

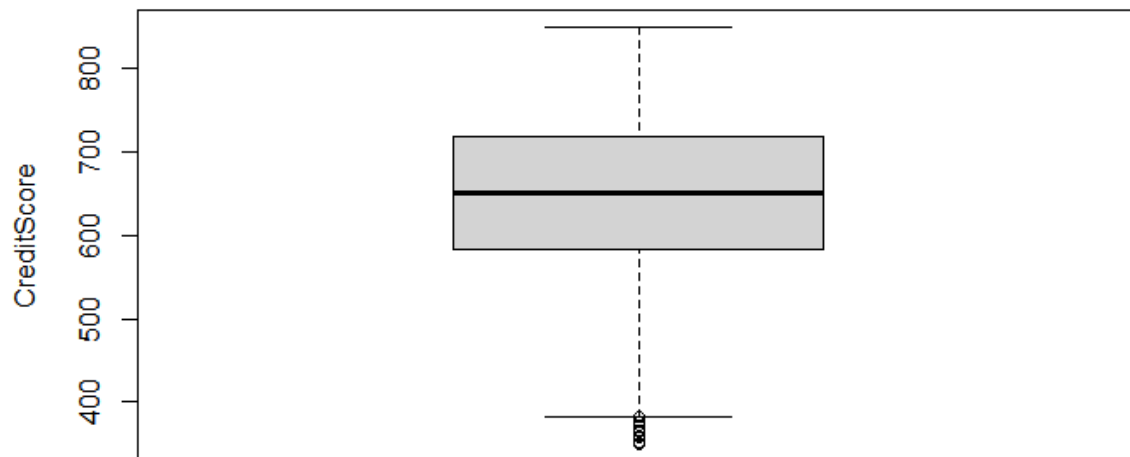
Summary Statistics

CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProducts	HasCrCard
Min. :350.0	Length:10000	Length:10000	Min. :18.00	Min. : 0.000	Min. : 0	Min. :1.00	0:2945
1st Qu.:584.0	Class :character	Class :character	1st Qu.:32.00	1st Qu.: 3.000	1st Qu.: 0	1st Qu.:1.00	1:7055
Median :652.0	Mode :character	Mode :character	Median :37.00	Median : 5.000	Median : 97199	Median :1.00	
Mean :650.5			Mean :38.92	Mean : 5.013	Mean : 76486	Mean :1.53	
3rd Qu.:718.0			3rd Qu.:44.00	3rd Qu.: 7.000	3rd Qu.:127644	3rd Qu.:2.00	
Max. :850.0			Max. :92.00	Max. :10.000	Max. :250898	Max. :4.00	
IsActiveMember	EstimatedSalary	Exited					
0:4849	Min. : 11.58	Min. :0.0000					
1:5151	1st Qu.: 51002.11	1st Qu.:0.0000					
	Median :100193.91	Median :0.0000					
	Mean :100090.24	Mean :0.2037					
	3rd Qu.:149388.25	3rd Qu.:0.0000					
	Max. :199992.48	Max. :1.0000					

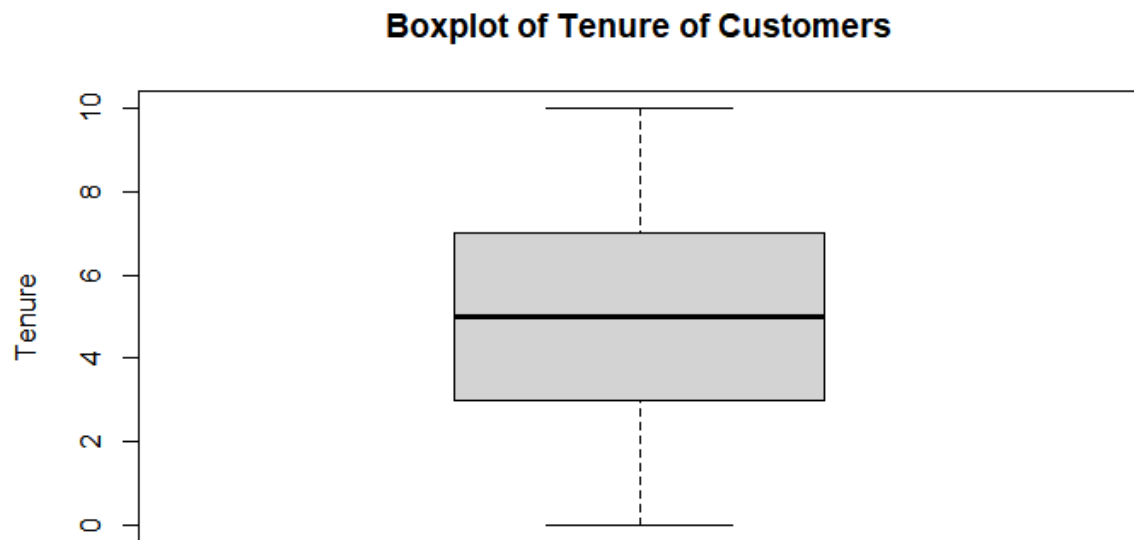
Boxplot of Age of Customers

Boxplot of Credit Score

Boxplot of Credit Score of Customers

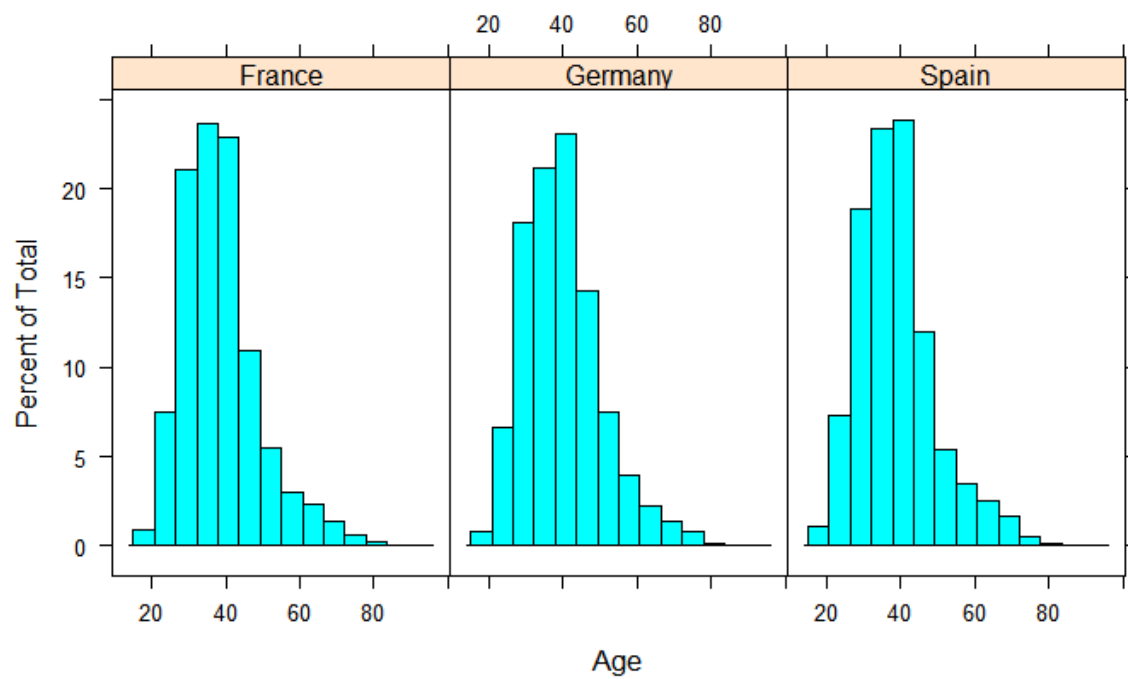


Boxplot of Tenure of Customers

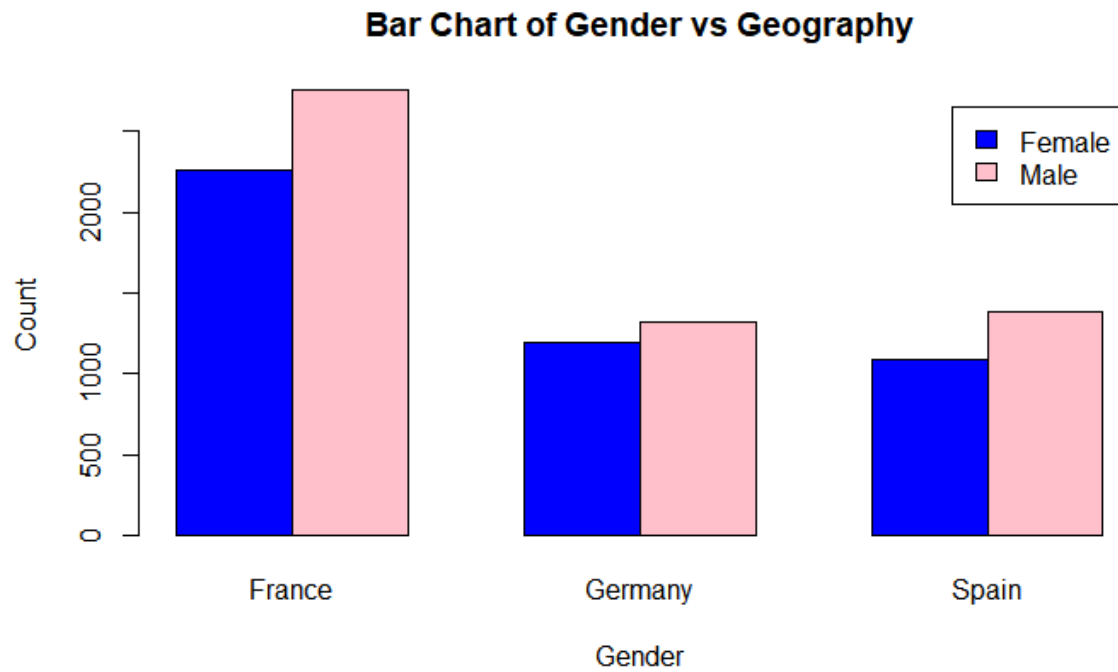


Visualizing Categorical Data

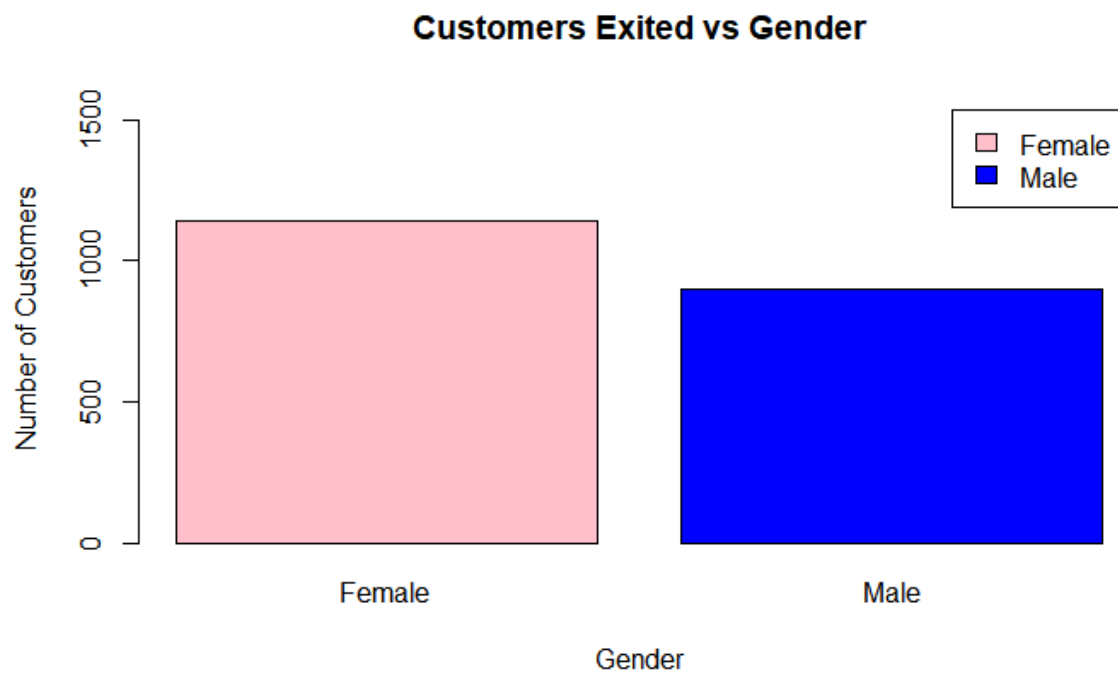
Histogram, Age versus Geography



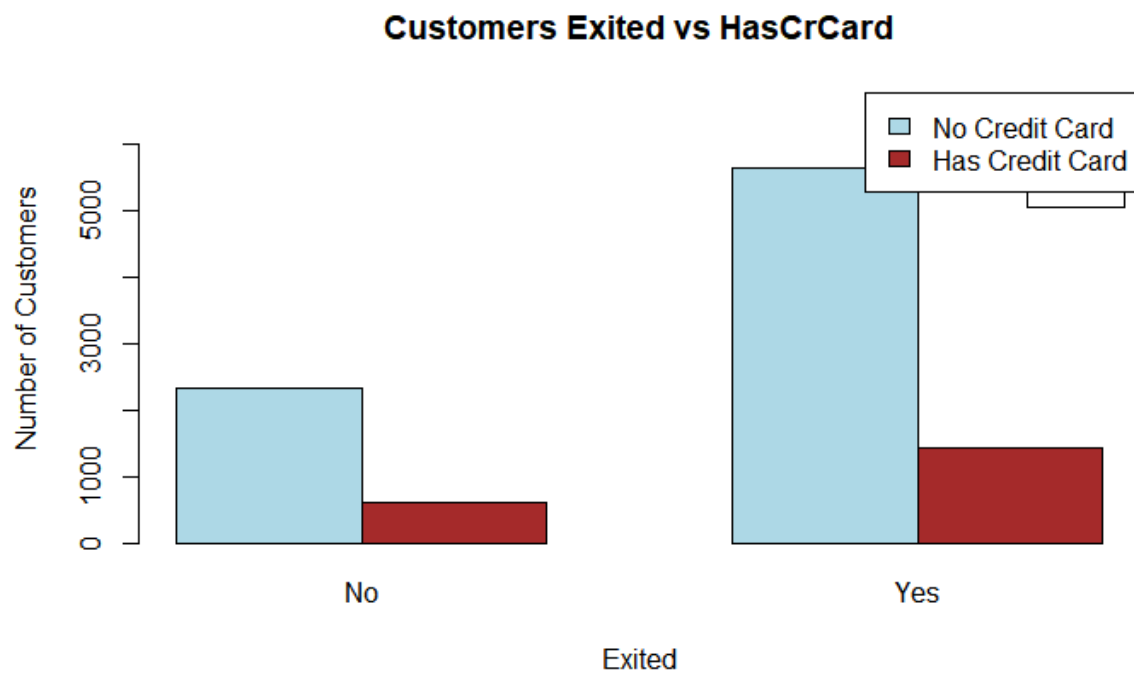
Visualizing Gender and Geography Exited



Visualizing Gender versus Exited

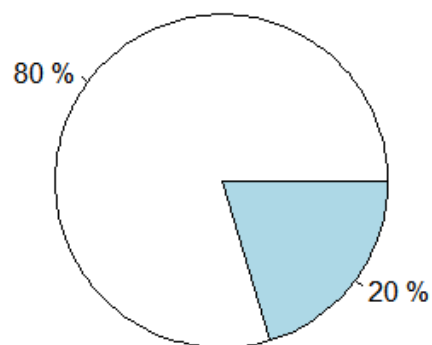


Visualizing HasCrCard Versus Exited



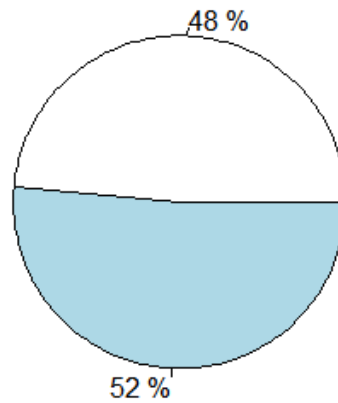
Visualizing Customers Exited using pie chart

**Percentage of Customers Exited and Retained
[0: Retained and 1: Customers Exited]**



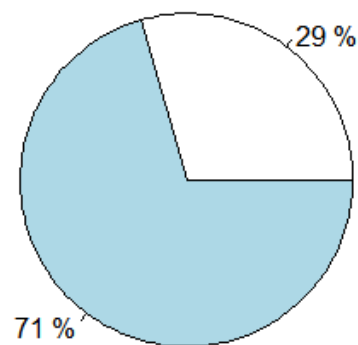
Visualizing IsActiveMember in a pie chart

Percentage of Active and Inactive Members
[0: Inactive and 1: Active]



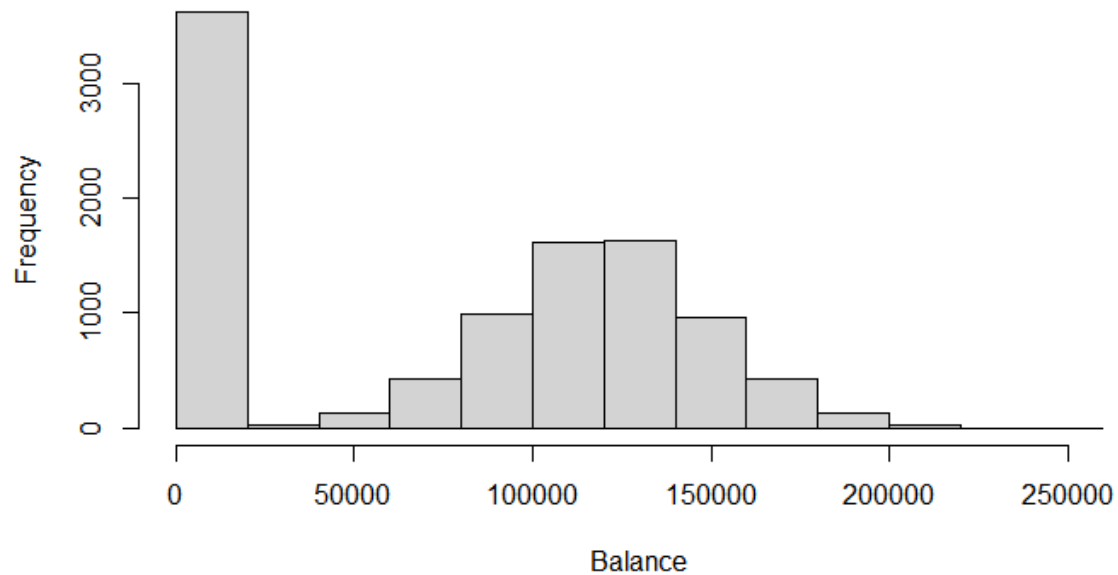
Visualizing HasCrCard in a pie chart

Percentage of Customers with and without Credit Card
[0: No, 1: Yes]

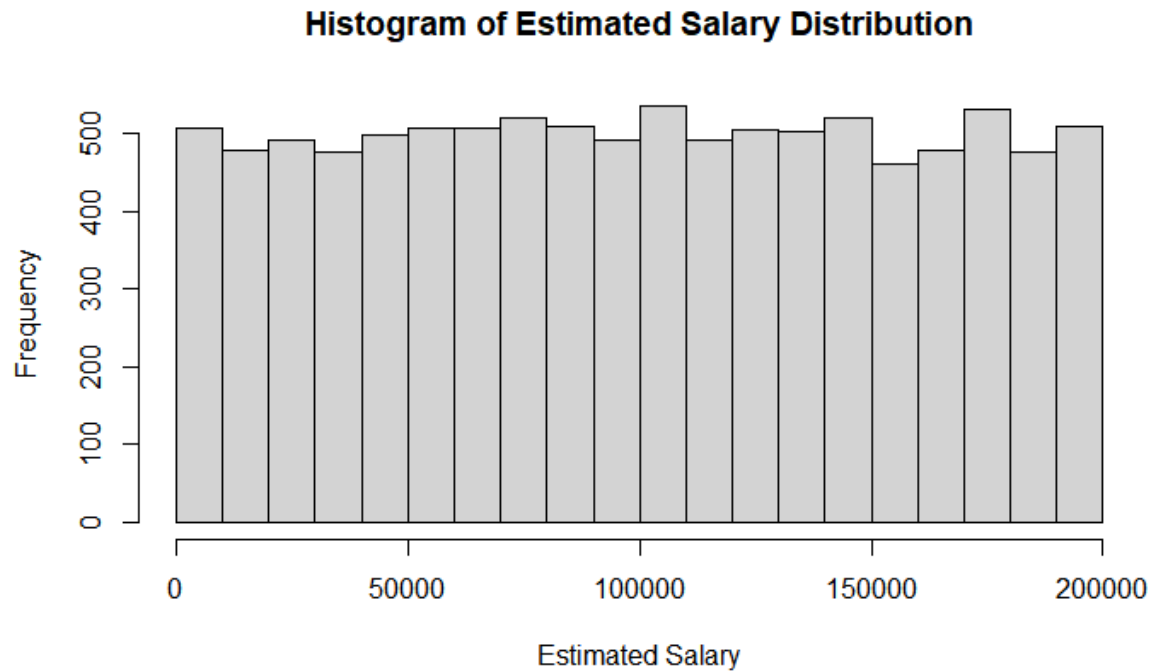


Visualizing Continuous Variables; Balance and EstimatedSalary

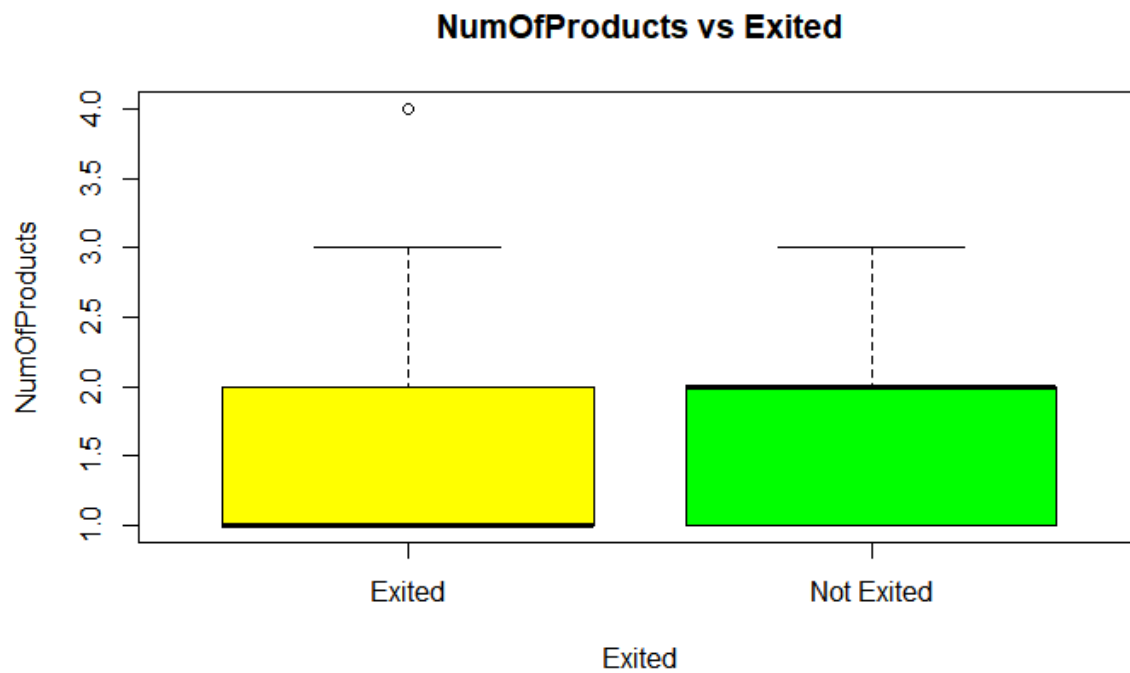
Histogram of Balance Distribution



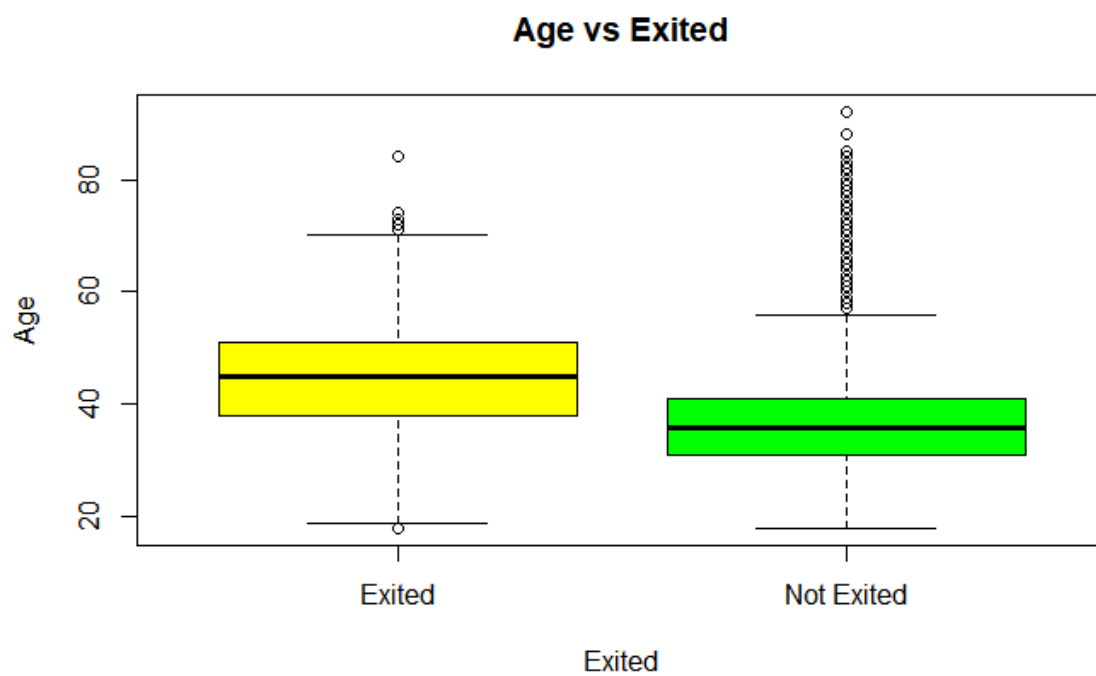
Histogram of Estimated Salary distribution



Visualizing NumofProducts versus Exited

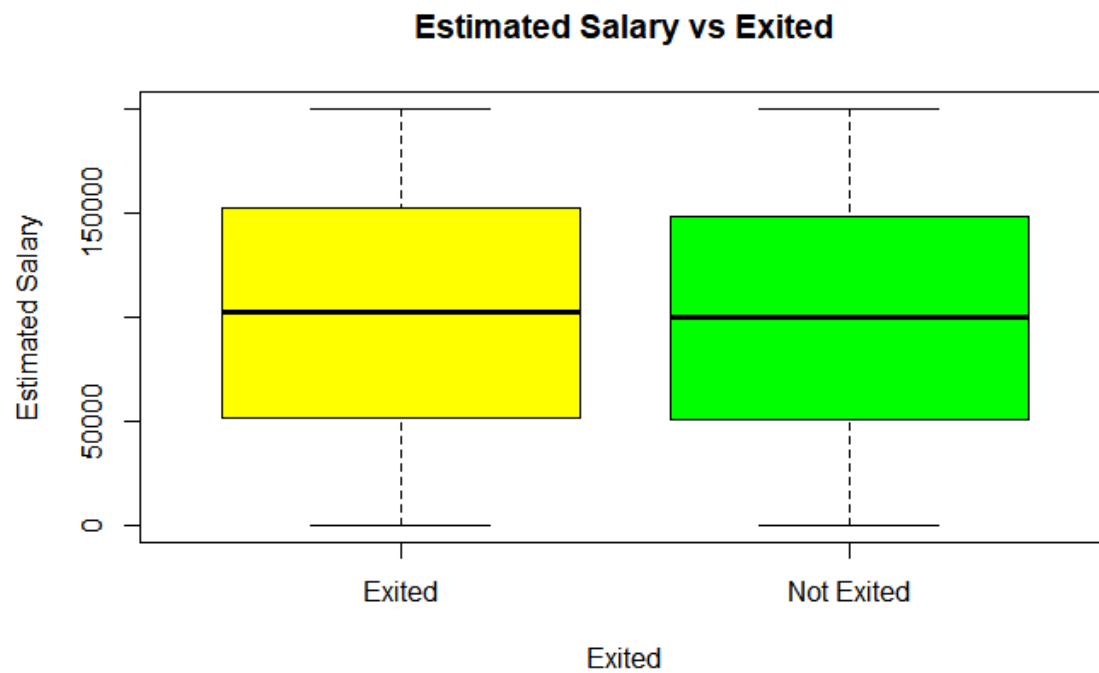


Visualizing Age versus Exited

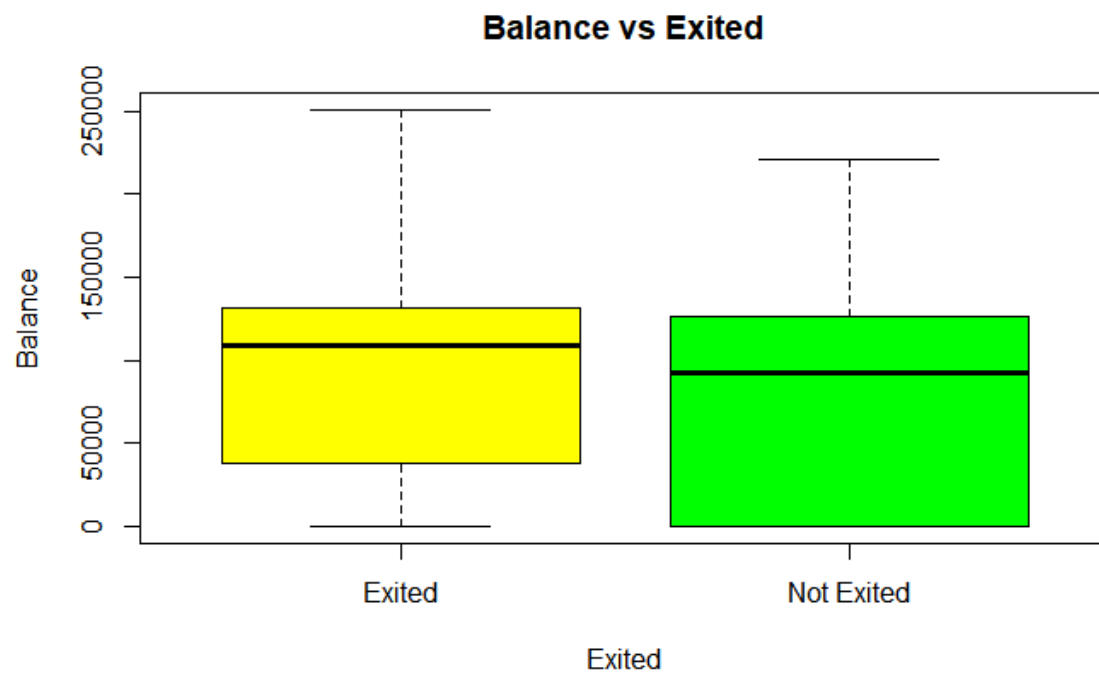


Visualizing Continuous Variables versus Categorical Variables

Visualizing EstimatedSalary versus Exited



Visualizing Balance versus Exited



Building Machine Language Model, Decision Tree

Training a model on the data

```
> prop.table(summary(churn_train$Exited))
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  0.0000  0.1702  0.0000  0.8298
> prop.table(summary(churn_test$Exited))
  Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
0.0000 0.0000  0.0000  0.1604  0.0000  0.8396
```

Display simple facts about the tree

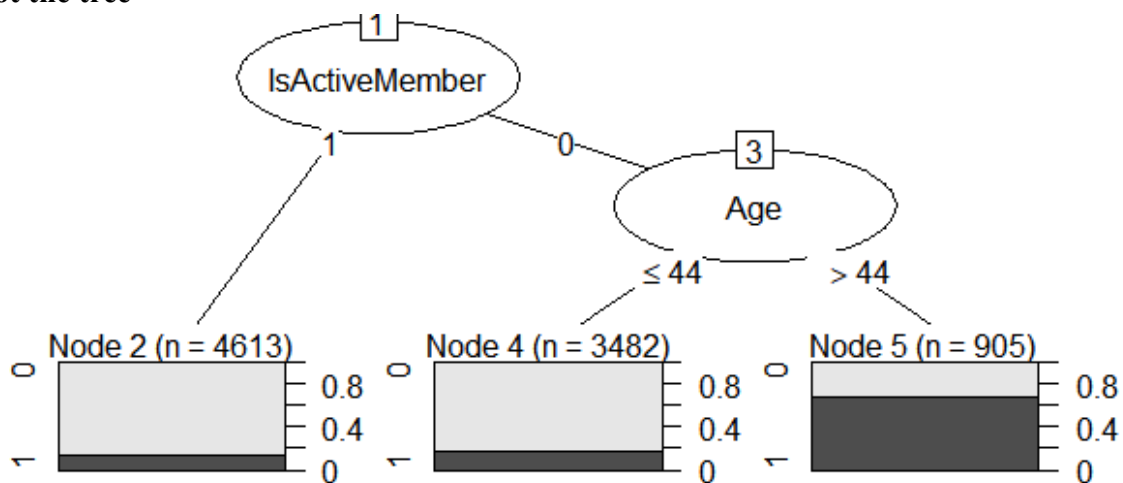
```
call:
C5.0.default(x = churn_train[-11], y = churn_train$Exited, control
 = C5.0Control(minCases = 400))

Classification Tree
Number of samples: 9000
Number of predictors: 10

Tree size: 3

Non-standard options: attempt to group attributes, minimum number of cases: 400
```

Plot the tree



Cell Contents

	N
N / Row Total	
N / Table Total	

Total observations in Table: 1000

actual Exited	predicted Exited		Row Total
	0	1	
0	776	33	809
	0.959	0.041	0.809
	0.776	0.033	
1	127	64	191
	0.665	0.335	0.191
	0.127	0.064	
Column Total	903	97	1000

> |