField          1      35.894      0.471      40.569      0.866
0.863
## Age                     1      34.592      0.074      40.966      0.865
0.863
## Years.With.Curr.Manager  1      34.837      0.060      40.980      0.865
0.863
## Marital.Status          1      36.909      0.056      40.985      0.865
0.863
## Job.Involvement         1      34.978      0.051      40.989      0.865
0.863
## Work.Life.Balance       1      35.316      0.031      41.009      0.865
0.863
## Education               1      35.688      0.009      41.031      0.865
0.863
## Job.Satisfaction        1      35.746      0.006      41.034      0.865
0.863
## Distance.From.Home     1      35.827      0.001      41.039      0.865
0.863
## Gender                  1      35.826      0.001      41.039      0.865
0.863
## Years.Since.Last.Promotion 1      35.822      0.001      41.039      0.865
0.863

```

```
## Performance.Rating          1    35.842    0.000    41.040    0.865
0.863
## Total.Working.Years         1    35.842    0.000    41.040    0.865
0.863
```

```
## -----
-----
```

```
##
##
## No more variables to be added.
```

```
##
## Variables Entered:
##
## - Job.Level
## - Attrition
## - Years.In.Current.Role
## - Num.Companies.Worked
## - OverTime
## - Environment.Satisfaction
## - BusinessTravel
## - Relationship.Satisfaction
```

```
##
##
## Final Model Output
## -----
```

```
##
##                               Model Summary
## -----
```

## R	0.930	RMSE	0.246
## R-Squared	0.865	Coef. Var	2.883
## Adj. R-Squared	0.863	MSE	0.060
## Pred R-Squared	0.860	MAE	0.190

```
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
```

```
##
##                               ANOVA
## -----
```

	Sum of Squares	DF	Mean Square	F	Sig.
## Regression	261.965	9	29.107	481.572	0.0000
## Residual	41.040	679	0.060		
## Total	303.005	688			

```
## -----
##
##                               Parameter Estimates
## -----
```

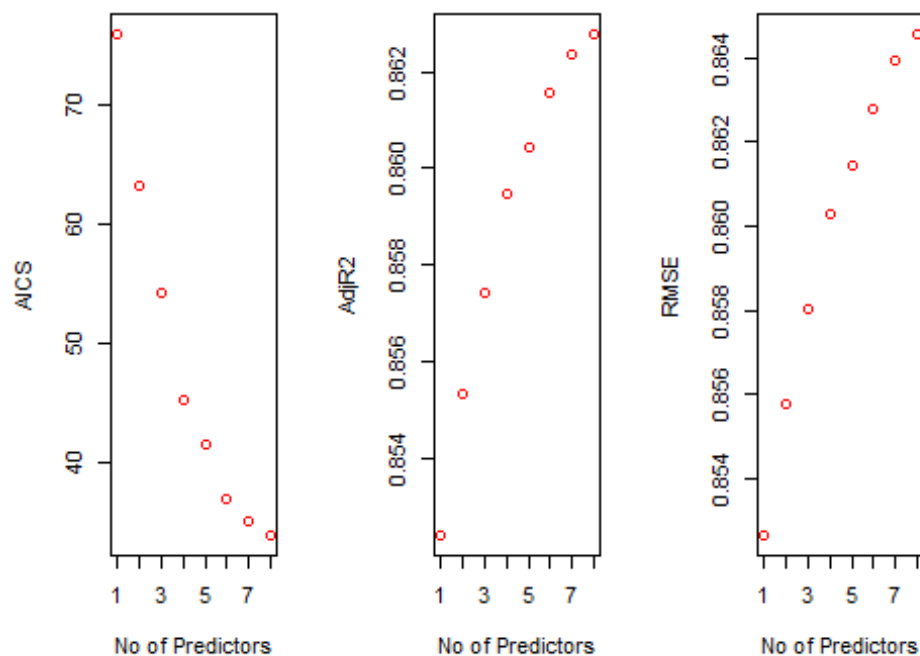
```
## -----
##                               model      Beta      Std. Error      Std. Beta
```

t	Sig	lower	upper			
##	-----					
##		(Intercept)	7.402	0.047		15
6.420	0.000	7.309	7.495			
##		Job.Level	0.538	0.010	0.878	5
5.247	0.000	0.519	0.558			
##		AttritionYes	-0.134	0.029	-0.072	-
4.697	0.000	-0.190	-0.078			
##		Years.In.Current.Role	0.011	0.003	0.061	
3.930	0.000	0.006	0.017			
##		Num.Companies.Worked	0.014	0.004	0.052	
3.536	0.000	0.006	0.021			
##		OverTimeYes	0.055	0.022	0.038	
2.559	0.011	0.013	0.098			
##		Environment.Satisfaction	-0.022	0.009	-0.037	-
2.558	0.011	-0.039	-0.005			
##		BusinessTravelTravel_Frequently	0.041	0.036	0.023	
1.138	0.256	-0.029	0.111			
##		BusinessTravelTravel_Rarely	0.067	0.030	0.046	
2.254	0.024	0.009	0.125			
##		Relationship.Satisfaction	-0.015	0.009	-0.025	-
1.751	0.080	-0.032	0.002			
##	-----					

```

par(mfrow=c(1,3))
plot(k$aics,xlab="No of Predictors",ylab="AICS", col = "red")
plot(k$arsq,xlab="No of Predictors",ylab="AdjR2", col = "red")
plot(k$rsq,xlab="No of Predictors",ylab="RMSE", col = "red")

```



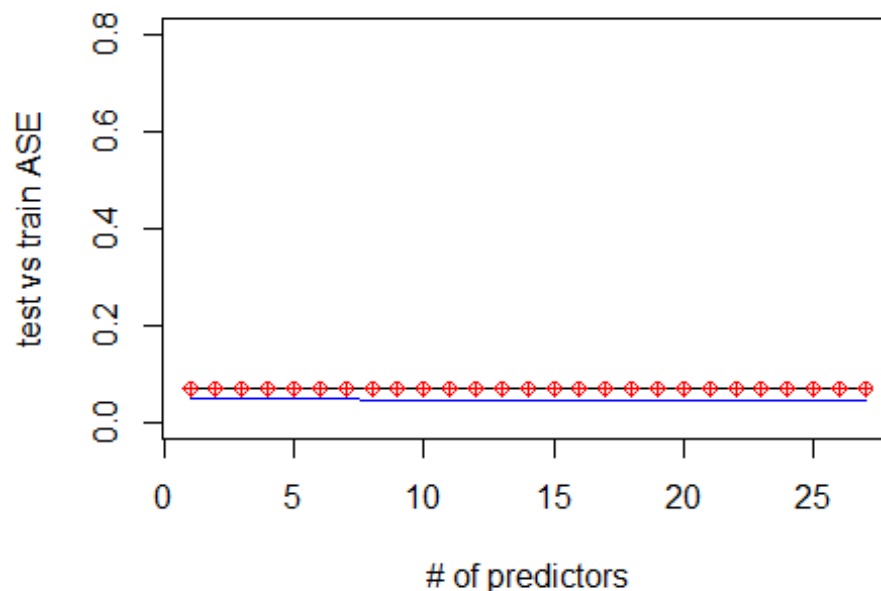
```
k$predictors
```

```
## [1] "Job.Level"           "Attrition"
## [3] "Years.In.Current.Role" "Num.Companies.Worked"
## [5] "OverTime"           "Environment.Satisfaction"
## [7] "BusinessTravel"     "Relationship.Satisfaction"
```

```
#Plot for AISC
```

```
for (i in 1:27){
  predictions<-predict(object=Model_Simp1,newdata=EmplTestSimp1,id=i)
  testASEsimp1[i]<-mean((log(EmplTestSimp1$Monthly.Income)-predictions)^2)
}
```

```
par(mfrow=c(1,1))
plot(1:27,testASEsimp1,type="l",xlab="# of predictors",ylab="test vs train ASE",ylim=c(0,0.8))
index<-which(testASEsimp1==min(testASEsimp1))
points(index,testASEsimp1[index],col="red",pch=10)
rss<-summary(reg.smp1)$rss
lines(index,rss/869,col="blue") #Dividing by 869 since ASE=RSS/sample size
```



#### ##### Simple Model2 ##### Using Interaction and Squared variable

```
EmplTrainSimp2<-Train%>%select(Age,Attrition,BusinessTravel,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,Num.Companies.Worked,OverTime,Performance.Rating,Relationship.Satisfaction,(Total.Working.Years),Work.Life.Balance,Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
EmplTestSimp2<-Test%>%select(Age,Attrition,BusinessTravel,Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(Monthly.Income),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,Num.Companies.Worked,OverTime,Performance.Rating,Relationship.Satisfaction,(Total.Working.Years),Work.Life.Balance,Years.In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
```

```
dim(EmplTrainSimp2)
```

```
## [1] 689 22
```

```
dim(EmplTestSimp2)
```

```
## [1] 173 22
```

```
Model_Simp2<-lm(log(Monthly.Income)~Age+Attrition+BusinessTravel+Distance.From.Home+Education+EducationField+Environment.Satisfaction+Gender+Job.Involvement+Job.Level+Job.Satisfaction+Marital.Status+Num.Companies.Worked+OverTime+Pe
```



```
rformance.Rating+Relationship.Satisfaction+(Total.Working.Years)+Work.Life.Ba
lance+Years.In.Current.Role+(Years.In.Current.Role)^2+Years.Since.Last.Promot
ion+Years.With.Curr.Manager, Age*Total.Working.Years, data=EmplTrainSimp2)
```

```
summary(Model_Simp2)
```

```
##
## Call:
## lm(formula = log(Monthly.Income) ~ Age + Attrition + BusinessTravel +
##     Distance.From.Home + Education + EducationField + Environment.Satisfac
tion +
##     Gender + Job.Involvement + Job.Level + Job.Satisfaction +
##     Marital.Status + Num.Companies.Worked + OverTime + Performance.Rating
+
##     Relationship.Satisfaction + (Total.Working.Years) + Work.Life.Balance
+
##     Years.In.Current.Role + (Years.In.Current.Role)^2 + Years.Since.Last.P
romotion +
##     Years.With.Curr.Manager, data = EmplTrainSimp2, subset = Age *
##     Total.Working.Years)
##
## Residuals:
```

	Min	1Q	Median	3Q	Max
	-0.80927	-0.11300	0.00921	0.15244	0.73471

```
##
## Coefficients:
```

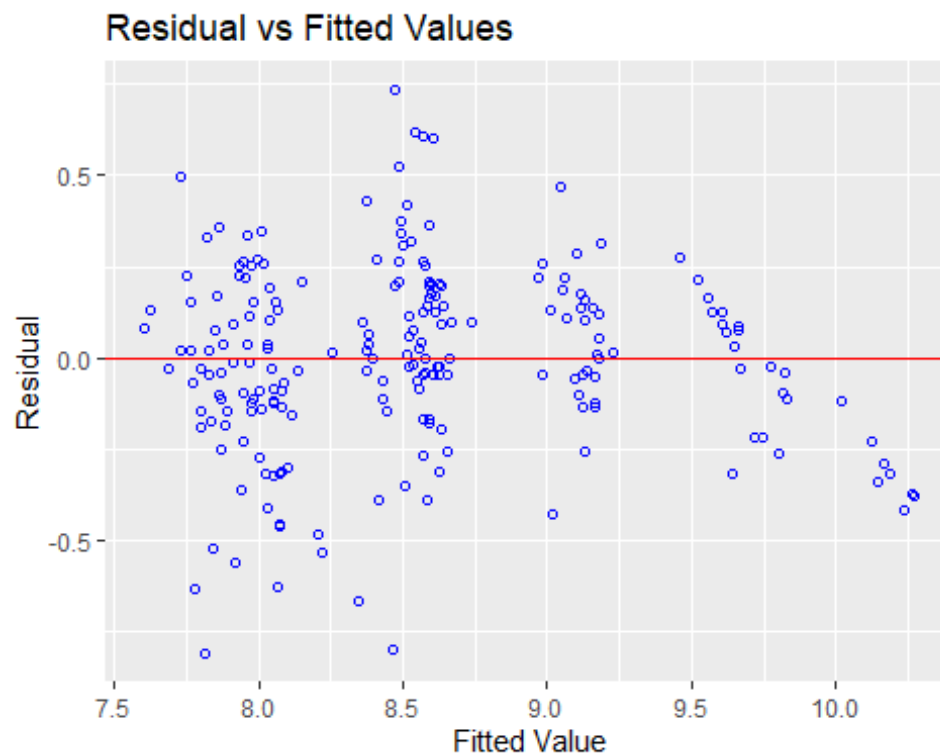
	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	6.725e+00	2.601e-01	25.860	< 2e-16	***
Age	7.341e-03	1.898e-03	3.867	0.000124	***
AttritionYes	-1.441e-01	3.590e-02	-4.015	6.81e-05	***
BusinessTravelTravel_Frequently	2.959e-02	4.178e-02	0.708	0.479087	
BusinessTravelTravel_Rarely	5.430e-02	3.980e-02	1.364	0.173092	
Distance.From.Home	-2.969e-03	1.388e-03	-2.139	0.032926	*
Education	1.644e-02	1.176e-02	1.398	0.162719	
EducationFieldLife Sciences	2.273e-01	1.699e-01	1.338	0.181385	
EducationFieldMarketing	2.467e-01	1.728e-01	1.428	0.153936	
EducationFieldMedical	2.237e-01	1.708e-01	1.310	0.190841	
EducationFieldOther	1.811e-01	1.762e-01	1.028	0.304557	
EducationFieldTechnical Degree	1.009e-01	1.735e-01	0.582	0.560848	
Environment.Satisfaction	-1.480e-02	1.047e-02	-1.414	0.157884	
GenderMale	5.368e-02	2.287e-02	2.347	0.019285	*
Job.Involvement	4.594e-02	1.580e-02	2.907	0.003800	**
Job.Level	5.466e-01	1.672e-02	32.693	< 2e-16	***
Job.Satisfaction	6.572e-03	1.009e-02	0.652	0.514909	
Marital.StatusMarried	8.141e-02	2.818e-02	2.889	0.004020	**
Marital.StatusSingle	1.013e-01	3.220e-02	3.146	0.001749	**
Num.Companies.Worked	-9.871e-05	4.951e-03	-0.020	0.984102	
OverTimeYes	3.359e-03	2.471e-02	0.136	0.891921	
Performance.Rating	6.934e-03	3.887e-02	0.178	0.858473	
Relationship.Satisfaction	-1.430e-02	1.035e-02	-1.382	0.167482	

```
## Total.Working.Years      -3.998e-03  3.202e-03  -1.248  0.212405
## Work.Life.Balance        1.810e-03  1.552e-02   0.117  0.907210
## Years.In.Current.Role    1.772e-02  4.997e-03   3.547  0.000425 ***
## Years.Since.Last.Promotion -5.641e-03  5.420e-03  -1.041  0.298424
## Years.With.Curr.Manager  -8.241e-03  5.183e-03  -1.590  0.112444
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 0.2358 on 525 degrees of freedom
## (130 observations deleted due to missingness)
## Multiple R-squared:  0.8887, Adjusted R-squared:  0.883
## F-statistic: 155.3 on 27 and 525 DF, p-value: < 2.2e-16

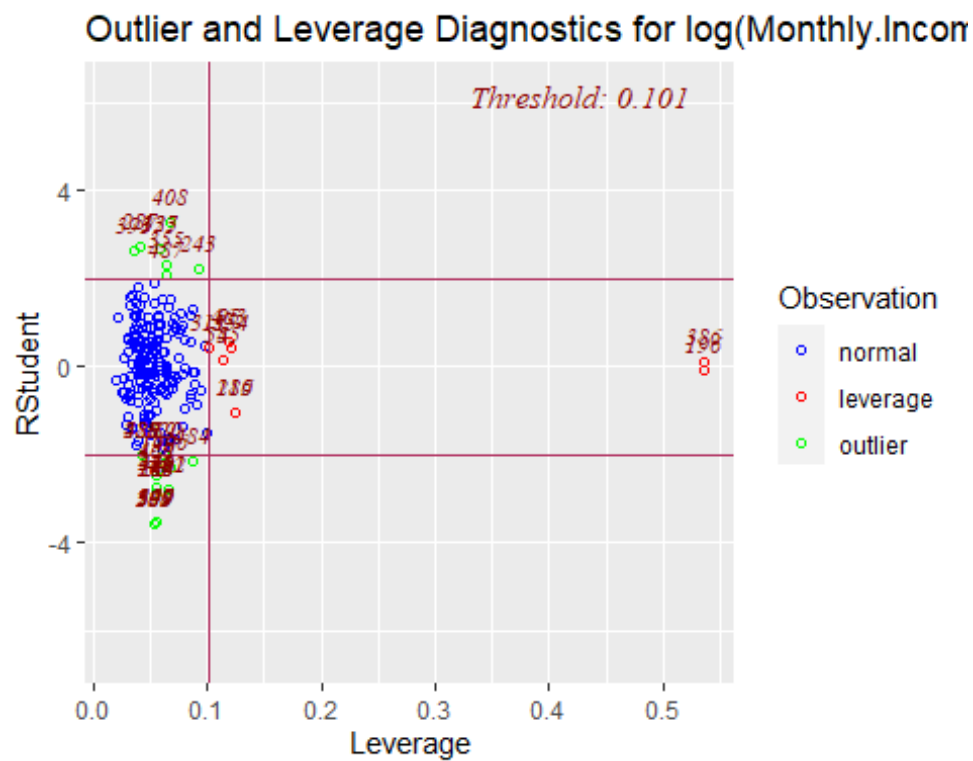
vif(Model_Simp2)

##              GVIF Df GVIF^(1/(2*Df))
## Age          2.489974 1         1.577965
## Attrition    1.602016 1         1.265708
## BusinessTravel 1.609693 2         1.126382
## Distance.From.Home 1.266748 1         1.125499
## Education    1.358421 1         1.165513
## EducationField 1.932110 5         1.068079
## Environment.Satisfaction 1.269431 1         1.126691
## Gender       1.260084 1         1.122535
## Job.Involvement 1.269655 1         1.126790
## Job.Level     3.560963 1         1.887051
## Job.Satisfaction 1.245031 1         1.115809
## Marital.Status 1.784034 2         1.155715
## Num.Companies.Worked 1.533035 1         1.238158
## OverTime     1.351601 1         1.162584
## Performance.Rating 1.190700 1         1.091192
## Relationship.Satisfaction 1.248752 1         1.117476
## Total.Working.Years 5.938813 1         2.436968
## Work.Life.Balance 1.219439 1         1.104282
## Years.In.Current.Role 2.982461 1         1.726980
## Years.Since.Last.Promotion 1.866197 1         1.366088
## Years.With.Curr.Manager 3.093828 1         1.758928

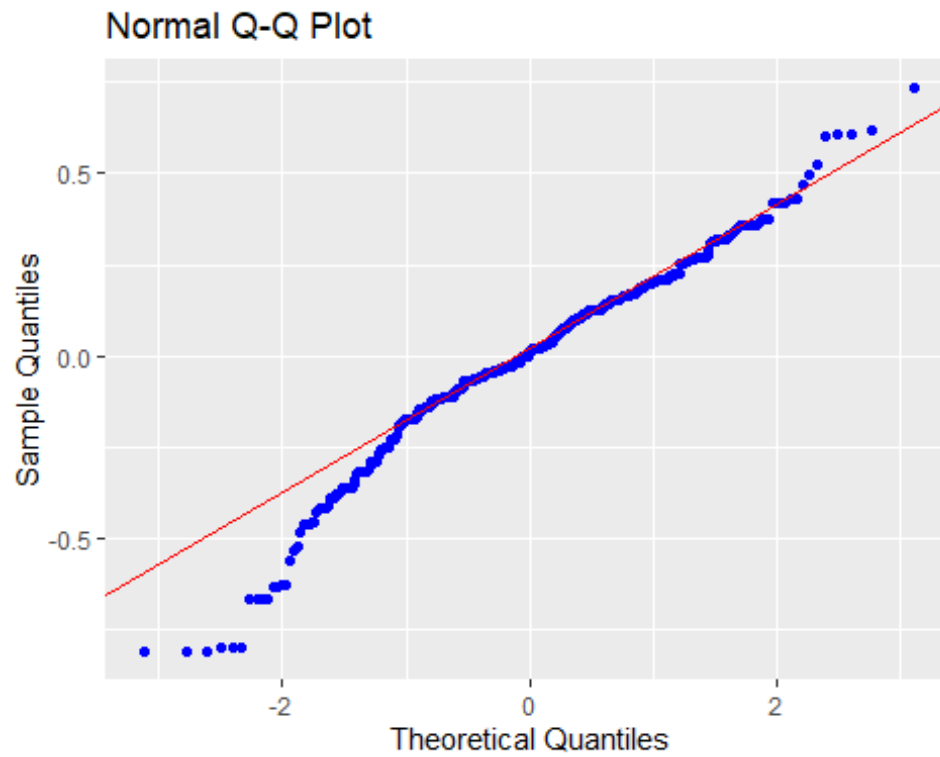
par(mfrow=c(1,5))
ols_plot_resid_fit(Model_Simp2)
```



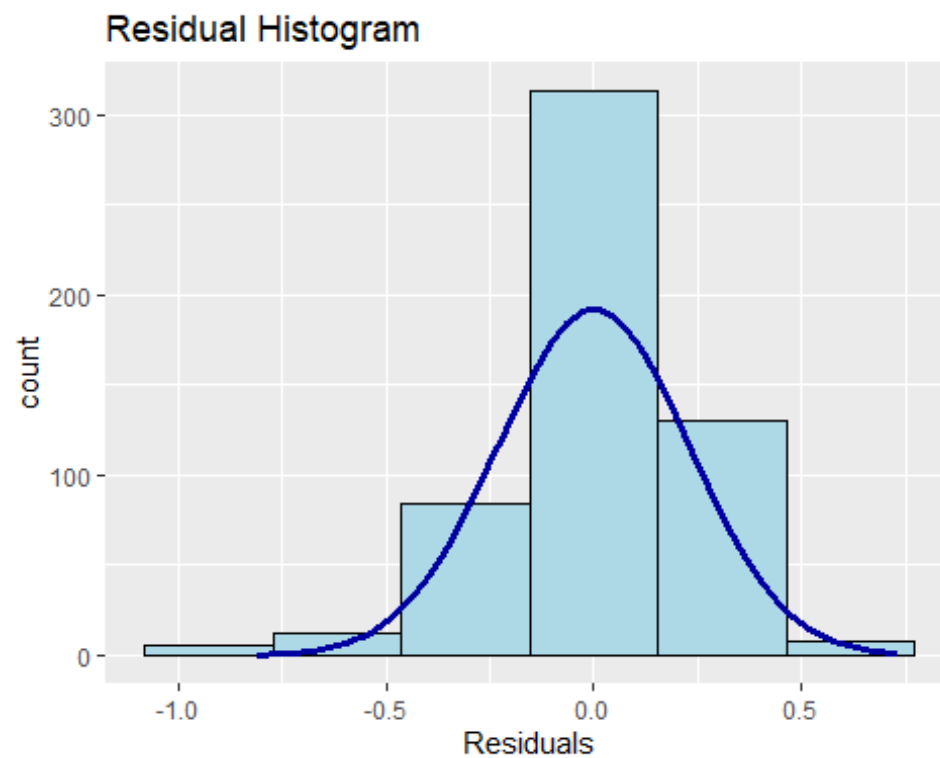
```
ols_plot_resid_lev(Model_Simp2)
```



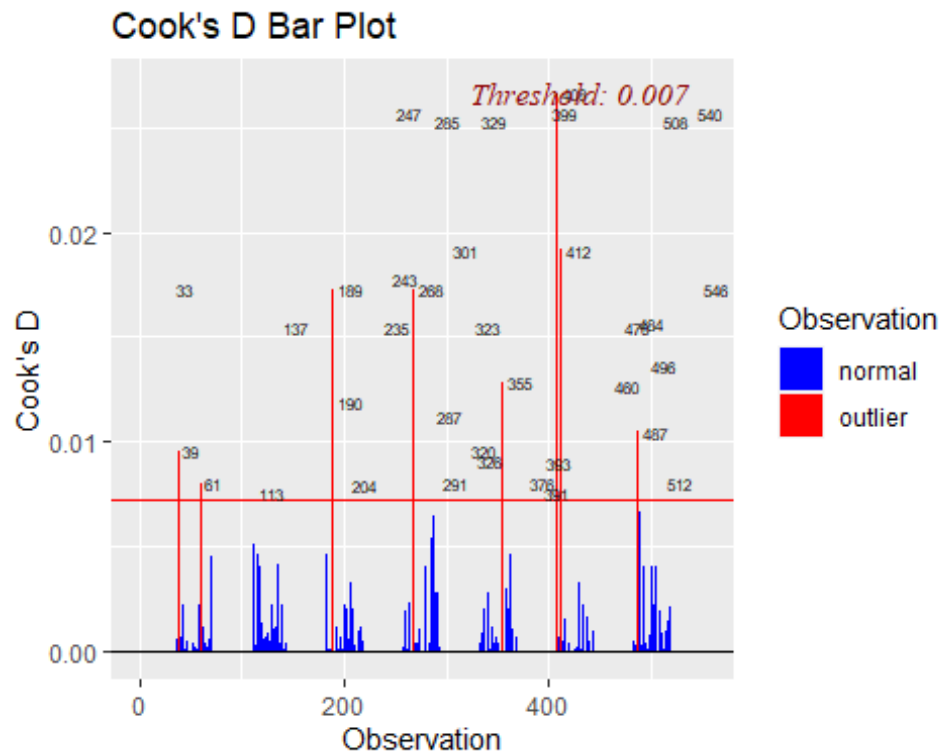
```
ols_plot_resid_qq(Model_Simp2)
```



```
ols_plot_resid_hist(Model_Simp2)
```



```
ols_plot_cooks_d_bar(Model_Simp2)
```



*#Assumptions are met:*

*#The histogram shows a bell shape curve which suggests that there is enough evidence for normality.*

*#The QQ Plot shows a straight line which suggests that there is enough evidence for constant variance.*

*#The observations are considered to be independent as they are randomly assigned.*

*#Business Travel Rarely, Daily Rates, Job Level, Laboratory Technician, Research Director, Research Scientist, Sales Representative, Number of companies worked, overtime, Total Working Years, Years In Current Role are statistically significant.*

*#The outlier at below 0.02 so we are good.*

*#Prediction*

```
Pred_Simp2=predict(Model_Simp2, newdata = EmplTestSimp2, interval = "confidence")
```

```
as.data.frame(Pred_Simp2)
```

##	fit	lwr	upr
## 6	8.975101	8.865210	9.084992
## 27	8.601808	8.513702	8.689914
## 32	8.070600	7.954410	8.186790
## 35	8.571372	8.459548	8.683196
## 40	8.054322	7.959088	8.149557
## 45	7.948960	7.846100	8.051821
## 48	9.121792	9.023053	9.220532
## 49	7.818928	7.702686	7.935169

## 53	8.083709	7.961527	8.205892
## 55	8.574763	8.469163	8.680364
## 57	7.846122	7.731958	7.960287
## 58	8.084668	7.976183	8.193154
## 65	7.745009	7.623783	7.866235
## 82	8.571588	8.484028	8.659148
## 83	8.518708	8.413561	8.623856
## 86	9.745596	9.643952	9.847240
## 94	8.582088	8.501761	8.662414
## 95	10.260054	10.172375	10.347732
## 97	9.813464	9.696218	9.930711
## 103	8.563265	8.433628	8.692902
## 107	8.400626	8.262775	8.538478
## 109	8.408238	8.254957	8.561519
## 114	8.397024	8.255952	8.538097
## 118	8.445018	8.327875	8.562162
## 124	8.673104	8.539661	8.806547
## 125	8.624358	8.527548	8.721168
## 127	7.624136	7.476987	7.771285
## 137	7.770368	7.666538	7.874199
## 160	9.048834	8.929030	9.168637
## 162	8.726910	8.563091	8.890728
## 166	7.742152	7.638739	7.845566
## 176	7.729604	7.606092	7.853115
## 181	9.057574	8.960247	9.154901
## 182	8.505969	8.413289	8.598649
## 187	8.488691	8.387315	8.590067
## 191	8.439355	8.327011	8.551700
## 192	9.065170	8.956748	9.173592
## 202	8.591789	8.505709	8.677869
## 204	7.771226	7.649026	7.893426
## 216	8.001888	7.914831	8.088945
## 217	8.500344	8.409420	8.591268
## 224	7.916836	7.807589	8.026083
## 225	7.967839	7.880437	8.055241
## 228	7.945595	7.831728	8.059461
## 245	8.572111	8.467043	8.677179
## 253	8.075115	7.982462	8.167768
## 254	7.679550	7.325074	8.034025
## 261	7.802792	7.680173	7.925411
## 272	8.448936	8.351607	8.546265
## 273	8.393434	8.252649	8.534219
## 278	8.137875	8.034268	8.241481
## 279	8.409670	8.310275	8.509065
## 280	8.789176	8.671516	8.906836
## 283	8.508592	8.430949	8.586235
## 284	8.511234	8.418847	8.603621
## 289	8.965937	8.854328	9.077547
## 295	9.694976	9.572906	9.817045
## 297	8.543797	8.449275	8.638319

## 308	7.958894	7.855272	8.062515
## 311	8.656653	8.574666	8.738639
## 312	9.613154	9.502851	9.723458
## 318	8.553660	8.473444	8.633876
## 324	8.631268	8.491162	8.771373
## 328	8.538650	8.448343	8.628957
## 333	7.871758	7.758552	7.984964
## 338	8.592538	8.508499	8.676577
## 340	7.861301	7.760070	7.962531
## 368	8.618637	8.503723	8.733552
## 369	7.855107	7.741983	7.968230
## 377	7.880451	7.724429	8.036472
## 379	7.892011	7.768016	8.016006
## 387	9.190623	9.068315	9.312931
## 388	8.318161	8.203660	8.432663
## 389	8.590689	8.508021	8.673357
## 400	9.176915	9.081383	9.272446
## 406	9.553229	9.442131	9.664327
## 407	8.509191	8.395741	8.622640
## 417	7.945894	7.837693	8.054094
## 424	7.868610	7.742337	7.994883
## 425	8.450055	8.357003	8.543108
## 436	8.608371	8.520373	8.696369
## 438	8.012049	7.911177	8.112921
## 448	8.652058	8.561025	8.743092
## 451	8.588663	8.460388	8.716938
## 452	8.075365	7.985181	8.165549
## 453	8.415636	8.305804	8.525469
## 454	8.632873	8.531819	8.733926
## 456	10.270962	10.146829	10.395094
## 459	8.192550	8.035564	8.349536
## 461	8.032407	7.914433	8.150382
## 465	7.722197	7.598565	7.845829
## 466	8.110920	8.025677	8.196163
## 467	8.114496	8.004067	8.224925
## 473	9.133220	9.003943	9.262496
## 474	8.140996	8.019488	8.262504
## 479	8.080829	7.942599	8.219059
## 480	9.238082	9.112735	9.363428
## 482	8.076939	7.998075	8.155802
## 488	7.851679	7.721085	7.982272
## 492	9.606891	9.522593	9.691190
## 494	9.073784	8.963780	9.183788
## 496	9.608595	9.461064	9.756126
## 511	8.600164	8.510935	8.689393
## 516	8.479618	8.371032	8.588204
## 521	7.935691	7.843414	8.027969
## 527	8.578034	8.475907	8.680161
## 530	8.057097	7.926765	8.187429
## 532	8.607488	8.523756	8.691219

## 540	8.709350	8.585100	8.833599
## 547	9.147977	9.006359	9.289595
## 550	8.158753	8.042201	8.275305
## 565	7.942215	7.833676	8.050754
## 566	8.201502	8.098204	8.304801
## 567	8.348178	8.239756	8.456601
## 573	8.544375	8.452576	8.636174
## 584	8.620812	8.480008	8.761616
## 596	8.672601	8.544535	8.800666
## 601	7.821735	7.712671	7.930800
## 603	9.127575	9.016110	9.239040
## 604	8.024646	7.928281	8.121010
## 608	8.427100	8.271335	8.582865
## 618	8.614317	8.472927	8.755708
## 626	7.974774	7.891516	8.058033
## 627	8.469408	8.367723	8.571093
## 628	9.085974	8.980174	9.191774
## 636	7.986110	7.855006	8.117214
## 639	8.049171	7.952925	8.145417
## 653	9.086308	8.966540	9.206075
## 654	9.090329	8.931511	9.249147
## 665	8.530931	8.381731	8.680131
## 667	9.131725	9.001604	9.261845
## 674	7.627969	7.476224	7.779715
## 680	8.069320	7.962269	8.176372
## 681	8.500774	8.391350	8.610198
## 688	7.956605	7.834773	8.078436
## 695	8.467567	8.359968	8.575166
## 696	8.132989	8.026417	8.239561
## 697	9.716350	9.579551	9.853148
## 698	8.655274	8.547961	8.762587
## 700	10.214829	10.119880	10.309779
## 703	8.881550	8.715103	9.047997
## 712	9.604430	9.456321	9.752540
## 719	8.471416	8.289881	8.652951
## 727	7.996106	7.894170	8.098041
## 731	8.552881	8.431301	8.674462
## 732	8.407139	8.292417	8.521860
## 738	8.641476	8.526892	8.756060
## 740	8.479132	8.346192	8.612073
## 752	7.863998	7.737421	7.990575
## 755	9.172317	9.040219	9.304416
## 756	7.946096	7.822421	8.069771
## 768	8.762355	8.600339	8.924370
## 769	8.477384	8.367818	8.586949
## 772	9.130483	8.956063	9.304904
## 774	7.885206	7.777640	7.992772
## 776	8.028668	7.934791	8.122545
## 778	7.823501	7.711750	7.935251
## 788	8.475665	8.338375	8.612955



```
## 799 7.725072 7.572862 7.877282
## 803 9.600924 9.467474 9.734375
## 804 8.940509 8.786118 9.094900
## 809 7.901743 7.789068 8.014417
## 814 10.157954 10.051768 10.264139
## 816 8.108656 8.015460 8.201852
## 818 9.161550 9.074395 9.248705
## 821 8.018316 7.900687 8.135946
## 825 8.582431 8.494573 8.670289
## 831 8.587175 8.473401 8.700949
## 834 7.957673 7.856213 8.059133
## 845 8.482837 8.375693 8.589981
## 852 7.883562 7.775994 7.991130
## 854 8.545626 8.444226 8.647026
## 864 9.372485 9.189850 9.555119
```

```
MSPE = data.frame(Observed = log(Emp1TestSimp1$Monthly.Income), Predicted = P
red_Simp1)
```

```
MSPE$Residual = MSPE$Observed - MSPE$Predicted.fit
```

```
MSPE$SquaredResidual = MSPE$Residual^2
```

```
MSPE
```

##	Observed	Predicted.fit	Predicted.lwr	Predicted.upr	Residual
## 6	9.081711	9.025450	8.924517	9.126383	0.056261025
## 27	9.202711	8.522011	8.456510	8.587512	0.680700351
## 32	7.614805	8.060779	7.961150	8.160407	-0.445973336
## 35	9.177714	8.501898	8.409211	8.594585	0.675815812
## 40	7.934155	7.941871	7.856504	8.027238	-0.007715711
## 45	7.109062	7.873044	7.790253	7.955835	-0.763981840
## 48	9.075665	9.167598	9.079307	9.255890	-0.091932943
## 49	7.537963	7.832858	7.732652	7.933063	-0.294894982
## 53	7.606387	8.041673	7.944575	8.138770	-0.435285242
## 55	8.394800	8.506589	8.422669	8.590508	-0.111789297
## 57	7.922624	7.915701	7.813367	8.018034	0.006922958
## 58	8.460199	8.026580	7.932427	8.120733	0.433619287
## 65	7.700748	7.807507	7.707040	7.907973	-0.106758706
## 82	8.836810	8.539146	8.455867	8.622425	0.297663858
## 83	8.579417	8.507668	8.417622	8.597714	0.071748710
## 86	9.527047	9.650587	9.553005	9.748168	-0.123539570
## 94	8.722906	8.569802	8.495668	8.643937	0.153103338
## 95	9.899781	10.139399	10.054397	10.224400	-0.239618052
## 97	9.717519	9.708235	9.603900	9.812571	0.009284085
## 103	8.785387	8.590412	8.483023	8.697801	0.194974651
## 107	8.370779	8.440080	8.331371	8.548790	-0.069301269
## 109	9.096724	8.418193	8.303627	8.532759	0.678530264
## 114	8.535622	8.383650	8.273599	8.493702	0.151971844
## 118	8.300280	8.604469	8.505382	8.703556	-0.304188657
## 124	8.301025	8.546485	8.444191	8.648779	-0.245459739
## 125	8.423761	8.553622	8.466603	8.640641	-0.129860584
## 127	8.273592	7.841606	7.723311	7.959901	0.431985741

## 137	7.748891	7.836953	7.748025	7.925881	-0.088061834
## 160	9.487290	9.060157	8.952264	9.168051	0.427132973
## 162	9.073604	8.867613	8.742491	8.992736	0.205990383
## 166	7.622664	7.754726	7.665663	7.843789	-0.132061936
## 176	7.635304	7.871503	7.768497	7.974509	-0.236199182
## 181	9.237372	9.061688	8.986005	9.137372	0.175683419
## 182	8.838262	8.577622	8.500953	8.654290	0.260640090
## 187	8.557567	8.499387	8.405710	8.593065	0.058179887
## 191	8.661294	8.505589	8.417018	8.594161	0.155704085
## 192	9.173365	9.060314	8.959050	9.161577	0.113051581
## 202	8.735525	8.548279	8.478125	8.618433	0.187245860
## 204	7.703459	7.987434	7.881469	8.093400	-0.283975219
## 216	7.760041	7.932376	7.860616	8.004137	-0.172335426
## 217	9.192584	8.457854	8.382959	8.532749	0.734729497
## 224	7.354362	7.945731	7.856468	8.034993	-0.591368663
## 225	8.470311	7.965477	7.885747	8.045207	0.504834010
## 228	7.752765	8.001198	7.912698	8.089698	-0.248433312
## 245	8.528331	8.569642	8.485777	8.653507	-0.041310890
## 253	7.729296	7.914390	7.831092	7.997688	-0.185094049
## 254	7.991592	7.683347	7.507656	7.859038	0.308244983
## 261	7.932003	7.813281	7.714131	7.912430	0.118722578
## 272	8.600247	8.531096	8.457949	8.604244	0.069150305
## 273	8.171882	8.522000	8.429477	8.614522	-0.350117562
## 278	7.805882	7.988960	7.901256	8.076665	-0.183078415
## 279	8.655911	8.417910	8.329147	8.506673	0.238001345
## 280	8.302762	8.544594	8.447767	8.641421	-0.241832376
## 283	8.781555	8.527383	8.455161	8.599605	0.254172651
## 284	8.928905	8.586510	8.497533	8.675488	0.342395069
## 289	9.183791	9.027481	8.931668	9.123294	0.156310218
## 295	9.707290	9.613188	9.518160	9.708216	0.094102284
## 297	9.163982	8.517112	8.427815	8.606409	0.646870093
## 308	7.999343	7.852685	7.765704	7.939667	0.146657492
## 311	8.609590	8.621932	8.539725	8.704138	-0.012341473
## 312	9.490771	9.703162	9.612548	9.793776	-0.212390637
## 318	8.437500	8.483408	8.412065	8.554750	-0.045907118
## 324	8.437067	8.739807	8.620805	8.858809	-0.302740037
## 328	8.596004	8.599956	8.517767	8.682145	-0.003951571
## 333	7.758761	7.872623	7.773743	7.971504	-0.113862786
## 338	8.956222	8.480170	8.395784	8.564556	0.476051823
## 340	7.758333	7.872662	7.787154	7.958169	-0.114328119
## 368	8.607582	8.482055	8.389638	8.574471	0.125527621
## 369	7.636752	7.875766	7.785404	7.966129	-0.239014231
## 377	7.916807	7.939932	7.807924	8.071940	-0.023124419
## 379	7.681560	8.028150	7.932718	8.123582	-0.346589438
## 387	9.081256	9.099824	8.997105	9.202543	-0.018567593
## 388	8.357494	8.455379	8.360942	8.549816	-0.097885256
## 389	8.412277	8.549348	8.477070	8.621627	-0.137071391
## 400	9.231025	9.108337	9.013542	9.203131	0.122688184
## 406	9.718783	9.677845	9.565249	9.790441	0.040937994
## 407	8.606668	8.629863	8.532013	8.727713	-0.023194917

## 417	7.849324	7.889318	7.794958	7.983677	-0.039993720
## 424	7.384610	7.784879	7.686340	7.883418	-0.400268463
## 425	8.460411	8.469226	8.392504	8.545947	-0.008814344
## 436	8.734560	8.619486	8.535491	8.703481	0.115074561
## 438	7.961021	7.926520	7.842620	8.010420	0.034501327
## 448	8.619389	8.536788	8.461937	8.611638	0.082600960
## 451	8.492491	8.584455	8.486535	8.682375	-0.091964611
## 452	8.137396	7.926434	7.848384	8.004484	0.210961570
## 453	8.667852	8.440289	8.345379	8.535199	0.227563087
## 454	8.610137	8.584263	8.499031	8.669496	0.025873629
## 456	9.895102	10.157750	10.052121	10.263378	-0.262647065
## 459	7.633370	7.998378	7.883813	8.112944	-0.365008825
## 461	7.646354	8.008621	7.902173	8.115069	-0.362267157
## 465	7.798523	7.878526	7.768784	7.988267	-0.080002666
## 466	8.279951	8.015307	7.944127	8.086486	0.264644027
## 467	7.880048	7.998512	7.909408	8.087616	-0.118463874
## 473	9.491375	9.106394	8.999313	9.213475	0.384981522
## 474	8.146709	8.032521	7.939996	8.125046	0.114187598
## 479	7.989560	8.152567	8.029410	8.275723	-0.163006054
## 480	9.528358	9.205554	9.113334	9.297774	0.322803878
## 482	7.764721	8.026417	7.953914	8.098919	-0.261696049
## 488	7.976252	7.979225	7.887188	8.071261	-0.002972881
## 492	9.733885	9.635078	9.544651	9.725505	0.098807081
## 494	9.060215	9.017323	8.922107	9.112539	0.042891530
## 496	9.699350	9.754149	9.632199	9.876100	-0.054799643
## 511	8.583543	8.599515	8.529373	8.669657	-0.015972081
## 516	8.609225	8.468102	8.377338	8.558867	0.141123132
## 521	7.845024	7.889700	7.811781	7.967618	-0.044675170
## 527	8.518392	8.623735	8.535815	8.711656	-0.105342927
## 530	8.509766	8.082063	7.973255	8.190871	0.427702347
## 532	8.826881	8.539027	8.462058	8.615997	0.287853912
## 540	8.547722	8.615864	8.520607	8.711121	-0.068141368
## 547	8.909641	9.228338	9.112624	9.344052	-0.318697730
## 550	7.685703	7.986864	7.895982	8.077745	-0.301160747
## 565	8.251403	7.913988	7.824385	8.003591	0.337415061
## 566	7.798113	8.075377	7.994139	8.156614	-0.277263905
## 567	7.685244	8.408033	8.312108	8.503957	-0.722788951
## 573	8.829665	8.551092	8.465058	8.637126	0.278573625
## 584	8.471987	8.659185	8.550206	8.768164	-0.187198361
## 596	8.303257	8.615915	8.515371	8.716459	-0.312657975
## 601	7.617268	7.817063	7.732955	7.901171	-0.199795092
## 603	9.342771	9.147286	9.060086	9.234486	0.195484981
## 604	8.049108	8.046285	7.962030	8.130540	0.002822957
## 608	8.631414	8.568387	8.450506	8.686267	0.063027740
## 618	8.604105	8.678064	8.568744	8.787383	-0.073959007
## 626	7.830823	8.002075	7.934498	8.069652	-0.171251851
## 627	8.333751	8.505100	8.426290	8.583909	-0.171348680
## 628	9.350972	9.160152	9.075174	9.245131	0.190819241
## 636	7.773174	7.937146	7.827805	8.046486	-0.163971867
## 639	7.910224	8.047865	7.965156	8.130573	-0.137640863

```

## 653 9.510371      9.175721      9.072678      9.278763  0.334650126
## 654 9.433804      9.086471      8.973651      9.199292  0.347332467
## 665 8.426831      8.480284      8.367659      8.592910 -0.053453530
## 667 8.976894      9.041890      8.932377      9.151404 -0.064996220
## 674 7.611842      7.879416      7.758938      7.999894 -0.267573738
## 680 7.753194      8.010605      7.924555      8.096656 -0.257411100
## 681 8.356085      8.513637      8.414499      8.612775 -0.157552188
## 688 7.871693      7.958488      7.870534      8.046442 -0.086795183
## 695 9.161675      8.444008      8.345690      8.542327  0.717666719
## 696 8.099858      8.001608      7.904893      8.098322  0.098250268
## 697 9.629182      9.528817      9.421995      9.635639  0.100365178
## 698 8.685078      8.601903      8.508951      8.694855  0.083174487
## 700 9.856448      10.147588     10.059067     10.236109 -0.291139698
## 703 9.247347      9.125460      9.000977      9.249944  0.121886754
## 712 9.555206      9.644789      9.520602      9.768976 -0.089583239
## 719 8.429673      8.509150      8.381638      8.636661 -0.079477060
## 727 7.997327      7.984295      7.897238      8.071353  0.013031407
## 731 8.469053      8.541826      8.445857      8.637794 -0.072772690
## 732 8.563695      8.428258      8.334980      8.521535  0.135437433
## 738 8.550821      8.525072      8.432560      8.617583  0.025749462
## 740 8.210940      8.558433      8.449795      8.667072 -0.347493523
## 752 7.741534      7.822286      7.725085      7.919487 -0.080752708
## 755 9.514068      9.200611      9.086622      9.314600  0.313456814
## 756 8.218248      7.891714      7.789191      7.994237  0.326534063
## 768 9.299450      8.961182      8.834388      9.087976  0.338267540
## 769 8.906393      8.471715      8.379107      8.564322  0.434678899
## 772 9.254644      9.187220      9.056566      9.317873  0.067424458
## 774 8.127995      7.830451      7.740741      7.920160  0.297544520
## 776 8.161946      7.936838      7.857246      8.016429  0.225108051
## 778 7.946971      7.850837      7.760245      7.941429  0.096134720
## 788 8.505323      8.417003      8.307055      8.526950  0.088320173
## 799 7.527794      7.770599      7.656813      7.884385 -0.242804739
## 803 9.744961      9.652581      9.557414      9.747748  0.092379767
## 804 9.167642      8.935463      8.820556      9.050370  0.232178873
## 809 7.959276      7.981821      7.889743      8.073899 -0.022544761
## 814 9.886240      10.083076     9.984338     10.181814 -0.196836081
## 816 7.930566      8.062898      7.980901      8.144896 -0.132332455
## 818 9.366575      9.038456      8.965658      9.111254  0.328118396
## 821 8.105308      8.030967      7.927840      8.134093  0.074341010
## 825 8.447414      8.648941      8.567030      8.730851 -0.201526212
## 831 8.197814      8.533676      8.431036      8.636317 -0.335862204
## 834 7.844633      7.880418      7.798182      7.962655 -0.035785813
## 845 8.704336      8.495211      8.402834      8.587588  0.209125743
## 852 7.698936      7.894588      7.800367      7.988809 -0.195651977
## 854 8.641356      8.475860      8.393428      8.558291  0.165496207
## 864 9.530248      9.681386      9.542520      9.820253 -0.151138860
##      SquaredResidual
## 6      3.165303e-03
## 27     4.633530e-01
## 32     1.988922e-01

```

```
## 35      4.567270e-01
## 40      5.953220e-05
## 45      5.836683e-01
## 48      8.451666e-03
## 49      8.696305e-02
## 53      1.894732e-01
## 55      1.249685e-02
## 57      4.792735e-05
## 58      1.880257e-01
## 65      1.139742e-02
## 82      8.860377e-02
## 83      5.147877e-03
## 86      1.526203e-02
## 94      2.344063e-02
## 95      5.741681e-02
## 97      8.619424e-05
## 103     3.801511e-02
## 107     4.802666e-03
## 109     4.604033e-01
## 114     2.309544e-02
## 118     9.253074e-02
## 124     6.025048e-02
## 125     1.686377e-02
## 127     1.866117e-01
## 137     7.754887e-03
## 160     1.824426e-01
## 162     4.243204e-02
## 166     1.744035e-02
## 176     5.579005e-02
## 181     3.086466e-02
## 182     6.793326e-02
## 187     3.384899e-03
## 191     2.424376e-02
## 192     1.278066e-02
## 202     3.506101e-02
## 204     8.064193e-02
## 216     2.969950e-02
## 217     5.398274e-01
## 224     3.497169e-01
## 225     2.548574e-01
## 228     6.171911e-02
## 245     1.706590e-03
## 253     3.425981e-02
## 254     9.501497e-02
## 261     1.409505e-02
## 272     4.781765e-03
## 273     1.225823e-01
## 278     3.351771e-02
## 279     5.664464e-02
## 280     5.848290e-02
```

```
## 283    6.460374e-02
## 284    1.172344e-01
## 289    2.443288e-02
## 295    8.855240e-03
## 297    4.184409e-01
## 308    2.150842e-02
## 311    1.523120e-04
## 312    4.510978e-02
## 318    2.107463e-03
## 324    9.165153e-02
## 328    1.561491e-05
## 333    1.296473e-02
## 338    2.266253e-01
## 340    1.307092e-02
## 368    1.575718e-02
## 369    5.712780e-02
## 377    5.347387e-04
## 379    1.201242e-01
## 387    3.447555e-04
## 388    9.581523e-03
## 389    1.878857e-02
## 400    1.505239e-02
## 406    1.675919e-03
## 407    5.380042e-04
## 417    1.599498e-03
## 424    1.602148e-01
## 425    7.769266e-05
## 436    1.324215e-02
## 438    1.190342e-03
## 448    6.822919e-03
## 451    8.457490e-03
## 452    4.450478e-02
## 453    5.178496e-02
## 454    6.694447e-04
## 456    6.898348e-02
## 459    1.332314e-01
## 461    1.312375e-01
## 465    6.400427e-03
## 466    7.003646e-02
## 467    1.403369e-02
## 473    1.482108e-01
## 474    1.303881e-02
## 479    2.657097e-02
## 480    1.042023e-01
## 482    6.848482e-02
## 488    8.838020e-06
## 492    9.762839e-03
## 494    1.839683e-03
## 496    3.003001e-03
## 511    2.551074e-04
```

```
## 516    1.991574e-02
## 521    1.995871e-03
## 527    1.109713e-02
## 530    1.829293e-01
## 532    8.285987e-02
## 540    4.643246e-03
## 547    1.015682e-01
## 550    9.069780e-02
## 565    1.138489e-01
## 566    7.687527e-02
## 567    5.224239e-01
## 573    7.760326e-02
## 584    3.504323e-02
## 596    9.775501e-02
## 601    3.991808e-02
## 603    3.821438e-02
## 604    7.969085e-06
## 608    3.972496e-03
## 618    5.469935e-03
## 626    2.932720e-02
## 627    2.936037e-02
## 628    3.641198e-02
## 636    2.688677e-02
## 639    1.894501e-02
## 653    1.119907e-01
## 654    1.206398e-01
## 665    2.857280e-03
## 667    4.224509e-03
## 674    7.159571e-02
## 680    6.626047e-02
## 681    2.482269e-02
## 688    7.533404e-03
## 695    5.150455e-01
## 696    9.653115e-03
## 697    1.007317e-02
## 698    6.917995e-03
## 700    8.476232e-02
## 703    1.485638e-02
## 712    8.025157e-03
## 719    6.316603e-03
## 727    1.698176e-04
## 731    5.295864e-03
## 732    1.834330e-02
## 738    6.630348e-04
## 740    1.207517e-01
## 752    6.521000e-03
## 755    9.825517e-02
## 756    1.066245e-01
## 768    1.144249e-01
## 769    1.889457e-01
```



```
## 772      4.546057e-03
## 774      8.853274e-02
## 776      5.067363e-02
## 778      9.241884e-03
## 788      7.800453e-03
## 799      5.895414e-02
## 803      8.534021e-03
## 804      5.390703e-02
## 809      5.082662e-04
## 814      3.874444e-02
## 816      1.751188e-02
## 818      1.076617e-01
## 821      5.526586e-03
## 825      4.061281e-02
## 831      1.128034e-01
## 834      1.280624e-03
## 845      4.373358e-02
## 852      3.827970e-02
## 854      2.738899e-02
## 864      2.284296e-02

mean(MSPE$SquaredResidual)

## [1] 0.06924576

reg.smp2=regsubsets(log(Monthly.Income)~Age+Attrition+BusinessTravel+Distance
.From.Home+Education+EducationField+Environment.Satisfaction+Gender+Job.Invol
vement+Job.Level+Job.Satisfaction+Marital.Status+Num.Companies.Worked+OverTim
e+Performance.Rating+Relationship.Satisfaction+(Total.Working.Years)+Work.Lif
e.Balance+Years.In.Current.Role+(Years.In.Current.Role)^2+Years.Since.Last.Pr
omotion+Years.With.Curr.Manager+Age*Total.Working.Years,data=EmplTrainSimp2,m
ethod="forward",nvmax=27)

k<-ols_step_forward_aic(Model_Simp2, details = TRUE)

## Forward Selection Method
## -----
##
## Candidate Terms:
##
## 1 . Age
## 2 . Attrition
## 3 . BusinessTravel
## 4 . Distance.From.Home
## 5 . Education
## 6 . EducationField
## 7 . Environment.Satisfaction
## 8 . Gender
## 9 . Job.Involvement
## 10 . Job.Level
## 11 . Job.Satisfaction
```



```
## 12 . Marital.Status
## 13 . Num.Companies.Worked
## 14 . OverTime
## 15 . Performance.Rating
## 16 . Relationship.Satisfaction
## 17 . Total.Working.Years
## 18 . Work.Life.Balance
## 19 . Years.In.Current.Role
## 20 . Years.Since.Last.Promotion
## 21 . Years.With.Curr.Manager
##
## Step 0: AIC = 1393.29
## log(Monthly.Income) ~ 1
##
## -----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
## Adj. R-Sq
## -----
## Job.Level                1      75.972      258.352      44.653      0.85
3      0.852
## Total.Working.Years      1      822.312      171.092      131.913      0.56
5      0.564
## Age                      1     1214.403       69.964      233.041      0.23
1      0.230
## Years.In.Current.Role    1     1271.951       49.664      253.342      0.16
4      0.163
## Years.With.Curr.Manager  1     1297.264       40.183      262.822      0.13
3      0.131
## Years.Since.Last.Promotion 1     1323.485       29.988      273.017      0.09
9      0.098
## Attrition                1     1357.267       16.268      286.737      0.05
4      0.052
## Num.Companies.Worked     1     1371.338       10.353      292.653      0.03
4      0.033
## Education                1     1380.446        6.458      296.547      0.02
1      0.020
## Marital.Status           1     1385.871        4.980      298.025      0.01
6      0.014
## EducationField           1     1392.075        4.892      298.113      0.01
6      0.009
## BusinessTravel           1     1394.576        1.191      301.814      0.00
4      0.001
## Performance.Rating       1     1393.953        0.587      302.418      0.00
2      0.000
## Distance.From.Home       1     1394.448        0.370      302.635      0.00
1      0.000
## Gender                   1     1394.496        0.349      302.656      0.00
1      0.000
```

```

## Relationship.Satisfaction      1      1394.523      0.337      302.668      0.00
1          0.000
## Work.Life.Balance             1      1394.647      0.283      302.723      0.00
1          -0.001
## Job.Satisfaction              1      1394.809      0.211      302.794      0.00
1          -0.001
## Environment.Satisfaction      1      1395.099      0.084      302.921      0.00
0          -0.001
## Job.Involvement              1      1395.264      0.011      302.994      0.00
0          -0.001
## OverTime                     1      1395.271      0.008      302.997      0.00
0          -0.001
## -----
##
##
## - Job.Level
##
##
## Step 1 : AIC = 75.97176
## log(Monthly.Income) ~ Job.Level
##
## -----
## -----
## Variable                      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## -----
## Attrition                    1      63.193      0.948      43.705      0.856
0.855
## Years.In.Current.Role        1      65.003      0.833      43.820      0.855
0.855
## Years.With.Curr.Manager      1      68.934      0.582      44.071      0.855
0.854
## EducationField               1      76.977      0.579      44.074      0.855
0.853
## Total.Working.Years          1      71.568      0.413      44.240      0.854
0.854
## BusinessTravel               1      73.586      0.412      44.241      0.854
0.853
## Age                          1      71.740      0.402      44.251      0.854
0.854
## Num.Companies.Worked         1      72.437      0.357      44.296      0.854
0.853
## Marital.Status               1      76.001      0.257      44.396      0.853
0.853
## Job.Involvement              1      74.203      0.244      44.409      0.853
0.853
## Environment.Satisfaction     1      75.281      0.174      44.479      0.853
0.853

```

```
## Relationship.Satisfaction      1      75.559      0.156      44.497      0.853
0.853
## Education                     1      76.562      0.091      44.562      0.853
0.853
## OverTime                     1      76.759      0.079      44.574      0.853
0.852
## Years.Since.Last.Promotion    1      77.138      0.054      44.599      0.853
0.852
## Job.Satisfaction              1      77.331      0.042      44.611      0.853
0.852
## Gender                       1      77.671      0.020      44.633      0.853
0.852
## Work.Life.Balance            1      77.813      0.010      44.643      0.853
0.852
## Distance.From.Home           1      77.831      0.009      44.644      0.853
0.852
## Performance.Rating           1      77.899      0.005      44.648      0.853
0.852
```

```
## -----
##
## - Attrition
##
##
## Step 2 : AIC = 63.19317
## log(Monthly.Income) ~ Job.Level + Attrition
##
## -----
```

```
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## Years.In.Current.Role      1      54.224      0.690      43.015      0.858
0.857
## EducationField             1      64.934      0.521      43.185      0.857
0.856
## Num.Companies.Worked       1      57.956      0.457      43.249      0.857
0.857
## Years.With.Curr.Manager    1      58.267      0.437      43.268      0.857
0.857
## BusinessTravel             1      60.717      0.409      43.296      0.857
0.856
## OverTime                   1      59.814      0.340      43.365      0.857
0.856
## Total.Working.Years        1      60.340      0.307      43.399      0.857
0.856
## Age                        1      60.372      0.305      43.401      0.857
0.856
## Environment.Satisfaction    1      61.068      0.261      43.444      0.857
```

```

0.856
## Relationship.Satisfaction      1      62.195      0.190      43.516      0.856
0.856
## Marital.Status                1      65.341      0.117      43.588      0.856
0.855
## Job.Involvement               1      63.544      0.105      43.601      0.856
0.855
## Education                     1      63.928      0.080      43.625      0.856
0.855
## Years.Since.Last.Promotion    1      64.198      0.063      43.642      0.856
0.855
## Work.Life.Balance             1      64.714      0.030      43.675      0.856
0.855
## Gender                        1      64.939      0.016      43.689      0.856
0.855
## Job.Satisfaction              1      65.074      0.008      43.698      0.856
0.855
## Performance.Rating           1      65.146      0.003      43.702      0.856
0.855
## Distance.From.Home           1      65.179      0.001      43.704      0.856
0.855
## -----
-----
##
## - Years.In.Current.Role
##
##
## Step 3 : AIC = 54.22357
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role
##
## -----
-----
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
-----
## Num.Companies.Worked      1      45.248      0.680      42.335      0.860
0.859
## EducationField            1      55.669      0.531      42.484      0.860
0.858
## BusinessTravel            1      52.030      0.385      42.630      0.859
0.858
## OverTime                  1      50.733      0.341      42.674      0.859
0.858
## Environment.Satisfaction   1      51.338      0.304      42.711      0.859
0.858
## Age                       1      51.705      0.281      42.734      0.859
0.858
## Relationship.Satisfaction   1      53.425      0.174      42.841      0.859
0.858

```

```

## Total.Working.Years      1    54.519    0.106    42.909    0.858
0.858
## Job.Involvement         1    54.576    0.103    42.912    0.858
0.858
## Marital.Status          1    56.767    0.091    42.924    0.858
0.857
## Education               1    55.036    0.074    42.941    0.858
0.857
## Work.Life.Balance       1    55.556    0.042    42.973    0.858
0.857
## Years.Since.Last.Promotion 1    55.600    0.039    42.976    0.858
0.857
## Years.With.Curr.Manager  1    55.920    0.019    42.996    0.858
0.857
## Job.Satisfaction        1    56.124    0.006    43.009    0.858
0.857
## Gender                  1    56.143    0.005    43.010    0.858
0.857
## Performance.Rating      1    56.169    0.003    43.012    0.858
0.857
## Distance.From.Home      1    56.222    0.000    43.015    0.858
0.857
## -----
##
##
## - Num.Companies.Worked
##
##
## Step 4 : AIC = 45.24834
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked
##
## -----
##
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1      46.626      0.526      41.809      0.862
0.860
## BusinessTravel      1      42.733      0.398      41.937      0.862
0.860
## OverTime            1      41.492      0.352      41.983      0.861
0.860
## Environment.Satisfaction 1      41.633      0.344      41.992      0.861
0.860
## Relationship.Satisfaction 1      44.296      0.181      42.154      0.861
0.860
## Age                 1      45.532      0.105      42.230      0.861
0.860

```

```

## Job.Involvement          1    45.840    0.086    42.249    0.861
0.860
## Marital.Status           1    47.847    0.086    42.249    0.861
0.859
## Work.Life.Balance        1    46.298    0.058    42.277    0.860
0.859
## Years.With.Curr.Manager  1    46.339    0.056    42.279    0.860
0.859
## Education                1    46.941    0.019    42.316    0.860
0.859
## Years.Since.Last.Promotion 1    46.949    0.018    42.317    0.860
0.859
## Job.Satisfaction         1    46.996    0.016    42.320    0.860
0.859
## Total.Working.Years      1    47.140    0.007    42.329    0.860
0.859
## Gender                   1    47.202    0.003    42.332    0.860
0.859
## Performance.Rating       1    47.219    0.002    42.333    0.860
0.859
## Distance.From.Home       1    47.237    0.001    42.335    0.860
0.859
## -----
##
##
## - OverTime
##
##
## Step 5 : AIC = 41.49172
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime
##
## -----
## -----
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField    1     43.092     0.509     41.474     0.863
0.861
## Environment.Satisfaction 1     36.837     0.404     41.579     0.863
0.862
## BusinessTravel    1     39.384     0.371     41.612     0.863
0.861
## Relationship.Satisfaction 1     40.270     0.196     41.787     0.862
0.861
## Age               1     42.064     0.087     41.896     0.862
0.861
## Job.Involvement    1     42.151     0.082     41.901     0.862
0.860

```

```

## Marital.Status          1    44.250    0.076    41.907    0.862
0.860
## Work.Life.Balance       1    42.455    0.063    41.920    0.862
0.860
## Years.With.Curr.Manager 1    42.472    0.062    41.921    0.862
0.860
## Education              1    43.173    0.019    41.964    0.862
0.860
## Years.Since.Last.Promotion 1    43.254    0.015    41.969    0.861
0.860
## Job.Satisfaction        1    43.321    0.010    41.973    0.861
0.860
## Total.Working.Years     1    43.409    0.005    41.978    0.861
0.860
## Gender                 1    43.424    0.004    41.979    0.861
0.860
## Distance.From.Home     1    43.492    0.000    41.983    0.861
0.860
## Performance.Rating      1    43.487    0.000    41.983    0.861
0.860
## -----
##
## - Environment.Satisfaction
##
##
## Step 6 : AIC = 36.83674
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction
##
## -----
##
## Variable          DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField    1      38.282      0.513      41.066      0.864
0.862
## BusinessTravel    1      34.948      0.354      41.226      0.864
0.862
## Relationship.Satisfaction 1      35.463      0.203      41.376      0.863
0.862
## Age              1      37.500      0.081      41.499      0.863
0.862
## Marital.Status    1      39.589      0.075      41.504      0.863
0.861
## Job.Involvement   1      37.723      0.067      41.512      0.863
0.862
## Years.With.Curr.Manager 1      38.092      0.045      41.535      0.863
0.862

```

```

## Work.Life.Balance      1    38.238    0.036    41.543    0.863
0.861
## Education              1    38.610    0.014    41.566    0.863
0.861
## Years.Since.Last.Promotion 1    38.682    0.009    41.570    0.863
0.861
## Job.Satisfaction       1    38.751    0.005    41.574    0.863
0.861
## Gender                 1    38.802    0.002    41.577    0.863
0.861
## Total.Working.Years    1    38.804    0.002    41.577    0.863
0.861
## Distance.From.Home     1    38.821    0.001    41.579    0.863
0.861
## Performance.Rating     1    38.834    0.000    41.579    0.863
0.861
## -----
##
## - BusinessTravel
##
##
## Step 7 : AIC = 34.94774
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction + BusinessTravel
##
## -----
##
## Variable      DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField      1    36.895    0.479    40.747    0.866
0.863
## Relationship.Satisfaction 1    33.842    0.185    41.040    0.865
0.863
## Age                  1    35.606    0.080    41.145    0.864
0.862
## Marital.Status       1    37.669    0.076    41.149    0.864
0.862
## Years.With.Curr.Manager 1    35.897    0.063    41.163    0.864
0.862
## Job.Involvement      1    35.986    0.057    41.168    0.864
0.862
## Work.Life.Balance    1    36.364    0.035    41.191    0.864
0.862
## Education             1    36.741    0.012    41.213    0.864
0.862
## Job.Satisfaction     1    36.813    0.008    41.218    0.864
0.862

```



```

## Years.Since.Last.Promotion      1      36.899      0.003      41.223      0.864
0.862
## Gender                          1      36.924      0.001      41.224      0.864
0.862
## Total.Working.Years             1      36.937      0.001      41.225      0.864
0.862
## Distance.From.Home              1      36.947      0.000      41.226      0.864
0.862
## Performance.Rating              1      36.946      0.000      41.225      0.864
0.862
## -----
##
## - Relationship.Satisfaction
##
##
## Step 8 : AIC = 33.84238
## log(Monthly.Income) ~ Job.Level + Attrition + Years.In.Current.Role + Num
.Companies.Worked + OverTime + Environment.Satisfaction + BusinessTravel + Re
lationship.Satisfaction
##
## -----
##
## Variable                DF      AIC      Sum Sq      RSS      R-Sq
Adj. R-Sq
## -----
## EducationField          1      35.894      0.471      40.569      0.866
0.863
## Age                     1      34.592      0.074      40.966      0.865
0.863
## Years.With.Curr.Manager  1      34.837      0.060      40.980      0.865
0.863
## Marital.Status          1      36.909      0.056      40.985      0.865
0.863
## Job.Involvement         1      34.978      0.051      40.989      0.865
0.863
## Work.Life.Balance        1      35.316      0.031      41.009      0.865
0.863
## Education               1      35.688      0.009      41.031      0.865
0.863
## Job.Satisfaction         1      35.746      0.006      41.034      0.865
0.863
## Distance.From.Home       1      35.827      0.001      41.039      0.865
0.863
## Gender                   1      35.826      0.001      41.039      0.865
0.863
## Years.Since.Last.Promotion 1      35.822      0.001      41.039      0.865
0.863
## Performance.Rating       1      35.842      0.000      41.040      0.865
0.863

```

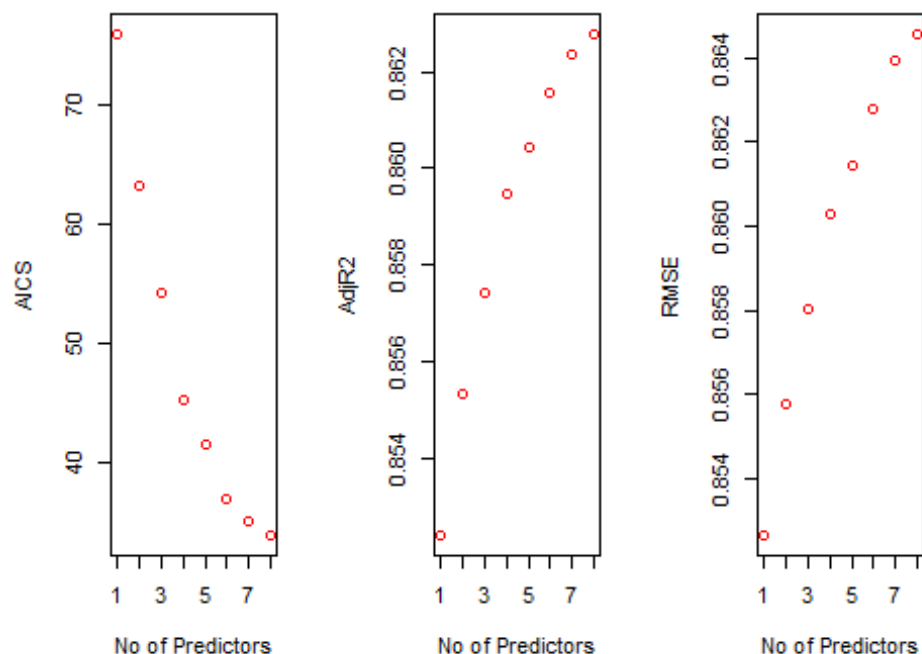
```

0.863
## Total.Working.Years          1    35.842    0.000    41.040    0.865
0.863
## -----
##
##
## No more variables to be added.
##
## Variables Entered:
##
## - Job.Level
## - Attrition
## - Years.In.Current.Role
## - Num.Companies.Worked
## - OverTime
## - Environment.Satisfaction
## - BusinessTravel
## - Relationship.Satisfaction
##
##
## Final Model Output
## -----
##
##                               Model Summary
## -----
## R                0.930            RMSE                0.246
## R-Squared         0.865            Coef. Var           2.883
## Adj. R-Squared    0.863            MSE                0.060
## Pred R-Squared    0.860            MAE                0.190
## -----
## RMSE: Root Mean Square Error
## MSE: Mean Square Error
## MAE: Mean Absolute Error
##
##                               ANOVA
## -----
##                               Sum of
##                               Squares      DF      Mean Square      F      Sig.
## -----
## Regression        261.965          9          29.107      481.572    0.0000
## Residual           41.040        679           0.060
## Total             303.005        688
## -----
##
##                               Parameter Estimates
## -----
##
##                               Sig.      lower      model      upper      Beta      Std. Error      Std. Beta
## t

```

```
## -----
##              (Intercept)      7.402      0.047      15
6.420      0.000      7.309      7.495
##              Job.Level      0.538      0.010      0.878      5
5.247      0.000      0.519      0.558
##              AttritionYes -0.134      0.029      -0.072      -
4.697      0.000      -0.190      -0.078
##              Years.In.Current.Role      0.011      0.003      0.061
3.930      0.000      0.006      0.017
##              Num.Companies.Worked      0.014      0.004      0.052
3.536      0.000      0.006      0.021
##              OverTimeYes      0.055      0.022      0.038
2.559      0.011      0.013      0.098
##              Environment.Satisfaction -0.022      0.009      -0.037      -
2.558      0.011      -0.039      -0.005
## BusinessTravelTravel_Frequently      0.041      0.036      0.023
1.138      0.256      -0.029      0.111
## BusinessTravelTravel_Rarely      0.067      0.030      0.046
2.254      0.024      0.009      0.125
## Relationship.Satisfaction -0.015      0.009      -0.025      -
1.751      0.080      -0.032      0.002
## -----
```

```
par(mfrow=c(1,3))
plot(k$aics,xlab="No of Predictors",ylab="AICS", col = "red")
plot(k$arsq,xlab="No of Predictors",ylab="AdjR2", col = "red")
plot(k$rsq,xlab="No of Predictors",ylab="RMSE", col = "red")
```

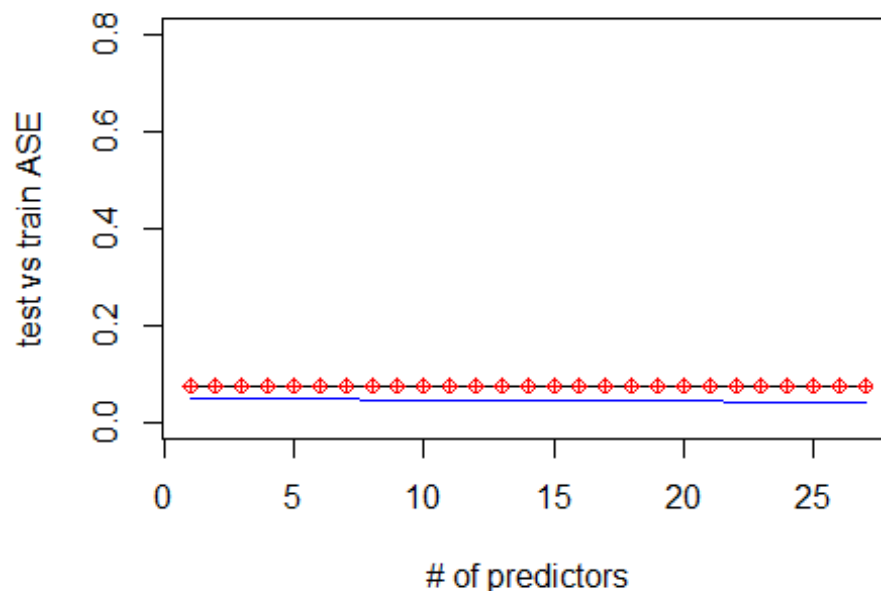


```
k$predictors
```

```
## [1] "Job.Level"           "Attrition"
## [3] "Years.In.Current.Role" "Num.Companies.Worked"
## [5] "OverTime"           "Environment.Satisfaction"
## [7] "BusinessTravel"      "Relationship.Satisfaction"
```

```
#Plot for AISC
```

```
for (i in 1:27){
  predictions<-predict(object=Model_Simp2,newdata=EmplTestSimp2,id=i)
  testASEsimp2[i]<-mean((log(EmplTestSimp2$Monthly.Income)-predictions)^2)
}
par(mfrow=c(1,1))
plot(1:27,testASEsimp2,type="l",xlab="# of predictors",ylab="test vs train ASE",ylim=c(0,0.8))
index<-which(testASEsimp2==min(testASEsimp2))
points(index,testASEsimp2[index],col="red",pch=10)
rss<-summary(reg.smp2)$rss
lines(index,rss/869,col="blue") #Dividing by 869 since ASE=RSS/sample size
```

*#Forward*

```
Empl_Nosal_Pred<-Empl_nosal%>%select(Age,Attrition,BusinessTravel,Daily.Rate,
Distance.From.Home,Education,EducationField,Environment.Satisfaction,Gender,(
Hourly.Rate),Job.Involvement,Job.Level,Job.Satisfaction,Marital.Status,(Month
ly.Rate),Num.Companies.Worked,OverTime,Percent.Salary.Hike,Performance.Rating
,Relationship.Satisfaction,Stock.Option.Level,(Total.Working.Years),Training.
Times.Last.Year,Work.Life.Balance,(Years.At.Company),Years.In.Current.Role,Ye
ars.Since.Last.Promotion,Years.With.Curr.Manager)
Pred_Nosal_FWD=predict(Model_FWD, newdata = Empl_Nosal_Pred, interval = "conf
idence")
data.frame(Pred_Nosal_FWD)
```

##	fit	lwr	upr
## 1	8.643070	8.527044	8.759097
## 2	7.997547	7.909613	8.085481
## 3	9.656945	9.529002	9.784888
## 4	7.960549	7.853987	8.067112
## 5	8.064925	7.947940	8.181910
## 6	8.284957	8.148523	8.421392
## 7	8.532685	8.422547	8.642824
## 8	7.792116	7.677969	7.906262
## 9	8.092143	7.956373	8.227914
## 10	9.597572	9.472827	9.722317
## 11	9.073578	8.937584	9.209571
## 12	7.951626	7.867258	8.035994
## 13	8.471798	8.383344	8.560251
## 14	8.536818	8.425255	8.648381

## 15	8.523069	8.424864	8.621274
## 16	8.419332	8.308053	8.530612
## 17	8.527114	8.391742	8.662486
## 18	8.420460	8.322861	8.518058
## 19	8.528561	8.432282	8.624840
## 20	7.928976	7.821100	8.036851
## 21	8.577067	8.486176	8.667959
## 22	9.012902	8.908623	9.117180
## 23	8.949714	8.839635	9.059793
## 24	8.563495	8.451314	8.675676
## 25	9.193118	9.085046	9.301189
## 26	9.143799	9.053317	9.234281
## 27	8.911656	8.804975	9.018337
## 28	9.557085	9.436383	9.677788
## 29	8.493461	8.390168	8.596755
## 30	7.949722	7.875332	8.024112
## 31	8.020007	7.918105	8.121909
## 32	8.560304	8.450256	8.670353
## 33	8.648732	8.553141	8.744322
## 34	8.049141	7.948583	8.149698
## 35	9.566868	9.463991	9.669745
## 36	8.424598	8.337032	8.512163
## 37	9.084198	8.964347	9.204049
## 38	8.583138	8.489714	8.676562
## 39	7.844793	7.745534	7.944053
## 40	7.855405	7.774048	7.936762
## 41	10.220574	10.115231	10.325918
## 42	7.988969	7.865374	8.112564
## 43	8.018409	7.924442	8.112375
## 44	9.074997	8.971401	9.178592
## 45	8.509093	8.415642	8.602543
## 46	8.510769	8.415608	8.605931
## 47	7.949403	7.863706	8.035100
## 48	8.431827	8.354509	8.509144
## 49	7.921992	7.825361	8.018623
## 50	8.078692	7.941494	8.215889
## 51	7.940487	7.845928	8.035046
## 52	7.918262	7.812787	8.023737
## 53	8.498866	8.379681	8.618052
## 54	8.459361	8.344516	8.574206
## 55	9.710712	9.578367	9.843058
## 56	8.114291	8.026970	8.201612
## 57	8.521892	8.435513	8.608270
## 58	9.148381	9.024663	9.272100
## 59	7.892594	7.783305	8.001883
## 60	7.955730	7.871433	8.040027
## 61	8.592201	8.471938	8.712463
## 62	9.122463	9.017650	9.227277
## 63	9.154867	9.054679	9.255054
## 64	7.914053	7.775745	8.052360

## 65	7.750408	7.635977	7.864839
## 66	7.791648	7.694804	7.888492
## 67	9.073580	8.985747	9.161413
## 68	8.952602	8.832710	9.072495
## 69	8.615199	8.501491	8.728907
## 70	7.923201	7.837395	8.009008
## 71	7.854219	7.740829	7.967609
## 72	9.096251	8.992569	9.199933
## 73	9.267826	9.136347	9.399304
## 74	8.521060	8.433650	8.608470
## 75	7.842113	7.750933	7.933293
## 76	8.553146	8.430453	8.675839
## 77	7.778187	7.674973	7.881402
## 78	8.022110	7.914146	8.130074
## 79	7.867638	7.742487	7.992788
## 80	8.441791	8.333617	8.549965
## 81	7.830835	7.705714	7.955956
## 82	8.600140	8.497580	8.702699
## 83	8.492191	8.384121	8.600261
## 84	7.971041	7.879971	8.062110
## 85	8.485597	8.389514	8.581681
## 86	8.948161	8.830949	9.065373
## 87	9.105628	8.963929	9.247327
## 88	8.001769	7.879844	8.123695
## 89	9.069383	8.971858	9.166908
## 90	10.107180	9.959045	10.255314
## 91	8.016952	7.928365	8.105539
## 92	8.662089	8.546669	8.777509
## 93	8.468582	8.369626	8.567537
## 94	8.515387	8.333488	8.697286
## 95	7.933595	7.837980	8.029209
## 96	10.142323	9.991333	10.293314
## 97	7.886582	7.777595	7.995570
## 98	9.003518	8.883827	9.123208
## 99	9.551567	9.409833	9.693302
## 100	7.915643	7.812979	8.018306
## 101	8.567332	8.467801	8.666862
## 102	8.530267	8.420566	8.639967
## 103	7.858331	7.758208	7.958454
## 104	7.826254	7.725175	7.927332
## 105	8.485124	8.379521	8.590727
## 106	7.850156	7.762833	7.937478
## 107	8.490914	8.387863	8.593965
## 108	7.795220	7.687792	7.902647
## 109	9.215648	9.110037	9.321258
## 110	10.123968	10.010107	10.237830
## 111	8.050559	7.932896	8.168223
## 112	9.184863	9.086543	9.283183
## 113	8.060920	7.957732	8.164107
## 114	7.926598	7.813947	8.039249

## 115	8.608261	8.509545	8.706976
## 116	7.882995	7.779404	7.986587
## 117	7.795454	7.682290	7.908618
## 118	8.565206	8.467832	8.662579
## 119	8.972039	8.853010	9.091069
## 120	7.907384	7.815048	7.999721
## 121	8.568835	8.475775	8.661896
## 122	7.925185	7.844650	8.005720
## 123	8.572144	8.392719	8.751569
## 124	8.516149	8.401423	8.630874
## 125	8.398833	8.282415	8.515252
## 126	8.647022	8.532355	8.761688
## 127	7.951713	7.847671	8.055754
## 128	9.620043	9.500867	9.739220
## 129	9.153639	9.056493	9.250786
## 130	7.889227	7.778307	8.000147
## 131	8.621981	8.524160	8.719801
## 132	8.580379	8.459372	8.701386
## 133	8.497678	8.414311	8.581046
## 134	8.557695	8.450829	8.664562
## 135	8.095442	7.965507	8.225377
## 136	8.498193	8.407037	8.589348
## 137	7.956841	7.866970	8.046713
## 138	8.586213	8.490880	8.681546
## 139	10.259616	10.138846	10.380386
## 140	8.722792	8.593206	8.852377
## 141	8.944628	8.828006	9.061250
## 142	8.511032	8.431564	8.590500
## 143	8.577671	8.459786	8.695556
## 144	8.327572	8.208816	8.446327
## 145	8.375340	8.255348	8.495332
## 146	7.933757	7.814923	8.052592
## 147	7.950565	7.843762	8.057367
## 148	9.137212	9.036733	9.237690
## 149	9.113920	9.024982	9.202857
## 150	7.796866	7.703574	7.890159
## 151	8.592913	8.480953	8.704872
## 152	8.388372	8.278347	8.498398
## 153	8.595711	8.471466	8.719955
## 154	9.059570	8.907839	9.211301
## 155	9.637223	9.530663	9.743783
## 156	9.946408	9.829313	10.063503
## 157	8.381855	8.213299	8.550411
## 158	8.547606	8.455998	8.639215
## 159	8.500952	8.388705	8.613200
## 160	8.988014	8.851414	9.124614
## 161	8.579196	8.456660	8.701732
## 162	7.989724	7.896424	8.083025
## 163	9.064951	8.945406	9.184496
## 164	7.957338	7.870327	8.044349



## 165	8.551188	8.430218	8.672158
## 166	7.817100	7.707319	7.926880
## 167	8.512899	8.404381	8.621416
## 168	9.023539	8.921678	9.125399
## 169	9.082536	8.979583	9.185488
## 170	8.570522	8.474191	8.666852
## 171	7.725720	7.614283	7.837156
## 172	8.033935	7.909181	8.158690
## 173	9.089319	8.989447	9.189192
## 174	8.662035	8.559364	8.764706
## 175	7.843554	7.754792	7.932316
## 176	7.803745	7.692203	7.915287
## 177	8.400967	8.300589	8.501345
## 178	9.093772	8.990582	9.196961
## 179	7.808825	7.695503	7.922147
## 180	8.505474	8.396462	8.614486
## 181	8.820467	8.620532	9.020401
## 182	7.909642	7.806227	8.013057
## 183	8.612529	8.493495	8.731563
## 184	8.013780	7.930239	8.097321
## 185	7.844343	7.745203	7.943483
## 186	7.875976	7.779731	7.972222
## 187	8.414725	8.290721	8.538729
## 188	9.802209	9.687832	9.916587
## 189	8.554810	8.430812	8.678807
## 190	8.066592	7.964679	8.168506
## 191	8.608914	8.493052	8.724777
## 192	8.496557	8.391326	8.601788
## 193	8.592905	8.475024	8.710787
## 194	7.885444	7.775027	7.995862
## 195	8.416663	8.298649	8.534677
## 196	7.872486	7.779312	7.965661
## 197	7.999463	7.880862	8.118063
## 198	10.136862	9.990349	10.283375
## 199	8.418320	8.319642	8.516997
## 200	8.007213	7.905021	8.109404
## 201	8.021725	7.922493	8.120956
## 202	8.560034	8.449517	8.670551
## 203	7.925786	7.821707	8.029865
## 204	8.463749	8.375729	8.551769
## 205	8.593597	8.482331	8.704863
## 206	9.871674	9.723819	10.019530
## 207	10.319994	10.189806	10.450182
## 208	8.521460	8.422220	8.620701
## 209	8.420119	8.306119	8.534119
## 210	8.519760	8.409184	8.630337
## 211	7.932437	7.849005	8.015870
## 212	7.859236	7.760427	7.958044
## 213	7.838664	7.707697	7.969630
## 214	8.725464	8.616900	8.834029

## 215	8.959596	8.851915	9.067276
## 216	9.174673	9.052845	9.296502
## 217	8.503055	8.406470	8.599640
## 218	8.005172	7.890920	8.119423
## 219	7.912665	7.817945	8.007384
## 220	8.471182	8.359852	8.582513
## 221	8.588290	8.477240	8.699340
## 222	8.570284	8.426841	8.713726
## 223	9.166925	9.039369	9.294481
## 224	8.456821	8.342555	8.571087
## 225	8.430177	8.331681	8.528673
## 226	8.575304	8.497687	8.652921
## 227	7.977095	7.874947	8.079242
## 228	7.744867	7.564276	7.925457
## 229	7.900293	7.810868	7.989718
## 230	8.310539	8.193889	8.427190
## 231	10.107018	10.001204	10.212832
## 232	8.607545	8.505341	8.709750
## 233	8.514015	8.406811	8.621220
## 234	9.271041	9.127617	9.414465
## 235	7.986305	7.868016	8.104594
## 236	7.865624	7.766951	7.964297
## 237	8.104181	8.000131	8.208230
## 238	8.573792	8.476157	8.671427
## 239	8.499421	8.408007	8.590836
## 240	8.487349	8.396293	8.578405
## 241	8.443259	8.335352	8.551166
## 242	9.147806	9.027057	9.268555
## 243	9.117008	8.995137	9.238879
## 244	8.453566	8.336414	8.570718
## 245	9.250666	9.130944	9.370387
## 246	7.960640	7.847839	8.073442
## 247	8.530966	8.430001	8.631931
## 248	8.506570	8.368675	8.644465
## 249	9.024056	8.900126	9.147986
## 250	7.888902	7.768241	8.009563
## 251	8.987264	8.873968	9.100561
## 252	9.578605	9.443139	9.714072
## 253	8.487687	8.361963	8.613410
## 254	9.675730	9.539441	9.812018
## 255	7.926428	7.813493	8.039362
## 256	7.692183	7.558233	7.826132
## 257	7.898722	7.796377	8.001068
## 258	8.619903	8.517645	8.722162
## 259	9.540400	9.406750	9.674050
## 260	7.914453	7.809293	8.019614
## 261	9.145608	9.032612	9.258603
## 262	9.636763	9.495361	9.778165
## 263	8.440612	8.350483	8.530740
## 264	7.859072	7.757353	7.960792

```
## 265 7.937817 7.823935 8.051699
## 266 7.941449 7.845129 8.037768
## 267 8.031499 7.932882 8.130117
## 268 8.503749 8.393274 8.614225
## 269 9.123898 9.020931 9.226865
## 270 9.706077 9.599422 9.812733
## 271 8.505836 8.391234 8.620438
## 272 8.521045 8.427597 8.614493
## 273 9.238030 9.147966 9.328095
## 274 8.522787 8.435162 8.610412
## 275 8.497854 8.316882 8.678826
## 276 8.518785 8.425717 8.611853
## 277 8.502995 8.414380 8.591610
## 278 8.052747 7.945161 8.160333
## 279 8.026964 7.924758 8.129170
## 280 8.617513 8.497699 8.737328
## 281 7.886348 7.787277 7.985419
## 282 8.391647 8.280921 8.502372
## 283 8.467778 8.361496 8.574060
## 284 7.898575 7.789198 8.007951
## 285 8.562257 8.460810 8.663704
## 286 9.560472 9.441130 9.679814
## 287 7.944752 7.832965 8.056538
## 288 8.538636 8.417997 8.659275
## 289 7.834174 7.750186 7.918162
## 290 8.461707 8.353455 8.569959
## 291 7.885977 7.788912 7.983043
## 292 9.014995 8.920404 9.109587
## 293 7.930050 7.819582 8.040518
## 294 9.051233 8.947536 9.154930
## 295 7.939753 7.836040 8.043465
## 296 7.886800 7.769165 8.004436
## 297 9.160731 9.007625 9.313838
## 298 8.489665 8.389008 8.590321
## 299 7.930317 7.834606 8.026028
## 300 8.094931 7.995573 8.194289
```

```
write.csv(data.frame(Pred_Nosal_FWD), 'C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2Predict_Salary_FWD.csv')
```

```
Pred_Nosal_BCK=predict(Model_BCK, newdata = Empl_Nosal_Pred, interval = "confidence")
```

```
data.frame(Pred_Nosal_BCK)
```

```
##          fit          lwr          upr
## 1  8.620038  8.550292  8.689784
## 2  7.988173  7.940094  8.036252
## 3  9.567412  9.479027  9.655798
## 4  7.953349  7.880150  8.026548
## 5  8.051717  7.992403  8.111030
## 6  8.307162  8.233933  8.380391
```

## 7	8.496251	8.425605	8.566897
## 8	7.813222	7.731721	7.894722
## 9	8.073113	7.999855	8.146372
## 10	9.633672	9.566477	9.700867
## 11	9.022621	8.944358	9.100884
## 12	7.934326	7.888267	7.980384
## 13	8.483043	8.421324	8.544761
## 14	8.455777	8.392720	8.518835
## 15	8.525827	8.467588	8.584065
## 16	8.419584	8.352793	8.486376
## 17	8.518569	8.441190	8.595948
## 18	8.437627	8.380313	8.494941
## 19	8.525260	8.472868	8.577652
## 20	7.942243	7.900145	7.984341
## 21	8.560408	8.513497	8.607320
## 22	9.096993	9.052128	9.141858
## 23	8.948453	8.871604	9.025303
## 24	8.575064	8.507473	8.642656
## 25	9.187236	9.134825	9.239647
## 26	9.106664	9.060592	9.152735
## 27	8.933471	8.853954	9.012988
## 28	9.561046	9.470034	9.652058
## 29	8.525046	8.475853	8.574239
## 30	7.931455	7.882904	7.980006
## 31	8.056512	7.985121	8.127903
## 32	8.500700	8.427679	8.573721
## 33	8.614430	8.557226	8.671633
## 34	7.995119	7.925213	8.065026
## 35	9.557823	9.489605	9.626041
## 36	8.423639	8.364476	8.482802
## 37	9.098088	9.024738	9.171437
## 38	8.568017	8.508646	8.627388
## 39	7.899477	7.835389	7.963565
## 40	7.868988	7.818550	7.919427
## 41	10.234529	10.165695	10.303364
## 42	7.944614	7.867660	8.021568
## 43	7.970265	7.918537	8.021993
## 44	9.136694	9.074604	9.198784
## 45	8.528259	8.477075	8.579444
## 46	8.526225	8.470588	8.581862
## 47	7.953727	7.914108	7.993345
## 48	8.477615	8.431716	8.523515
## 49	7.932446	7.877425	7.987468
## 50	8.045919	7.984126	8.107712
## 51	7.906985	7.851914	7.962056
## 52	7.883182	7.824676	7.941687
## 53	8.428890	8.357588	8.500192
## 54	8.455985	8.377100	8.534869
## 55	9.677167	9.626018	9.728316
## 56	8.107750	8.044806	8.170694

## 57	8.526315	8.488420	8.564211
## 58	9.191408	9.105194	9.277622
## 59	7.883666	7.806711	7.960620
## 60	7.950227	7.889097	8.011358
## 61	8.587390	8.492319	8.682460
## 62	9.132714	9.081567	9.183862
## 63	9.101187	9.060490	9.141884
## 64	7.865606	7.780339	7.950874
## 65	7.785897	7.715506	7.856289
## 66	7.822280	7.752669	7.891891
## 67	9.060350	9.009081	9.111619
## 68	8.953074	8.864100	9.042048
## 69	8.638459	8.560827	8.716091
## 70	7.911815	7.856584	7.967046
## 71	7.824049	7.751374	7.896724
## 72	9.119378	9.055275	9.183482
## 73	9.263306	9.162613	9.363999
## 74	8.516111	8.461204	8.571018
## 75	7.904991	7.850880	7.959103
## 76	8.524486	8.457735	8.591237
## 77	7.761552	7.693539	7.829565
## 78	8.000195	7.942288	8.058101
## 79	7.869970	7.780640	7.959300
## 80	8.430739	8.361855	8.499624
## 81	7.855783	7.787465	7.924101
## 82	8.534343	8.486850	8.581836
## 83	8.459511	8.402883	8.516139
## 84	7.980618	7.910560	8.050675
## 85	8.490025	8.412722	8.567328
## 86	8.972237	8.914740	9.029735
## 87	9.120990	9.062477	9.179503
## 88	8.037953	7.950576	8.125330
## 89	9.064822	9.001360	9.128285
## 90	10.105602	9.975916	10.235288
## 91	8.009267	7.959572	8.058962
## 92	8.675838	8.612078	8.739597
## 93	8.470062	8.404098	8.536026
## 94	8.555897	8.486132	8.625661
## 95	7.961305	7.903109	8.019501
## 96	10.151287	10.023860	10.278714
## 97	7.919640	7.872771	7.966510
## 98	9.021162	8.935655	9.106668
## 99	9.564056	9.482286	9.645826
## 100	7.941657	7.871555	8.011759
## 101	8.552131	8.494122	8.610140
## 102	8.540313	8.488769	8.591857
## 103	7.904553	7.838047	7.971058
## 104	7.870845	7.819514	7.922175
## 105	8.505133	8.453491	8.556775
## 106	7.864464	7.806797	7.922130

## 107	8.486317	8.431430	8.541204
## 108	7.802035	7.729492	7.874578
## 109	9.243372	9.160869	9.325874
## 110	10.147081	10.060267	10.233895
## 111	8.028125	7.963617	8.092632
## 112	9.101244	9.048858	9.153629
## 113	8.037299	7.976772	8.097825
## 114	7.896762	7.837006	7.956518
## 115	8.558825	8.505050	8.612600
## 116	7.884356	7.803746	7.964966
## 117	7.820904	7.743220	7.898588
## 118	8.509636	8.466293	8.552979
## 119	9.007538	8.919560	9.095516
## 120	7.927144	7.866968	7.987320
## 121	8.594362	8.533456	8.655269
## 122	7.925695	7.882945	7.968446
## 123	8.610650	8.551979	8.669321
## 124	8.528622	8.459625	8.597619
## 125	8.449345	8.373153	8.525537
## 126	8.629639	8.565792	8.693487
## 127	7.932767	7.869680	7.995854
## 128	9.584126	9.504372	9.663880
## 129	9.158595	9.101321	9.215870
## 130	7.860653	7.794910	7.926396
## 131	8.620100	8.556708	8.683491
## 132	8.553488	8.478430	8.628546
## 133	8.507137	8.456011	8.558263
## 134	8.544785	8.489581	8.599989
## 135	8.030407	7.957129	8.103684
## 136	8.518488	8.471232	8.565743
## 137	7.983545	7.937022	8.030069
## 138	8.574329	8.514112	8.634545
## 139	10.238549	10.161216	10.315881
## 140	8.656329	8.596833	8.715826
## 141	8.952915	8.866173	9.039657
## 142	8.523364	8.480434	8.566295
## 143	8.643923	8.573443	8.714403
## 144	8.291156	8.202633	8.379678
## 145	8.345009	8.267336	8.422681
## 146	7.961404	7.907764	8.015043
## 147	7.968560	7.903446	8.033674
## 148	9.097046	9.049055	9.145038
## 149	9.136042	9.078936	9.193149
## 150	7.808609	7.736986	7.880232
## 151	8.515941	8.468812	8.563070
## 152	8.407687	8.343168	8.472206
## 153	8.544836	8.485586	8.604085
## 154	9.022034	8.903008	9.141061
## 155	9.634380	9.564396	9.704364
## 156	9.948235	9.850773	10.045696

## 157	8.480359	8.419571	8.541147
## 158	8.587123	8.539892	8.634354
## 159	8.521133	8.436114	8.606151
## 160	8.992798	8.878666	9.106930
## 161	8.536976	8.477405	8.596546
## 162	7.975383	7.916919	8.033846
## 163	9.130969	9.066890	9.195047
## 164	7.958134	7.904109	8.012158
## 165	8.509159	8.444978	8.573339
## 166	7.862781	7.781726	7.943836
## 167	8.545396	8.507006	8.583786
## 168	9.008254	8.947766	9.068741
## 169	9.116288	9.064495	9.168081
## 170	8.596914	8.531760	8.662068
## 171	7.772339	7.698469	7.846210
## 172	8.028336	7.972103	8.084568
## 173	9.072592	9.018116	9.127068
## 174	8.656322	8.577088	8.735556
## 175	7.871339	7.803446	7.939231
## 176	7.818771	7.737321	7.900220
## 177	8.411164	8.344102	8.478225
## 178	9.106006	9.039183	9.172828
## 179	7.814075	7.726308	7.901842
## 180	8.513249	8.442204	8.584294
## 181	8.818948	8.671947	8.965948
## 182	7.928586	7.853874	8.003298
## 183	8.560510	8.496974	8.624047
## 184	8.003921	7.961997	8.045844
## 185	7.860731	7.801515	7.919947
## 186	7.886338	7.821877	7.950798
## 187	8.458227	8.399062	8.517392
## 188	9.758494	9.688241	9.828747
## 189	8.485498	8.418407	8.552589
## 190	8.057186	7.994447	8.119924
## 191	8.545739	8.484287	8.607190
## 192	8.483305	8.413072	8.553539
## 193	8.580953	8.511949	8.649956
## 194	7.869646	7.804059	7.935233
## 195	8.414317	8.339374	8.489259
## 196	7.915624	7.865456	7.965791
## 197	7.978510	7.937941	8.019078
## 198	10.123917	10.011314	10.236521
## 199	8.439235	8.372269	8.506202
## 200	7.936975	7.874320	7.999630
## 201	8.018428	7.954538	8.082317
## 202	8.591559	8.528041	8.655076
## 203	7.882972	7.833896	7.932047
## 204	8.449706	8.388002	8.511410
## 205	8.519514	8.465521	8.573506
## 206	9.814781	9.712061	9.917501



```
## 207 10.274232 10.193728 10.354735
## 208 8.532696 8.468273 8.597119
## 209 8.488012 8.415619 8.560405
## 210 8.510704 8.448266 8.573142
## 211 7.946107 7.891316 8.000899
## 212 7.871611 7.819763 7.923459
## 213 7.768785 7.680618 7.856952
## 214 8.689259 8.619348 8.759170
## 215 9.000243 8.929282 9.071204
## 216 9.209226 9.129918 9.288535
## 217 8.530516 8.483245 8.577787
## 218 7.996850 7.930178 8.063521
## 219 7.953746 7.903861 8.003631
## 220 8.440589 8.377067 8.504112
## 221 8.568511 8.499542 8.637480
## 222 8.495951 8.411656 8.580246
## 223 9.125902 9.059567 9.192236
## 224 8.518593 8.458883 8.578302
## 225 8.429094 8.365350 8.492839
## 226 8.579565 8.534120 8.625010
## 227 7.979944 7.932577 8.027311
## 228 7.813041 7.739923 7.886159
## 229 7.912896 7.844880 7.980912
## 230 8.314540 8.233108 8.395973
## 231 10.125068 10.050404 10.199733
## 232 8.562103 8.511288 8.612917
## 233 8.493160 8.422504 8.563815
## 234 9.185143 9.116276 9.254010
## 235 7.915730 7.859163 7.972298
## 236 7.848806 7.779743 7.917870
## 237 8.109444 8.042762 8.176126
## 238 8.618451 8.562727 8.674175
## 239 8.518396 8.453346 8.583446
## 240 8.481948 8.438783 8.525112
## 241 8.450637 8.372373 8.528900
## 242 9.155165 9.106380 9.203950
## 243 9.146929 9.064135 9.229722
## 244 8.468246 8.391918 8.544575
## 245 9.248612 9.180857 9.316367
## 246 7.930062 7.860172 7.999952
## 247 8.552111 8.493621 8.610602
## 248 8.527999 8.452502 8.603496
## 249 9.065618 9.001016 9.130220
## 250 7.914248 7.843498 7.984998
## 251 8.939809 8.870124 9.009493
## 252 9.583476 9.500531 9.666420
## 253 8.518985 8.456259 8.581710
## 254 9.677661 9.577266 9.778055
## 255 7.921719 7.864547 7.978891
## 256 7.770092 7.688985 7.851200
```



```
## 257 7.887249 7.809764 7.964733
## 258 8.606268 8.542065 8.670471
## 259 9.528708 9.441709 9.615707
## 260 7.925908 7.866763 7.985053
## 261 9.179634 9.098898 9.260370
## 262 9.637074 9.545729 9.728419
## 263 8.417440 8.361253 8.473628
## 264 7.888169 7.820184 7.956154
## 265 7.985737 7.909359 8.062115
## 266 7.964366 7.904799 8.023934
## 267 8.041717 7.994938 8.088495
## 268 8.434217 8.369193 8.499240
## 269 9.108231 9.037592 9.178869
## 270 9.708044 9.636383 9.779704
## 271 8.527381 8.452893 8.601870
## 272 8.480153 8.425078 8.535228
## 273 9.246741 9.182142 9.311341
## 274 8.545134 8.494381 8.595887
## 275 8.583804 8.505371 8.662238
## 276 8.522466 8.460101 8.584830
## 277 8.523329 8.479014 8.567644
## 278 8.062750 7.997755 8.127744
## 279 7.997276 7.940618 8.053935
## 280 8.573108 8.516860 8.629355
## 281 7.867360 7.808915 7.925805
## 282 8.442122 8.377102 8.507143
## 283 8.466069 8.410211 8.521928
## 284 7.888535 7.814401 7.962669
## 285 8.550421 8.493476 8.607366
## 286 9.542825 9.466193 9.619457
## 287 7.931287 7.862800 7.999774
## 288 8.488669 8.429492 8.547846
## 289 7.852185 7.799512 7.904858
## 290 8.476868 8.414092 8.539644
## 291 7.877944 7.817938 7.937949
## 292 9.029431 8.963844 9.095018
## 293 7.960949 7.892317 8.029582
## 294 9.100887 9.050272 9.151501
## 295 7.952418 7.873513 8.031323
## 296 7.853587 7.790018 7.917156
## 297 9.195434 9.106678 9.284191
## 298 8.554362 8.512711 8.596013
## 299 7.951208 7.900161 8.002256
## 300 8.091814 8.022270 8.161357
```

```
write.csv(data.frame(Pred_Nosal_BCK), 'C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2Predict_Salary_BCK.csv')
```

```
Pred_Nosal_Step=predict(Model_Step, newdata = Empl_Nosal_Pred, interval = "confidence")
```

```
data.frame(Pred_Nosal_Step)
```

##	fit	lwr	upr
## 1	8.620038	8.550292	8.689784
## 2	7.988173	7.940094	8.036252
## 3	9.567412	9.479027	9.655798
## 4	7.953349	7.880150	8.026548
## 5	8.051717	7.992403	8.111030
## 6	8.307162	8.233933	8.380391
## 7	8.496251	8.425605	8.566897
## 8	7.813222	7.731721	7.894722
## 9	8.073113	7.999855	8.146372
## 10	9.633672	9.566477	9.700867
## 11	9.022621	8.944358	9.100884
## 12	7.934326	7.888267	7.980384
## 13	8.483043	8.421324	8.544761
## 14	8.455777	8.392720	8.518835
## 15	8.525827	8.467588	8.584065
## 16	8.419584	8.352793	8.486376
## 17	8.518569	8.441190	8.595948
## 18	8.437627	8.380313	8.494941
## 19	8.525260	8.472868	8.577652
## 20	7.942243	7.900145	7.984341
## 21	8.560408	8.513497	8.607320
## 22	9.096993	9.052128	9.141858
## 23	8.948453	8.871604	9.025303
## 24	8.575064	8.507473	8.642656
## 25	9.187236	9.134825	9.239647
## 26	9.106664	9.060592	9.152735
## 27	8.933471	8.853954	9.012988
## 28	9.561046	9.470034	9.652058
## 29	8.525046	8.475853	8.574239
## 30	7.931455	7.882904	7.980006
## 31	8.056512	7.985121	8.127903
## 32	8.500700	8.427679	8.573721
## 33	8.614430	8.557226	8.671633
## 34	7.995119	7.925213	8.065026
## 35	9.557823	9.489605	9.626041
## 36	8.423639	8.364476	8.482802
## 37	9.098088	9.024738	9.171437
## 38	8.568017	8.508646	8.627388
## 39	7.899477	7.835389	7.963565
## 40	7.868988	7.818550	7.919427
## 41	10.234529	10.165695	10.303364
## 42	7.944614	7.867660	8.021568
## 43	7.970265	7.918537	8.021993
## 44	9.136694	9.074604	9.198784
## 45	8.528259	8.477075	8.579444
## 46	8.526225	8.470588	8.581862
## 47	7.953727	7.914108	7.993345
## 48	8.477615	8.431716	8.523515
## 49	7.932446	7.877425	7.987468

## 50	8.045919	7.984126	8.107712
## 51	7.906985	7.851914	7.962056
## 52	7.883182	7.824676	7.941687
## 53	8.428890	8.357588	8.500192
## 54	8.455985	8.377100	8.534869
## 55	9.677167	9.626018	9.728316
## 56	8.107750	8.044806	8.170694
## 57	8.526315	8.488420	8.564211
## 58	9.191408	9.105194	9.277622
## 59	7.883666	7.806711	7.960620
## 60	7.950227	7.889097	8.011358
## 61	8.587390	8.492319	8.682460
## 62	9.132714	9.081567	9.183862
## 63	9.101187	9.060490	9.141884
## 64	7.865606	7.780339	7.950874
## 65	7.785897	7.715506	7.856289
## 66	7.822280	7.752669	7.891891
## 67	9.060350	9.009081	9.111619
## 68	8.953074	8.864100	9.042048
## 69	8.638459	8.560827	8.716091
## 70	7.911815	7.856584	7.967046
## 71	7.824049	7.751374	7.896724
## 72	9.119378	9.055275	9.183482
## 73	9.263306	9.162613	9.363999
## 74	8.516111	8.461204	8.571018
## 75	7.904991	7.850880	7.959103
## 76	8.524486	8.457735	8.591237
## 77	7.761552	7.693539	7.829565
## 78	8.000195	7.942288	8.058101
## 79	7.869970	7.780640	7.959300
## 80	8.430739	8.361855	8.499624
## 81	7.855783	7.787465	7.924101
## 82	8.534343	8.486850	8.581836
## 83	8.459511	8.402883	8.516139
## 84	7.980618	7.910560	8.050675
## 85	8.490025	8.412722	8.567328
## 86	8.972237	8.914740	9.029735
## 87	9.120990	9.062477	9.179503
## 88	8.037953	7.950576	8.125330
## 89	9.064822	9.001360	9.128285
## 90	10.105602	9.975916	10.235288
## 91	8.009267	7.959572	8.058962
## 92	8.675838	8.612078	8.739597
## 93	8.470062	8.404098	8.536026
## 94	8.555897	8.486132	8.625661
## 95	7.961305	7.903109	8.019501
## 96	10.151287	10.023860	10.278714
## 97	7.919640	7.872771	7.966510
## 98	9.021162	8.935655	9.106668
## 99	9.564056	9.482286	9.645826

## 100	7.941657	7.871555	8.011759
## 101	8.552131	8.494122	8.610140
## 102	8.540313	8.488769	8.591857
## 103	7.904553	7.838047	7.971058
## 104	7.870845	7.819514	7.922175
## 105	8.505133	8.453491	8.556775
## 106	7.864464	7.806797	7.922130
## 107	8.486317	8.431430	8.541204
## 108	7.802035	7.729492	7.874578
## 109	9.243372	9.160869	9.325874
## 110	10.147081	10.060267	10.233895
## 111	8.028125	7.963617	8.092632
## 112	9.101244	9.048858	9.153629
## 113	8.037299	7.976772	8.097825
## 114	7.896762	7.837006	7.956518
## 115	8.558825	8.505050	8.612600
## 116	7.884356	7.803746	7.964966
## 117	7.820904	7.743220	7.898588
## 118	8.509636	8.466293	8.552979
## 119	9.007538	8.919560	9.095516
## 120	7.927144	7.866968	7.987320
## 121	8.594362	8.533456	8.655269
## 122	7.925695	7.882945	7.968446
## 123	8.610650	8.551979	8.669321
## 124	8.528622	8.459625	8.597619
## 125	8.449345	8.373153	8.525537
## 126	8.629639	8.565792	8.693487
## 127	7.932767	7.869680	7.995854
## 128	9.584126	9.504372	9.663880
## 129	9.158595	9.101321	9.215870
## 130	7.860653	7.794910	7.926396
## 131	8.620100	8.556708	8.683491
## 132	8.553488	8.478430	8.628546
## 133	8.507137	8.456011	8.558263
## 134	8.544785	8.489581	8.599989
## 135	8.030407	7.957129	8.103684
## 136	8.518488	8.471232	8.565743
## 137	7.983545	7.937022	8.030069
## 138	8.574329	8.514112	8.634545
## 139	10.238549	10.161216	10.315881
## 140	8.656329	8.596833	8.715826
## 141	8.952915	8.866173	9.039657
## 142	8.523364	8.480434	8.566295
## 143	8.643923	8.573443	8.714403
## 144	8.291156	8.202633	8.379678
## 145	8.345009	8.267336	8.422681
## 146	7.961404	7.907764	8.015043
## 147	7.968560	7.903446	8.033674
## 148	9.097046	9.049055	9.145038
## 149	9.136042	9.078936	9.193149

## 150	7.808609	7.736986	7.880232
## 151	8.515941	8.468812	8.563070
## 152	8.407687	8.343168	8.472206
## 153	8.544836	8.485586	8.604085
## 154	9.022034	8.903008	9.141061
## 155	9.634380	9.564396	9.704364
## 156	9.948235	9.850773	10.045696
## 157	8.480359	8.419571	8.541147
## 158	8.587123	8.539892	8.634354
## 159	8.521133	8.436114	8.606151
## 160	8.992798	8.878666	9.106930
## 161	8.536976	8.477405	8.596546
## 162	7.975383	7.916919	8.033846
## 163	9.130969	9.066890	9.195047
## 164	7.958134	7.904109	8.012158
## 165	8.509159	8.444978	8.573339
## 166	7.862781	7.781726	7.943836
## 167	8.545396	8.507006	8.583786
## 168	9.008254	8.947766	9.068741
## 169	9.116288	9.064495	9.168081
## 170	8.596914	8.531760	8.662068
## 171	7.772339	7.698469	7.846210
## 172	8.028336	7.972103	8.084568
## 173	9.072592	9.018116	9.127068
## 174	8.656322	8.577088	8.735556
## 175	7.871339	7.803446	7.939231
## 176	7.818771	7.737321	7.900220
## 177	8.411164	8.344102	8.478225
## 178	9.106006	9.039183	9.172828
## 179	7.814075	7.726308	7.901842
## 180	8.513249	8.442204	8.584294
## 181	8.818948	8.671947	8.965948
## 182	7.928586	7.853874	8.003298
## 183	8.560510	8.496974	8.624047
## 184	8.003921	7.961997	8.045844
## 185	7.860731	7.801515	7.919947
## 186	7.886338	7.821877	7.950798
## 187	8.458227	8.399062	8.517392
## 188	9.758494	9.688241	9.828747
## 189	8.485498	8.418407	8.552589
## 190	8.057186	7.994447	8.119924
## 191	8.545739	8.484287	8.607190
## 192	8.483305	8.413072	8.553539
## 193	8.580953	8.511949	8.649956
## 194	7.869646	7.804059	7.935233
## 195	8.414317	8.339374	8.489259
## 196	7.915624	7.865456	7.965791
## 197	7.978510	7.937941	8.019078
## 198	10.123917	10.011314	10.236521
## 199	8.439235	8.372269	8.506202

## 200	7.936975	7.874320	7.999630
## 201	8.018428	7.954538	8.082317
## 202	8.591559	8.528041	8.655076
## 203	7.882972	7.833896	7.932047
## 204	8.449706	8.388002	8.511410
## 205	8.519514	8.465521	8.573506
## 206	9.814781	9.712061	9.917501
## 207	10.274232	10.193728	10.354735
## 208	8.532696	8.468273	8.597119
## 209	8.488012	8.415619	8.560405
## 210	8.510704	8.448266	8.573142
## 211	7.946107	7.891316	8.000899
## 212	7.871611	7.819763	7.923459
## 213	7.768785	7.680618	7.856952
## 214	8.689259	8.619348	8.759170
## 215	9.000243	8.929282	9.071204
## 216	9.209226	9.129918	9.288535
## 217	8.530516	8.483245	8.577787
## 218	7.996850	7.930178	8.063521
## 219	7.953746	7.903861	8.003631
## 220	8.440589	8.377067	8.504112
## 221	8.568511	8.499542	8.637480
## 222	8.495951	8.411656	8.580246
## 223	9.125902	9.059567	9.192236
## 224	8.518593	8.458883	8.578302
## 225	8.429094	8.365350	8.492839
## 226	8.579565	8.534120	8.625010
## 227	7.979944	7.932577	8.027311
## 228	7.813041	7.739923	7.886159
## 229	7.912896	7.844880	7.980912
## 230	8.314540	8.233108	8.395973
## 231	10.125068	10.050404	10.199733
## 232	8.562103	8.511288	8.612917
## 233	8.493160	8.422504	8.563815
## 234	9.185143	9.116276	9.254010
## 235	7.915730	7.859163	7.972298
## 236	7.848806	7.779743	7.917870
## 237	8.109444	8.042762	8.176126
## 238	8.618451	8.562727	8.674175
## 239	8.518396	8.453346	8.583446
## 240	8.481948	8.438783	8.525112
## 241	8.450637	8.372373	8.528900
## 242	9.155165	9.106380	9.203950
## 243	9.146929	9.064135	9.229722
## 244	8.468246	8.391918	8.544575
## 245	9.248612	9.180857	9.316367
## 246	7.930062	7.860172	7.999952
## 247	8.552111	8.493621	8.610602
## 248	8.527999	8.452502	8.603496
## 249	9.065618	9.001016	9.130220

## 250	7.914248	7.843498	7.984998
## 251	8.939809	8.870124	9.009493
## 252	9.583476	9.500531	9.666420
## 253	8.518985	8.456259	8.581710
## 254	9.677661	9.577266	9.778055
## 255	7.921719	7.864547	7.978891
## 256	7.770092	7.688985	7.851200
## 257	7.887249	7.809764	7.964733
## 258	8.606268	8.542065	8.670471
## 259	9.528708	9.441709	9.615707
## 260	7.925908	7.866763	7.985053
## 261	9.179634	9.098898	9.260370
## 262	9.637074	9.545729	9.728419
## 263	8.417440	8.361253	8.473628
## 264	7.888169	7.820184	7.956154
## 265	7.985737	7.909359	8.062115
## 266	7.964366	7.904799	8.023934
## 267	8.041717	7.994938	8.088495
## 268	8.434217	8.369193	8.499240
## 269	9.108231	9.037592	9.178869
## 270	9.708044	9.636383	9.779704
## 271	8.527381	8.452893	8.601870
## 272	8.480153	8.425078	8.535228
## 273	9.246741	9.182142	9.311341
## 274	8.545134	8.494381	8.595887
## 275	8.583804	8.505371	8.662238
## 276	8.522466	8.460101	8.584830
## 277	8.523329	8.479014	8.567644
## 278	8.062750	7.997755	8.127744
## 279	7.997276	7.940618	8.053935
## 280	8.573108	8.516860	8.629355
## 281	7.867360	7.808915	7.925805
## 282	8.442122	8.377102	8.507143
## 283	8.466069	8.410211	8.521928
## 284	7.888535	7.814401	7.962669
## 285	8.550421	8.493476	8.607366
## 286	9.542825	9.466193	9.619457
## 287	7.931287	7.862800	7.999774
## 288	8.488669	8.429492	8.547846
## 289	7.852185	7.799512	7.904858
## 290	8.476868	8.414092	8.539644
## 291	7.877944	7.817938	7.937949
## 292	9.029431	8.963844	9.095018
## 293	7.960949	7.892317	8.029582
## 294	9.100887	9.050272	9.151501
## 295	7.952418	7.873513	8.031323
## 296	7.853587	7.790018	7.917156
## 297	9.195434	9.106678	9.284191
## 298	8.554362	8.512711	8.596013

```
## 299 7.951208 7.900161 8.002256
## 300 8.091814 8.022270 8.161357

write.csv(data.frame(Pred_Nosal_Step), 'C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & Unit-15/CaseStudy2Predict_Salary_Step.csv')

#Classification
##Train - 695 : Test - 174
##### knn - K-Nearest Neighbors #####

set.seed(32)
iterations = 100
accs = data.frame(accuracy = numeric(30), k = numeric(30))

splitPerc = .80
TrainIndicesKnn = sample(seq(1:length(Empl$Attrition)),round(splitPerc * length(Empl$Attrition)))
TrainKnn = Empl[TrainIndicesKnn,]
TestKnn = Empl[-TrainIndicesKnn,]

TrainKnn<-na.omit(TrainKnn)
TestKnn<-na.omit(TestKnn)

dim(TrainKnn)

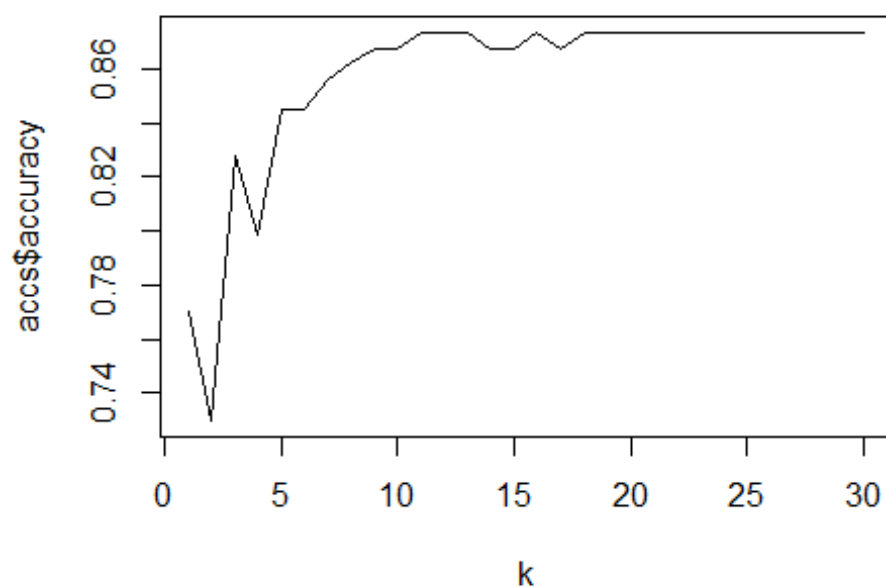
## [1] 695 36

dim(TestKnn)

## [1] 174 36

for(i in 1:30)
{
modelKNN = class::knn(TrainKnn[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],TestKnn[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],(TrainKnn$Attrition),k=i,prob=TRUE)
table(modelKNN,TestKnn$Attrition)
CM = confusionMatrix(table(modelKNN,TestKnn$Attrition))
  accs$accuracy[i] = CM$overall[1]
  accs$k[i] = i
}
plot(accs$k,accs$accuracy, type = "l", xlab = "k")
```





```
#Best value of k=7
MeanAcc = colMeans(accs)
MeanAcc

##      accuracy      k
## 0.8574713 15.5000000

#
modelKNN = class::knn(TrainKnn[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],
TestKnn[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],(TrainKnn$Attrition),k=9,prob=TRUE)
table(modelKNN,TestKnn$Attrition)

##
## modelKNN  No Yes
##      No   150  21
##      Yes    2   1

CM = confusionMatrix(table(modelKNN,TestKnn$Attrition))

##### confusionMatrix KNN #####
CM

## Confusion Matrix and Statistics
##
##
## modelKNN  No Yes
##      No   150  21
```

```

##      Yes    2    1
##
##              Accuracy : 0.8678
##              95% CI   : (0.8083, 0.9143)
##      No Information Rate : 0.8736
##      P-Value [Acc > NIR] : 0.6432147
##
##              Kappa   : 0.0512
##
##      McNemar's Test P-Value : 0.0001746
##
##              Sensitivity : 0.98684
##              Specificity : 0.04545
##              Pos Pred Value : 0.87719
##              Neg Pred Value : 0.33333
##              Prevalence : 0.87356
##              Detection Rate : 0.86207
##              Detection Prevalence : 0.98276
##              Balanced Accuracy : 0.51615
##
##              'Positive' Class : No
##

#####NB-Naive Base #####

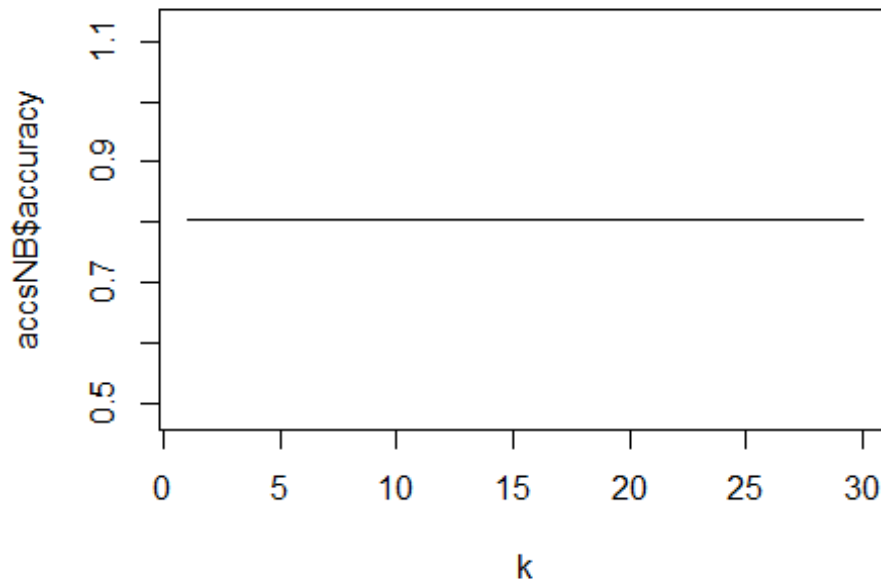
iterations = 100
accsNB = data.frame(accuracy = numeric(30), k = numeric(30))
splitPerc = .80

TrainIndicesNB = sample(seq(1:length(Empl$Attrition)),round(splitPerc * length(Empl$Attrition)))
TrainNB = Empl[TrainIndicesNB,]
TestNB = Empl[-TrainIndicesNB,]

for(i in 1:30)
{
  modelNB = naiveBayes(TrainNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],as.factor(TrainNB$Attrition))
  table(predict(modelNB,TestNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)]),as.factor(TestNB$Attrition))
  CM = confusionMatrix(table(predict(modelNB,TestNB[,c(2,11)]),as.factor(TestNB$Attrition)))
  accsNB$accuracy[i] = CM$overall[1]
  accsNB$k[i] = i
}

plot(accsNB$k,accsNB$accuracy, type = "l", xlab = "k")

```



```
#Best value of k=7
MeanAccNB = colMeans(accsNB)
MeanAccNB

##      accuracy      k
## 0.8045977 15.5000000

modelNB = naiveBayes(TrainNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)],as.factor(TrainNB$Attrition))
table(predict(modelNB,TestNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)]),as.factor(TestNB$Attrition))

##
##           No Yes
## No    116  19
## Yes    24  15

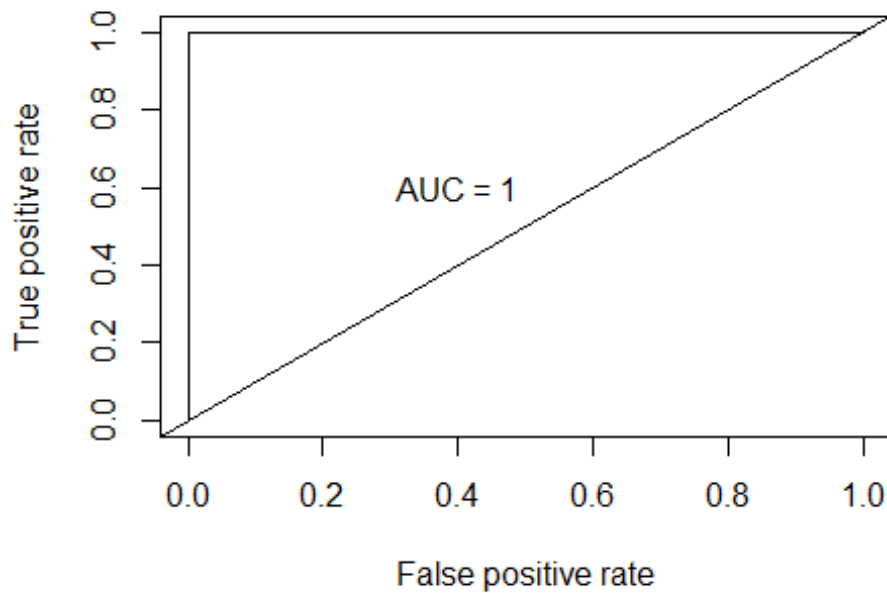
CM = confusionMatrix(table(predict(modelNB,TestNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,30,31,32,33,34,35,36)]),as.factor(TestNB$Attrition)))

##### confusionMatrix NB #####
CM

## Confusion Matrix and Statistics
##
##           No Yes
## No    116  19
```

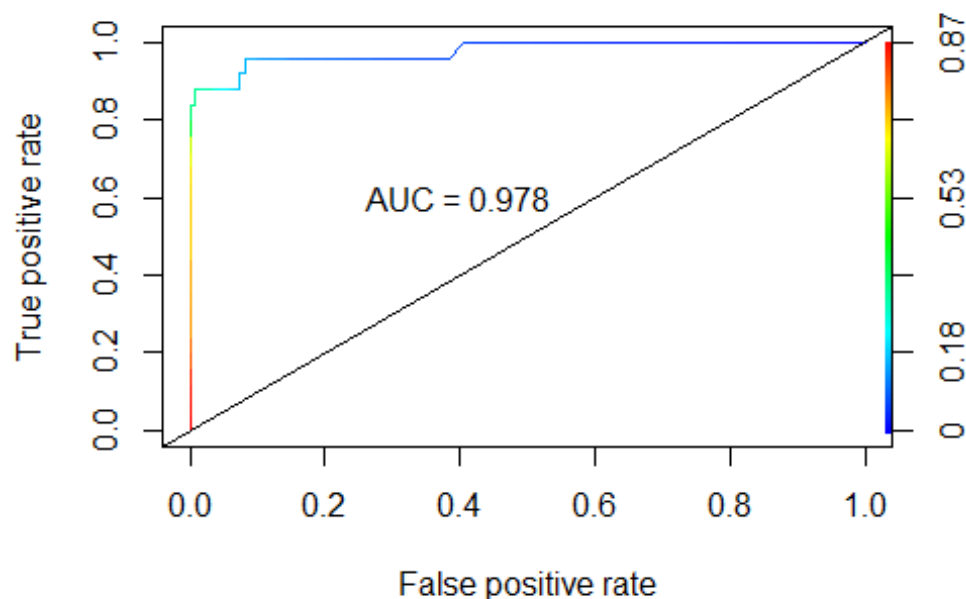
```
## Yes 24 15
##
## Accuracy : 0.7529
## 95% CI : (0.6819, 0.815)
## No Information Rate : 0.8046
## P-Value [Acc > NIR] : 0.9623
##
## Kappa : 0.2555
##
## McNemar's Test P-Value : 0.5419
##
## Sensitivity : 0.8286
## Specificity : 0.4412
## Pos Pred Value : 0.8593
## Neg Pred Value : 0.3846
## Prevalence : 0.8046
## Detection Rate : 0.6667
## Detection Prevalence : 0.7759
## Balanced Accuracy : 0.6349
##
## 'Positive' Class : No
##

##### Random Forest #####
Test<-na.omit(Test)
Train<-na.omit(Train)
# Random Forest (training data)
# Remove id variable as it's just for reference
dat.train.rf <- Train
train.rf<-randomForest(as.factor(Attrition)~.,data=dat.train.rf,mtry=4,ntree=
500,importance=T)
fit.pred<-predict(train.rf,newdata=dat.train.rf,type="prob")
pred <- prediction(fit.pred[,2], dat.train.rf$Attrition)
roc.perf = performance(pred, measure = "tpr", x.measure = "fpr")
auc.train <- performance(pred, measure = "auc")
auc.train <- auc.train@y.values
plot(roc.perf)
abline(a=0, b= 1)
text(x = .40, y = .6,paste("AUC = ", round(auc.train[[1]],3), sep = ""))
```



```
#AUC=1
```

```
# Random Forest (test data)
#Predict test set
dat.val1.rf <- Test
pred.val1<-predict(train.rf,newdata=dat.val1.rf,type="prob")
pred <- prediction(pred.val1[,2], dat.val1.rf$Attrition)
roc.perf = performance(pred, measure = "tpr", x.measure = "fpr")
auc.train <- performance(pred, measure = "auc")
auc.train <- auc.train@y.values
plot(roc.perf, colorize=TRUE)
abline(a=0, b= 1)
text(x = .40, y = .6,paste("AUC = ", round(auc.train[[1]],3), sep = ""))
```



```
# AUC = 0.974
```

```
Empl_NoAttrition_Pred<-Empl_No_Attrition%>%select(Age,Monthly.Income,Business
Travel,Daily.Rate,Distance.From.Home,Education,EducationField,Environment.Sat
isfaction,Gender,(Hourly.Rate),Job.Involvement,Job.Level,Job.Satisfaction,Mar
ital.Status,(Monthly.Rate),Num.Companies.Worked,OverTime,Percent.Salary.Hike,
Performance.Rating,Relationship.Satisfaction,Stock.Option.Level,(Total.Workin
g.Years),Training.Times.Last.Year,Work.Life.Balance,(Years.At.Company),Years.
In.Current.Role,Years.Since.Last.Promotion,Years.With.Curr.Manager)
dim(TrainKnn)
```

```
## [1] 695 36
```

```
dim(Empl_No_Attrition)
```

```
## [1] 300 35
```

```
TrainKnn<-na.omit(TrainKnn)
Empl_No_Attrition<-na.omit(Empl_No_Attrition)
```

```
modelKNN=class::knn(TrainKnn[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,3
0,31,32,33,34,35,36)],Empl_No_Attrition[,c(2,4,6,7,11,13,14,15,17,19,20,21,24
,25,26,28,29,30,31,32,33,34,35)],TrainKnn$Attrition, prob = TRUE, k = 7)
modelKNN
```

```
## [1] No No No No No No No No No No No No No No No No No No
No
```

```
## [19] No No No No No No No No No No No No No No No No No No
```

```

No
## [37] No No No No No No No No No No No No No No No No No No
No
## [55] No No No No No No No No No No No No No No No No No No
No
## [73] No No No No No No No No No No No No No No No No No No
No
## [91] No No No No No No No No No No No No No No No No Yes No No
No
## [109] No No No No No No No No No No No No No No No No No No
No
## [127] Yes No No No Yes No No No No No No No No No No No No No
No
## [145] No No No No No No No No No No No No No No No No No No
No
## [163] No No No No No No No No No No No No No No No No No No
No
## [181] No No No No No No No No No No No No No No No Yes No No No
No
## [199] No No No No No No No No No No No No No No No No No No
No
## [217] No No No No No No No No No No No No No No No No No No
No
## [235] No No No No No No No No No No No No No No No No No Yes
No
## [253] No No No No No No No No No No No No No No No No No No
No
## [271] No Yes No No No No No No No No No No No Yes No No No No
No
## [289] No No No No No No No No No No No No No
## attr(,"prob")
## [1] 1.0000000 1.0000000 0.5714286 1.0000000 0.8571429 1.0000000 0.857142
9
## [8] 0.8571429 1.0000000 0.7142857 1.0000000 0.5714286 0.7142857 1.000000
0
## [15] 0.8571429 0.5714286 1.0000000 1.0000000 0.8571429 1.0000000 0.857142
9
## [22] 1.0000000 1.0000000 0.5714286 1.0000000 1.0000000 0.8571429 1.000000
0
## [29] 1.0000000 0.7142857 0.7142857 0.8571429 1.0000000 0.7142857 0.857142
9
## [36] 0.8571429 1.0000000 0.8571429 0.8571429 1.0000000 0.8571429 0.714285
7
## [43] 1.0000000 1.0000000 0.7142857 0.8571429 1.0000000 1.0000000 1.000000
0
## [50] 0.8571429 1.0000000 0.8571429 0.5714286 0.8571429 0.7142857 1.000000
0
## [57] 0.8571429 0.7142857 1.0000000 1.0000000 1.0000000 0.8571429 0.714285
7
## [64] 1.0000000 0.8571429 0.8571429 1.0000000 1.0000000 0.8571429 0.857142

```

```

9
## [71] 1.0000000 0.8571429 0.8571429 1.0000000 0.8571429 0.7142857 1.0000000
0
## [78] 0.8571429 0.7142857 0.8571429 0.8571429 0.8571429 0.5714286 0.857142
9
## [85] 0.8571429 0.8571429 0.8571429 0.8571429 0.7142857 0.8571429 0.714285
7
## [92] 0.8571429 0.5714286 1.0000000 1.0000000 1.0000000 0.8571429 1.000000
0
## [99] 0.8571429 0.5714286 1.0000000 1.0000000 0.7142857 1.0000000 0.571428
6
## [106] 1.0000000 0.8571429 1.0000000 0.8571429 1.0000000 0.8571429 0.714285
7
## [113] 0.8571429 1.0000000 1.0000000 1.0000000 0.7142857 1.0000000 1.000000
0
## [120] 0.8571429 0.8571429 0.7142857 0.8571429 0.7142857 0.8571429 0.714285
7
## [127] 0.5714286 1.0000000 1.0000000 0.8571429 0.7142857 1.0000000 0.857142
9
## [134] 0.8571429 1.0000000 1.0000000 1.0000000 0.8571429 1.0000000 1.000000
0
## [141] 0.8571429 0.8571429 0.8571429 0.7142857 0.8571429 0.7142857 0.857142
9
## [148] 0.8571429 0.8571429 0.8571429 0.5714286 0.8571429 1.0000000 0.857142
9
## [155] 0.7142857 0.8571429 0.8571429 0.8571429 0.5714286 1.0000000 0.857142
9
## [162] 1.0000000 0.8571429 0.8571429 0.8571429 0.5714286 0.8571429 0.857142
9
## [169] 0.5714286 1.0000000 0.7142857 0.5714286 0.8571429 0.5714286 1.000000
0
## [176] 1.0000000 0.7142857 1.0000000 1.0000000 0.8571429 0.5714286 0.571428
6
## [183] 0.7142857 0.8571429 1.0000000 1.0000000 1.0000000 1.0000000 0.857142
9
## [190] 1.0000000 0.8571429 1.0000000 0.8571429 0.5714286 0.7142857 0.857142
9
## [197] 0.7142857 0.7142857 0.8571429 1.0000000 0.8571429 1.0000000 0.714285
7
## [204] 0.7142857 0.8571429 0.8571429 0.8571429 0.8571429 0.8571429 0.857142
9
## [211] 0.8571429 0.7142857 1.0000000 0.8571429 0.7142857 1.0000000 0.714285
7
## [218] 0.8571429 0.5714286 1.0000000 0.8571429 0.5714286 1.0000000 1.000000
0
## [225] 0.8571429 0.7142857 0.8571429 1.0000000 0.7142857 1.0000000 0.714285
7
## [232] 0.5714286 0.8571429 1.0000000 0.8571429 1.0000000 0.5714286 1.000000
0
## [239] 1.0000000 1.0000000 0.8571429 0.7142857 1.0000000 0.8571429 0.571428

```



```

6
## [246] 1.0000000 0.8571429 0.7142857 0.8571429 0.5714286 0.5714286 0.857142
9
## [253] 1.0000000 0.8571429 1.0000000 0.8571429 1.0000000 1.0000000 0.714285
7
## [260] 1.0000000 1.0000000 1.0000000 1.0000000 0.8571429 0.8571429 0.714285
7
## [267] 1.0000000 1.0000000 0.8571429 0.7142857 0.7142857 0.7142857 0.714285
7
## [274] 0.7142857 0.7142857 0.8571429 0.7142857 1.0000000 0.7142857 0.857142
9
## [281] 0.7142857 0.5714286 1.0000000 0.7142857 0.8571429 1.0000000 0.714285
7
## [288] 0.7142857 0.5714286 0.7142857 0.8571429 0.7142857 0.7142857 0.857142
9
## [295] 0.7142857 0.7142857 0.8571429 0.7142857 0.8571429 0.8571429
## Levels: No Yes

write.csv(data.frame(modelKNN), 'C:/Sowmya/SMU/04_Doing Data Science/Unit-14 &
Unit-15/CaseStudy2Predict_Attrition_KNN.csv')
modelNB = naiveBayes(TrainNB[,c(2,5,7,8,12,14,15,16,18,20,21,22,25,26,27,29,3
0,31,32,33,34,35,36)],as.factor(TrainNB$Attrition))
PredNB=predict(modelNB,Empl_No_Attrition[,c(2,4,6,7,11,13,14,15,17,19,20,21,2
4,25,26,28,29,30,31,32,33,34,35)])
PredNB

## [1] No No Yes No No No No No No No No No No No No No No No
No
## [19] No No Yes No No No No No No Yes Yes Yes Yes No No No Yes Yes
Yes
## [37] No No No No No No No No No Yes No No No Yes No No No No
No
## [55] No No No No No No No No No Yes No No No No No No No No Yes
No
## [73] No No No Yes No No No No No No No No No No No No No No
Yes
## [91] No No No No No No No No No No Yes No No No No Yes No No
No
## [109] No No No No No No No No No No No No No No No No No No
No
## [127] No No No No No No No No No No No No No No Yes Yes No No No
No
## [145] No No Yes Yes No No No No No No No Yes No Yes No Yes No No
Yes
## [163] No No No Yes No No No No No Yes No Yes No No No No Yes No
No
## [181] Yes No No No No No No No Yes No No No No No No No No No
Yes
## [199] No No No No No No No Yes No No No No No Yes No No No No
No

```

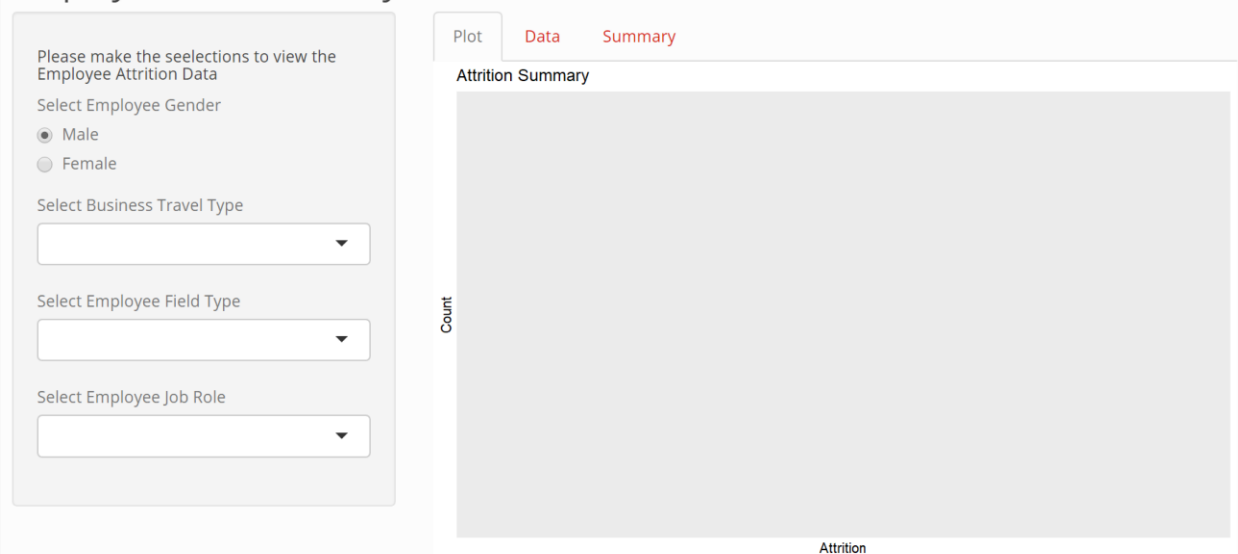
```
## [217] Yes No Yes No No No No No Yes No No No Yes No No No No
Yes
## [235] No No No No No No Yes No No No No No Yes No No No Yes
No
## [253] No No No No No No No No No No No No No No No No No Yes
No
## [271] Yes Yes No Yes Yes No No No Yes Yes Yes No No No Yes Yes Yes
Yes
## [289] Yes Yes No No Yes No Yes No No Yes No No
## Levels: No Yes
```

```
write.csv(data.frame(PredNB), 'C:/Sowmya/SMU/04_Doing Data Science/Unit-14 & U
nit-15/CaseStudy2Predict_Attrition_NB.csv')
```

R SHINY App

The Landing Page for the RShiny App:

## Employee Attrition Analysis

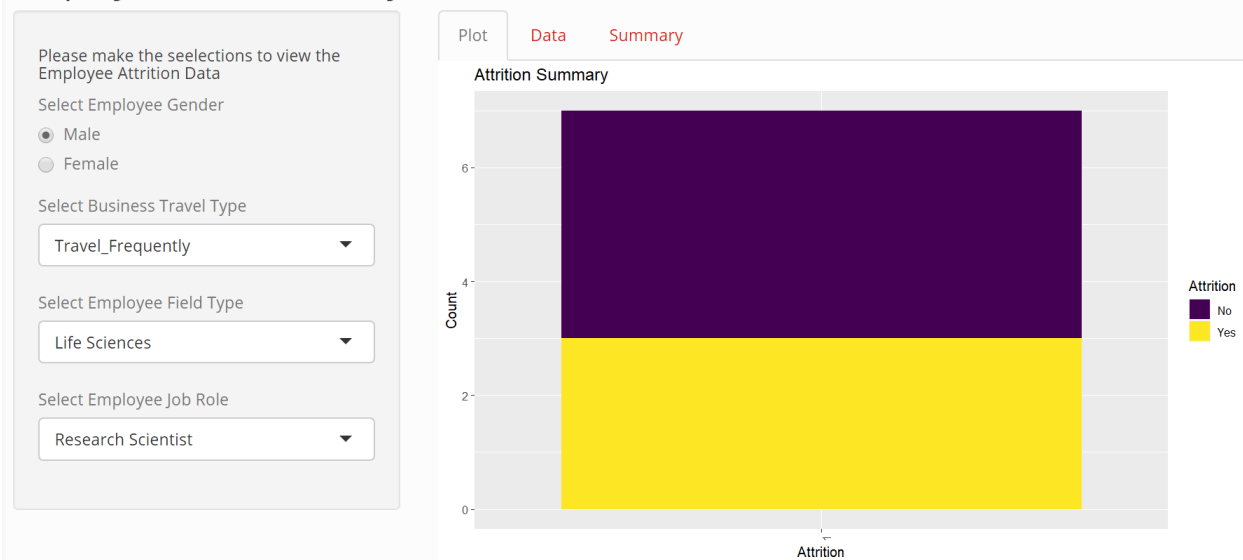


On Selecting the text Drop downs for Business Travel, Employee Field Type and Employee Job Role:

Gender: Male; Business Travel Type: Travel Frequently; Filed Type: Life Science , Job Role : Research Scientist

Selection 1: Displays the Attrition summary for the selected values in Tab Plot

## Employee Attrition Analysis



Tab Data displays the raw data for this selection:

## Employee Attrition Analysis

Please make the selections to view the Employee Attrition Data

Select Employee Gender

☒ Male  
☐ Female

Select Business Travel Type

Travel\_Frequently

Select Employee Field Type

Life Sciences

Select Employee Job Role

Research Scientist

Plot Data Summary

ID	Age	Attrition	BusinessTravel	Daily.Rate	Department	Distance.From.Home	Education	Educatic
111	28	No	Travel_Frequently	773	Research & Development	6	3	Life Scier
178	26	Yes	Travel_Frequently	342	Research & Development	2	3	Life Scier
323	30	No	Travel_Frequently	1012	Research & Development	5	4	Life Scier
447	38	No	Travel_Frequently	1189	Research & Development	1	3	Life Scier
472	29	Yes	Travel_Frequently	459	Research & Development	24	2	Life Scier
513	32	No	Travel_Frequently	585	Research & Development	10	3	Life Scier
796	33	Yes	Travel_Frequently	1076	Research & Development	3	3	Life Scier

EducationField	Employee.Count	Employee.Number	Environment.Satisfaction	Gender	Hourly.Rate	Job.Involvement	Job.Level	Job.Role	Job.Satisfaction
Life Sciences	1	1154	3	Male	39	2	1	Research Scientist	3
Life Sciences	1	1053	1	Male	57	3	1	Research Scientist	1
Life Sciences	1	861	2	Male	75	2	1	Research Scientist	4
Life Sciences	1	1668	4	Male	90	3	2	Research Scientist	4
Life Sciences	1	1868	4	Male	73	2	1	Research Scientist	4
Life Sciences	1	1720	1	Male	56	3	1	Research Scientist	3
Life Sciences	1	702	1	Male	70	3	1	Research Scientist	1
Total.Working.Years	Training.Times.Last.Year	Work.Life.Balance	Years.At.Company	Years.In.Current.Role	Years.Since.Last.Promotion	Years.With.Curr.Manager			
3	2	3	3		1		0		2
6	2	3	3		2		1		2
10	3	2	5		4		0		3
19	4	4	13		11		2		9
1	3	2	1		0		1		0
10	3	2	5		2		1		3
10	3	3	10		8		9		7

The Summary Tab displays the summary of the dataset

## Employee Attrition Analysis

Please make the selections to view the Employee Attrition Data

Select Employee Gender

☒ Male

☐ Female

Select Business Travel Type

Travel\_Frequently

Select Employee Field Type

Life Sciences

Select Employee Job Role

Research Scientist

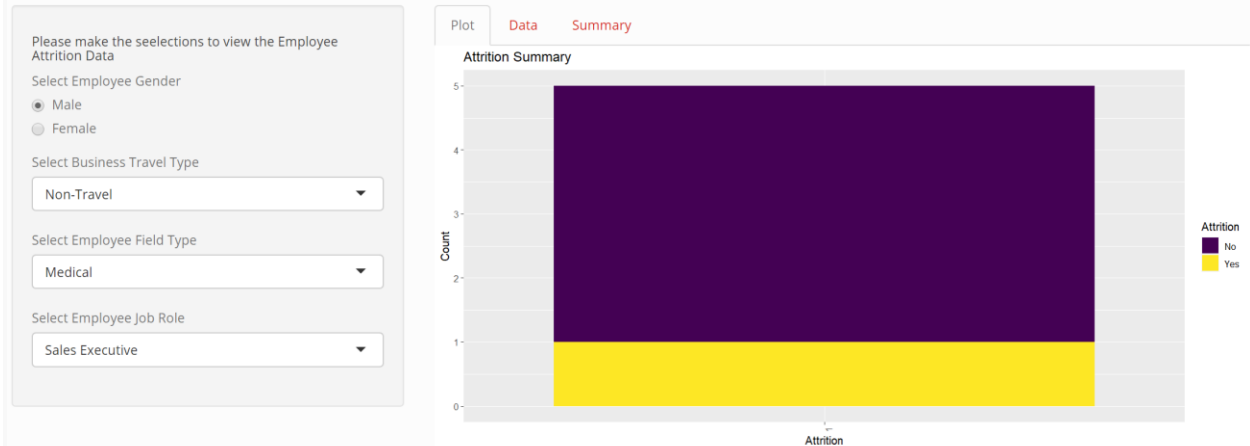
Plot Data Summary

ID	Age	Attrition	BusinessTravel	Daily.Rate	Department
Min. : 1.0	Min. :18.00	Length:870	Length:870	Min. : 103.0	Length:870
1st Qu.:218.2	1st Qu.:30.00	Class :character	Class :character	1st Qu.: 472.5	Class :character
Median :435.5	Median :35.00	Mode :character	Mode :character	Median : 817.5	Mode :character
Mean :435.5	Mean :36.83			Mean : 815.2	
3rd Qu.:652.8	3rd Qu.:43.00			3rd Qu.:1165.8	
Max. :870.0	Max. :60.00			Max. :1499.0	
Distance.From.Home	Education	EducationField	Employee.Count	Employee.Number	Environment.Satisfaction
Min. : 1.000	Min. :1.000	Length:870	Min. :1	Min. : 1.0	Min. :1.000
1st Qu.: 2.000	1st Qu.:2.000	Class :character	1st Qu.:1	1st Qu.: 477.2	1st Qu.:2.000
Median : 7.000	Median :3.000	Mode :character	Median :1	Median :1039.0	Median :3.000
Mean : 9.339	Mean :2.901		Mean :1	Mean :1029.8	Mean :2.701
3rd Qu.:14.000	3rd Qu.:4.000		3rd Qu.:1	3rd Qu.:1561.5	3rd Qu.:4.000
Max. :29.000	Max. :5.000		Max. :1	Max. :2064.0	Max. :4.000
Gender	Hourly.Rate	Job.Involvement	Job.Level	Job.Role	Job.Satisfaction
Length:870	Min. : 30.00	Min. :1.000	Min. :1.000	Length:870	Min. :1.000
Class :character	1st Qu.: 48.00	1st Qu.:2.000	1st Qu.:1.000	Class :character	1st Qu.:2.000
Mode :character	Median : 66.00	Median :3.000	Median :2.000	Mode :character	Median :3.000
	Mean : 65.61	Mean :2.723	Mean :2.039		Mean :2.709
	3rd Qu.: 83.00	3rd Qu.:3.000	3rd Qu.:3.000		3rd Qu.:4.000
	Max. :100.00	Max. :4.000	Max. :5.000		Max. :4.000
Marital.Status	Monthly.Income	Monthly.Rate	Num.Companies.Worked	Over18	OverTime
Length:870	Min. : 1081	Min. : 2094	Min. :0.000	Length:870	Length:870
Class :character	1st Qu.: 2840	1st Qu.: 8092	1st Qu.:1.000	Class :character	Class :character
Mode :character	Median : 4946	Median :14074	Median :2.000	Mode :character	Mode :character
	Mean : 6390	Mean :14326	Mean :2.728		
	3rd Qu.: 8182	3rd Qu.:20456	3rd Qu.:4.000		
	Max. :19999	Max. :26997	Max. :9.000		
Percent.Salary.Hike	Performance.Rating	Relationship.Satisfaction	Standard.Hours	Stock.Option.Level	
Min. :11.0	Min. :3.000	Min. :1.000	Min. :80	Min. :0.0000	
1st Qu.:12.0	1st Qu.:3.000	1st Qu.:2.000	1st Qu.:80	1st Qu.:0.0000	
Median :14.0	Median :3.000	Median :3.000	Median :80	Median :1.0000	
Mean :15.2	Mean :3.152	Mean :2.707	Mean :80	Mean :0.7839	
3rd Qu.:18.0	3rd Qu.:3.000	3rd Qu.:4.000	3rd Qu.:80	3rd Qu.:1.0000	
Max. :25.0	Max. :4.000	Max. :4.000	Max. :80	Max. :3.0000	
Total.Working.Years	Training.Times.Last.Year	Work.Life.Balance	Years.At.Company	Years.In.Current.Role	
Min. : 0.00	Min. :0.000	Min. :1.000	Min. :0.000	Min. :0.000	
1st Qu.: 6.00	1st Qu.:2.000	1st Qu.:2.000	1st Qu.:3.000	1st Qu.:2.000	
Median :10.00	Median :3.000	Median :3.000	Median :5.000	Median :3.000	

Running the application for another selection:

Gender: Male; Business Travel Type: Non-Travel; Filed Type: Medical , Job Role : Sales Executive

### Employee Attrition Analysis



### Employee Attrition Analysis

Please make the selections to view the Employee Attrition Data

Select Employee Gender

☒ Male  
☐ Female

Select Business Travel Type

Non-Travel

Select Employee Field Type

Medical

Select Employee Job Role

Sales Executive

Plot Data Summary

ID	Age	Attrition	BusinessTravel	Daily.Rate	Department	Distance.From.Home	Education	EducationLevel
116	37	No	Non-Travel	1252	Sales	19	2	Medical
190	28	No	Non-Travel	120	Sales	4	3	Medical
469	26	Yes	Non-Travel	265	Sales	29	2	Medical
763	41	No	Non-Travel	256	Sales	10	2	Medical
836	37	No	Non-Travel	142	Sales	9	4	Medical

Education	EducationField	Employee.Count	Employee.Number	Environment.Satisfaction	Gender	Hourly.Rate	Job.Involvement	Job.Level	Job.Role
2	Medical	1	904	1	Male	32	3	3	Sales Executive
3	Medical	1	129	2	Male	43	3	2	Sales Executive
2	Medical	1	1037	2	Male	79	1	2	Sales Executive
2	Medical	1	1329	3	Male	40	1	2	Sales Executive
4	Medical	1	626	1	Male	69	3	3	Sales Executive