HR Analytics CASE STUDY

Submitted By:

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ABSTRACT

Problem Statement:

- A 4000 employee company XYZ has 16% attrition rate and thus wants to identify the factors impacting attrition to reduce the costs and improve work efficiency.

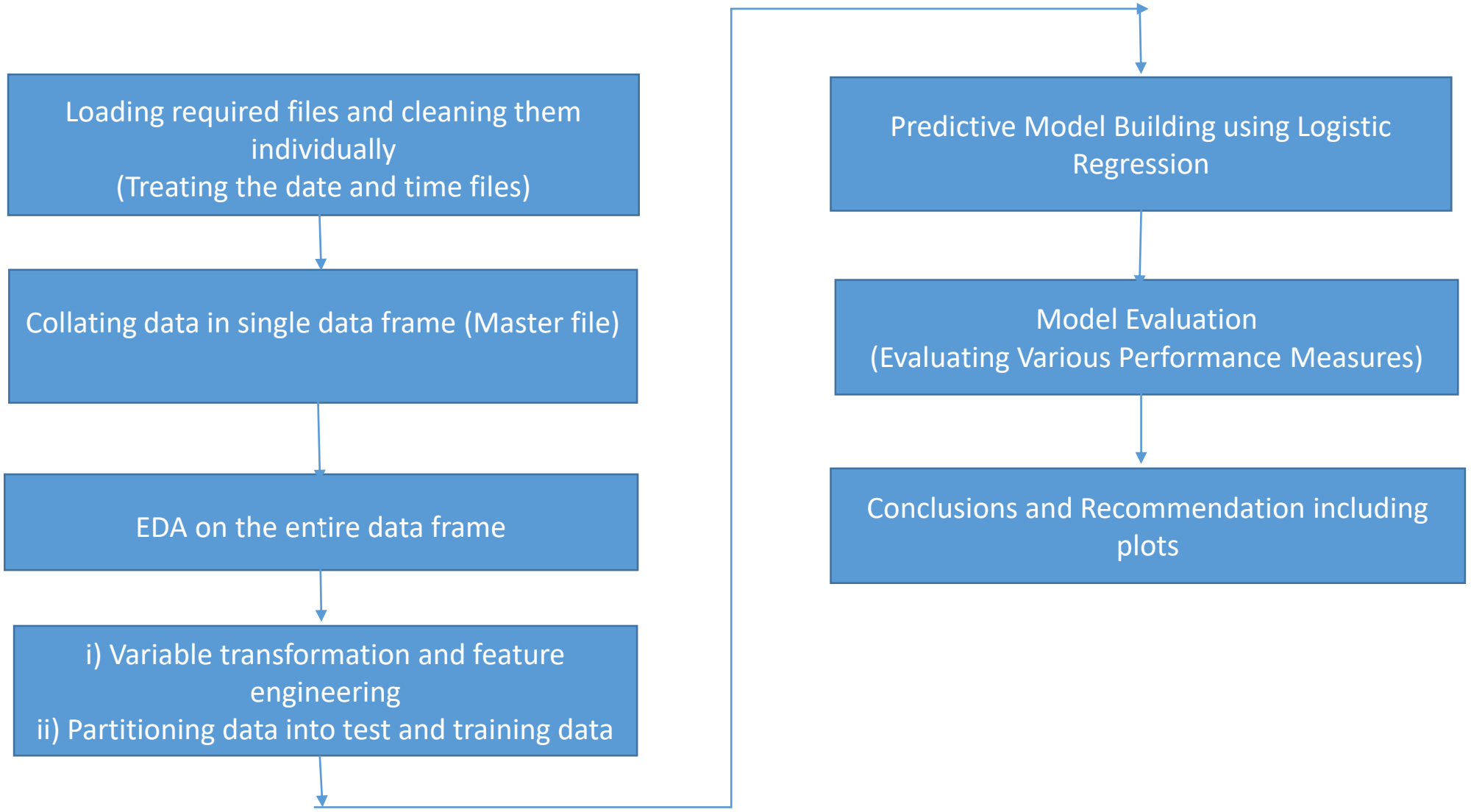
Abstract:

The HR Analytics Case Study is being carried out for the company who wants to act upon the cause of attrition in the company. Attrition in any company, be it because of the employees leaving voluntarily or being fired, harms the company's reputation and the issues must be addressed in a right way.

Business Goals:

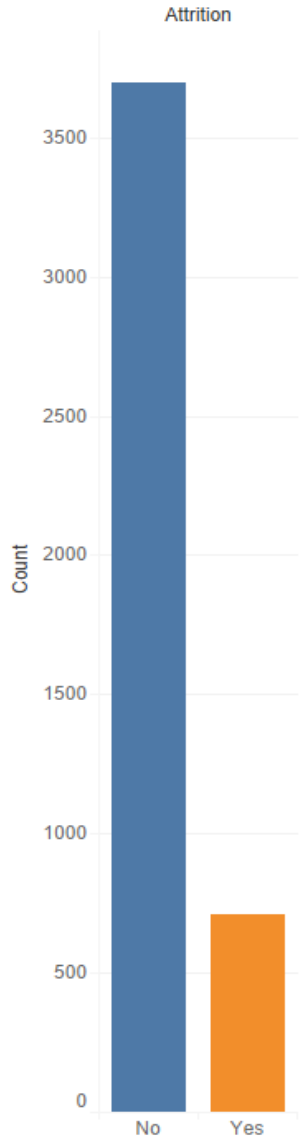
- Find the factors affecting the 16% attrition rate
- Perform Univariate and Multivariate Analysis of variables of interest
- To model the probability of Attrition using Logistic Regression
- Find most important factors leading to attrition to be addressed on priority
- Suggest Methods for minimizing the same.

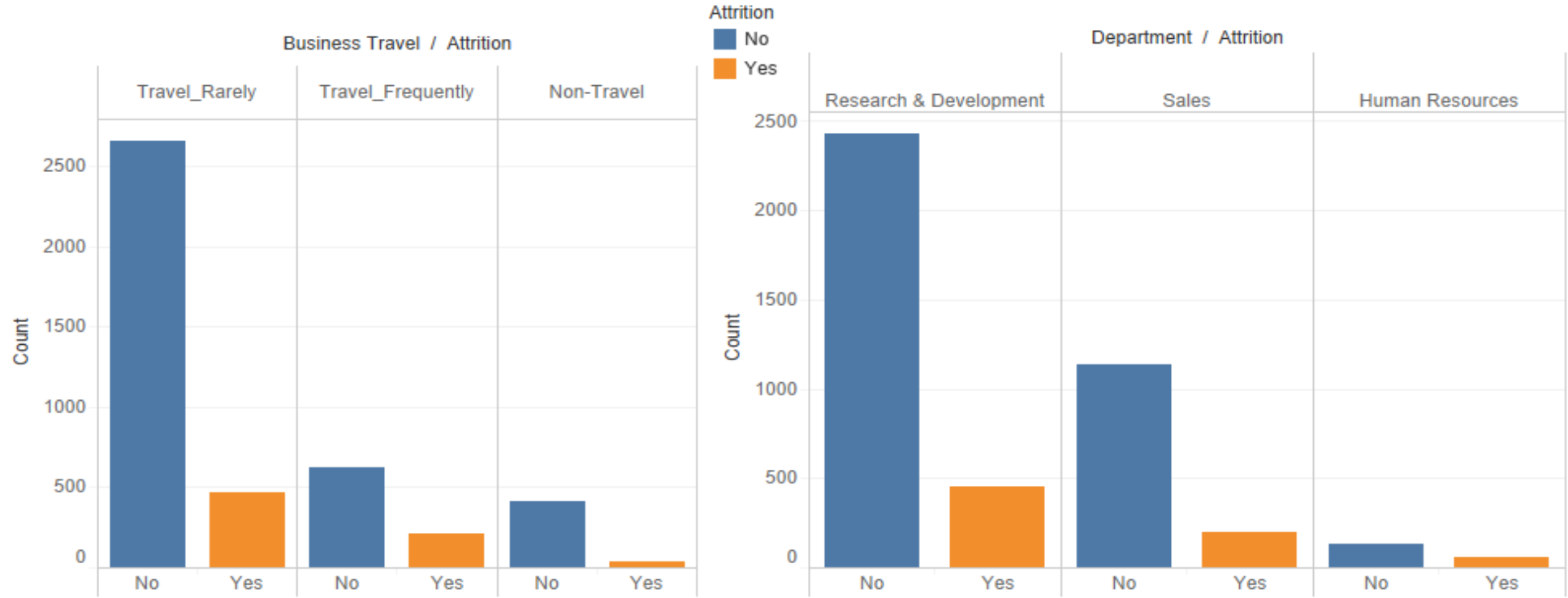
PROBLEM SOLVING METHODOLOGY

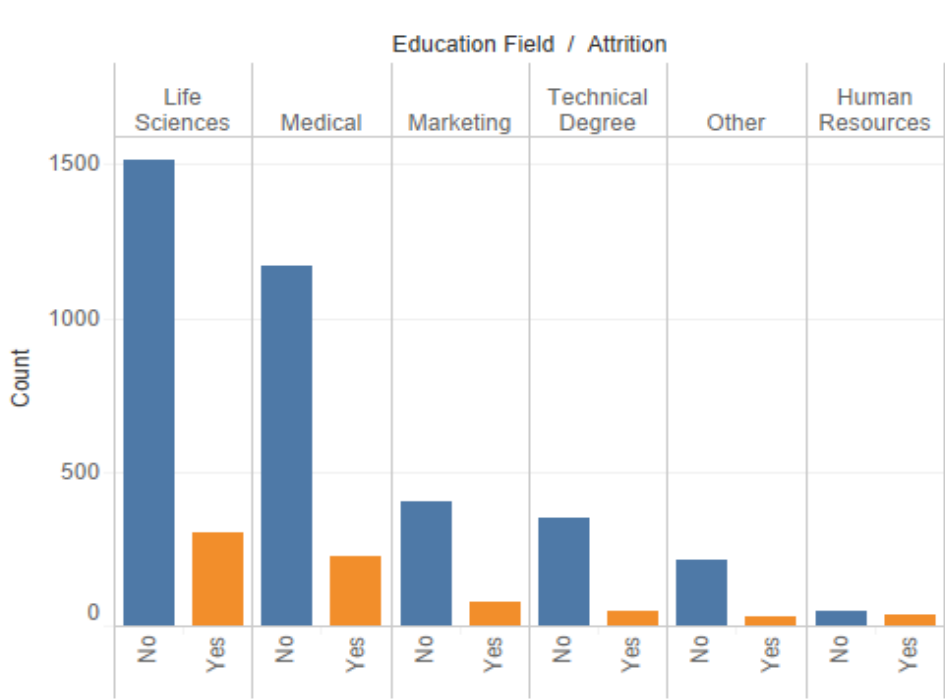


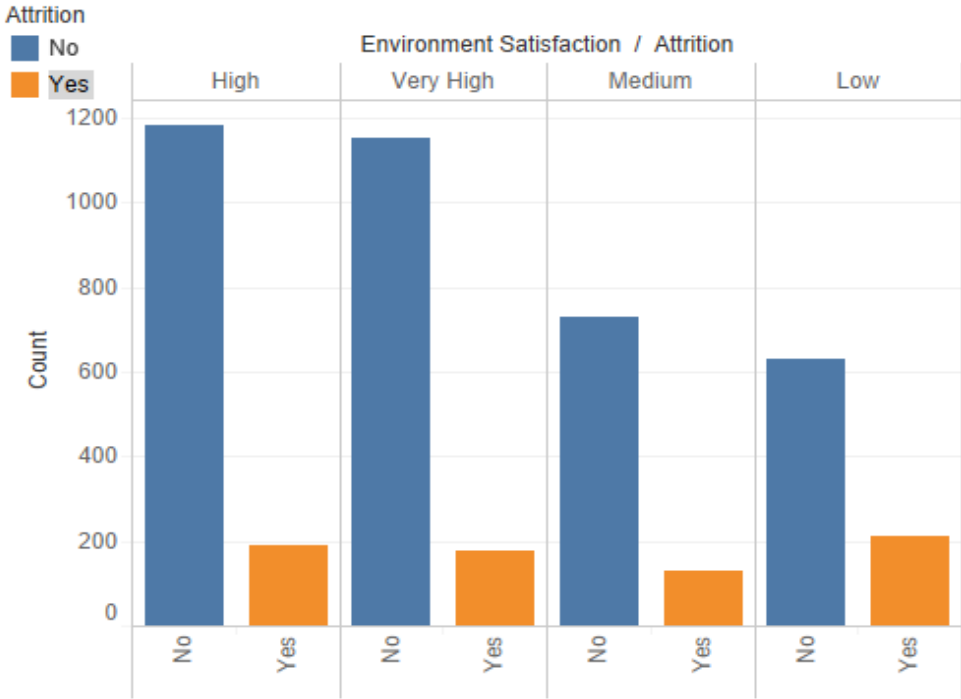
PLOTS

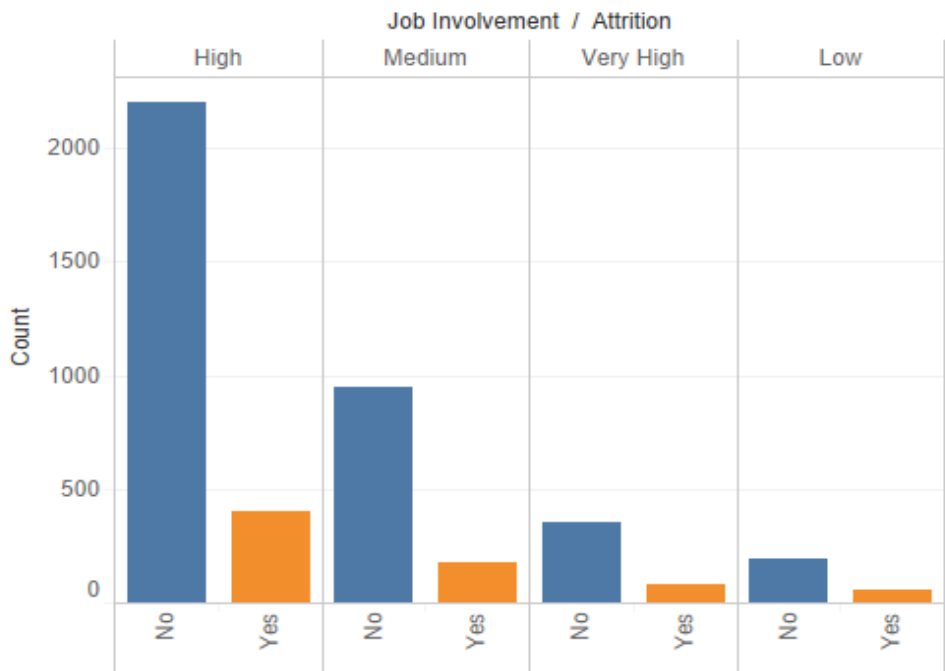
- This bar graph shows that there is about 16% of Attrition of the total employees working in XYZ company.
- Succeeding this, there are graphs showing Attrition with respect to each important variable given in the dataset.
- We had derived three new variables, TenurePerJob, YearsWithoutChange1, YearsWithoutChange2 whose graphs are also shown.

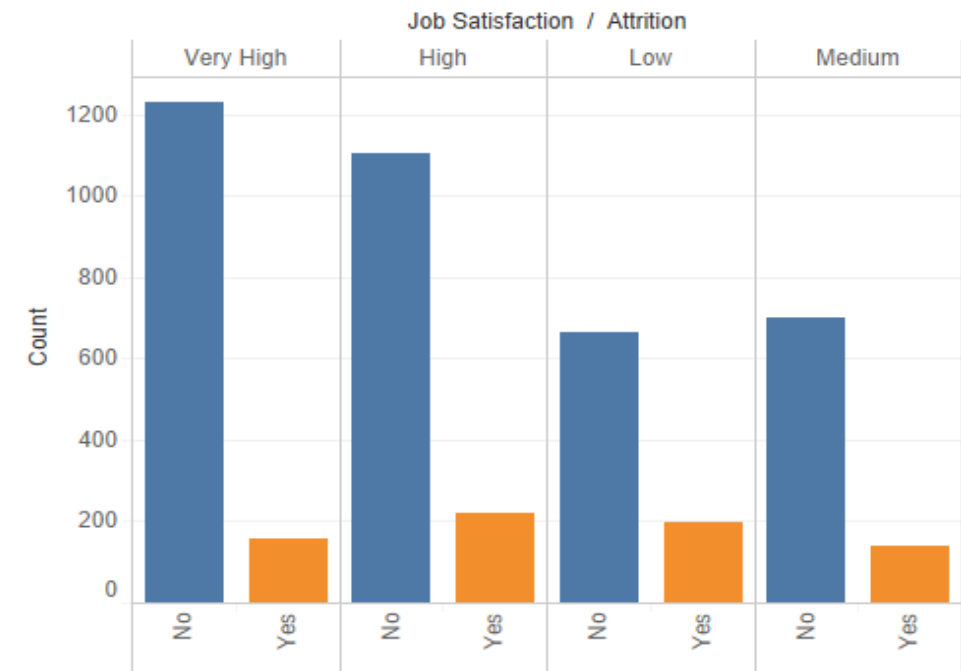


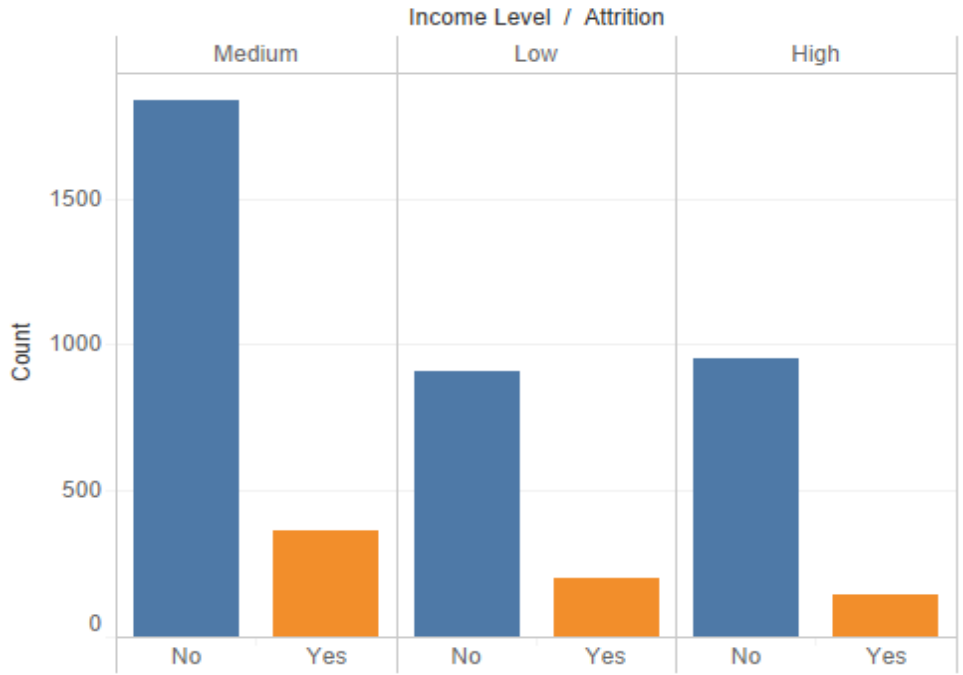

Attribution
No
Yes
Business Travel / Attrition
Travel_Rarely
Travel_Frequently
Non-Travel
Count
2500
2000
1500
1000
500
0
No
Yes
Department / Attrition
Research & Development
Sales
Human Resources
Education / Attrition
Bachelor
Master
College
Below College
Doctor
Gender / Attrition
Male
Female

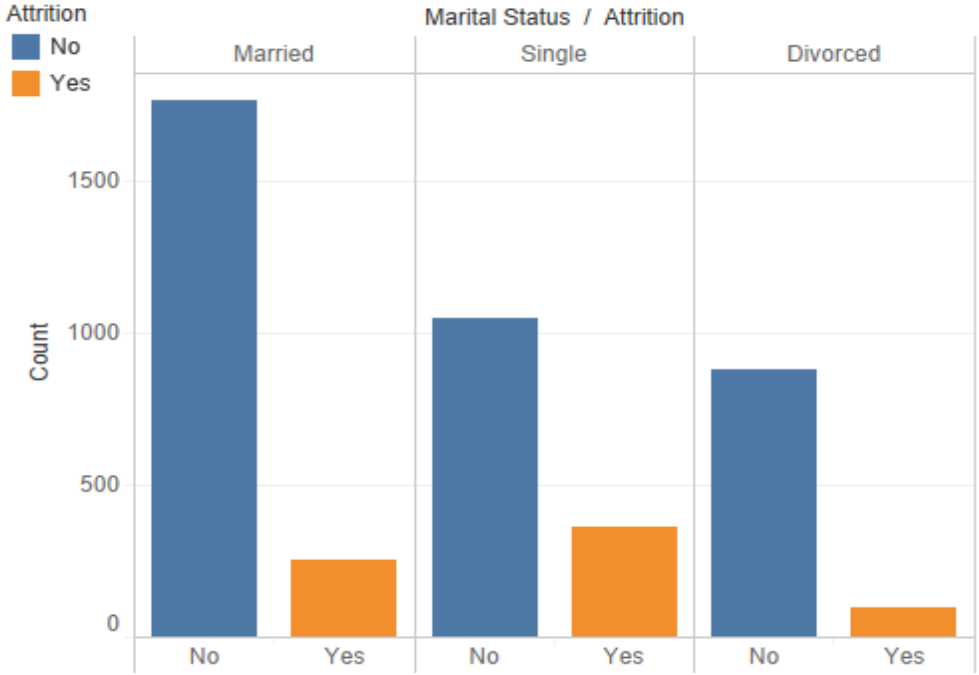

Education Field / Attrition
Life Sciences
Medical
Marketing
Technical Degree
Other
Human Resources
Count
1500
1000
500
0
No
Yes

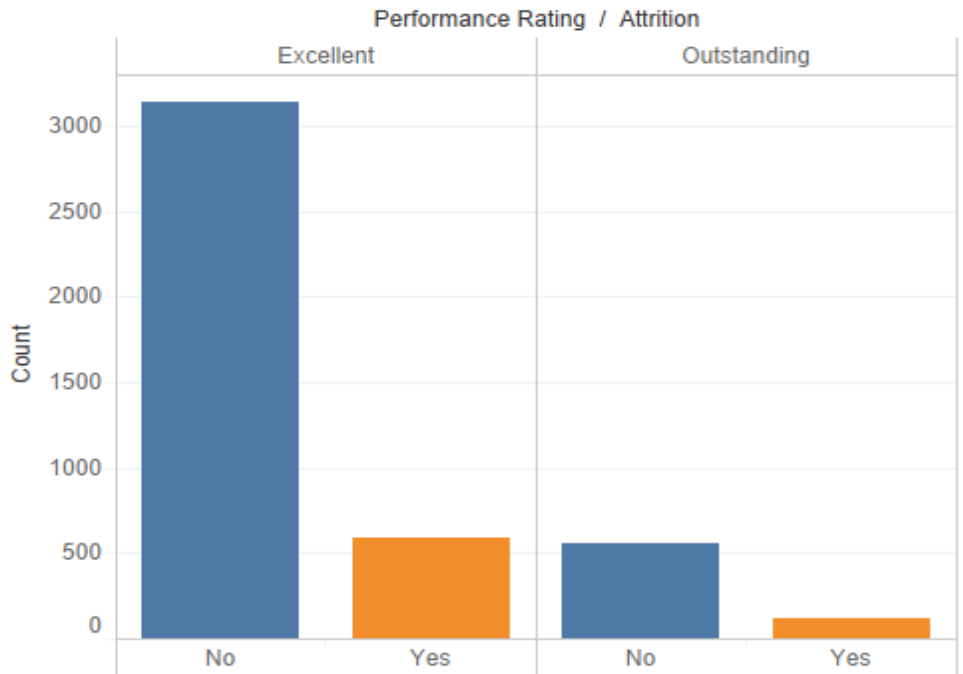

Attrition
No
Yes
Environment Satisfaction / Attrition
High
Very High
Medium
Low
Count
1200
1000
800
600
400
200
0
No
Yes

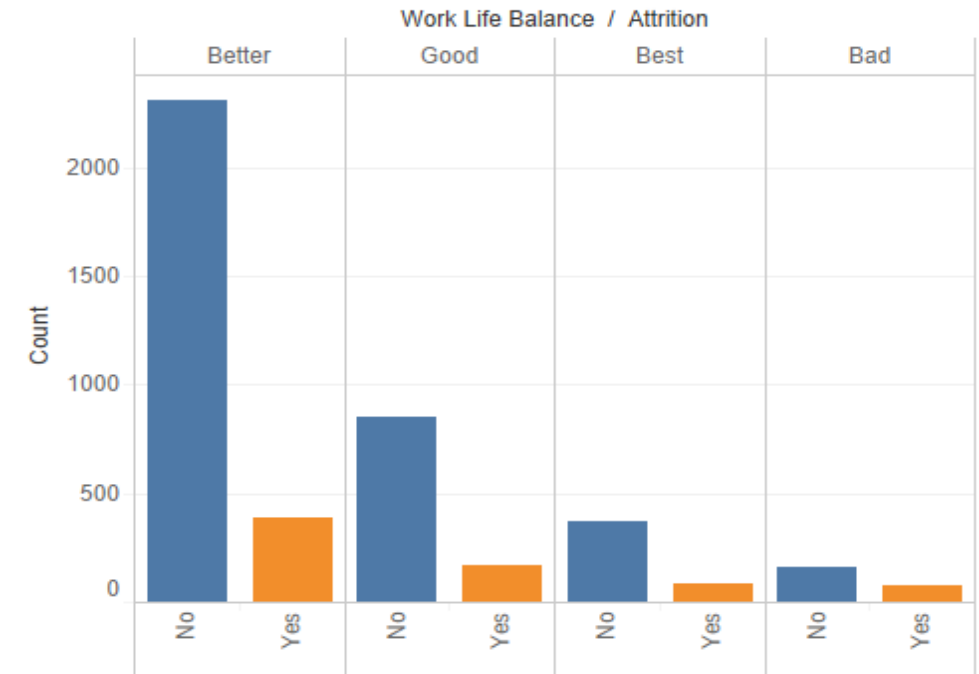

Job Involvement / Attrition
High
Medium
Very High
Low
Count
2000
1500
1000
500
0
No
Yes

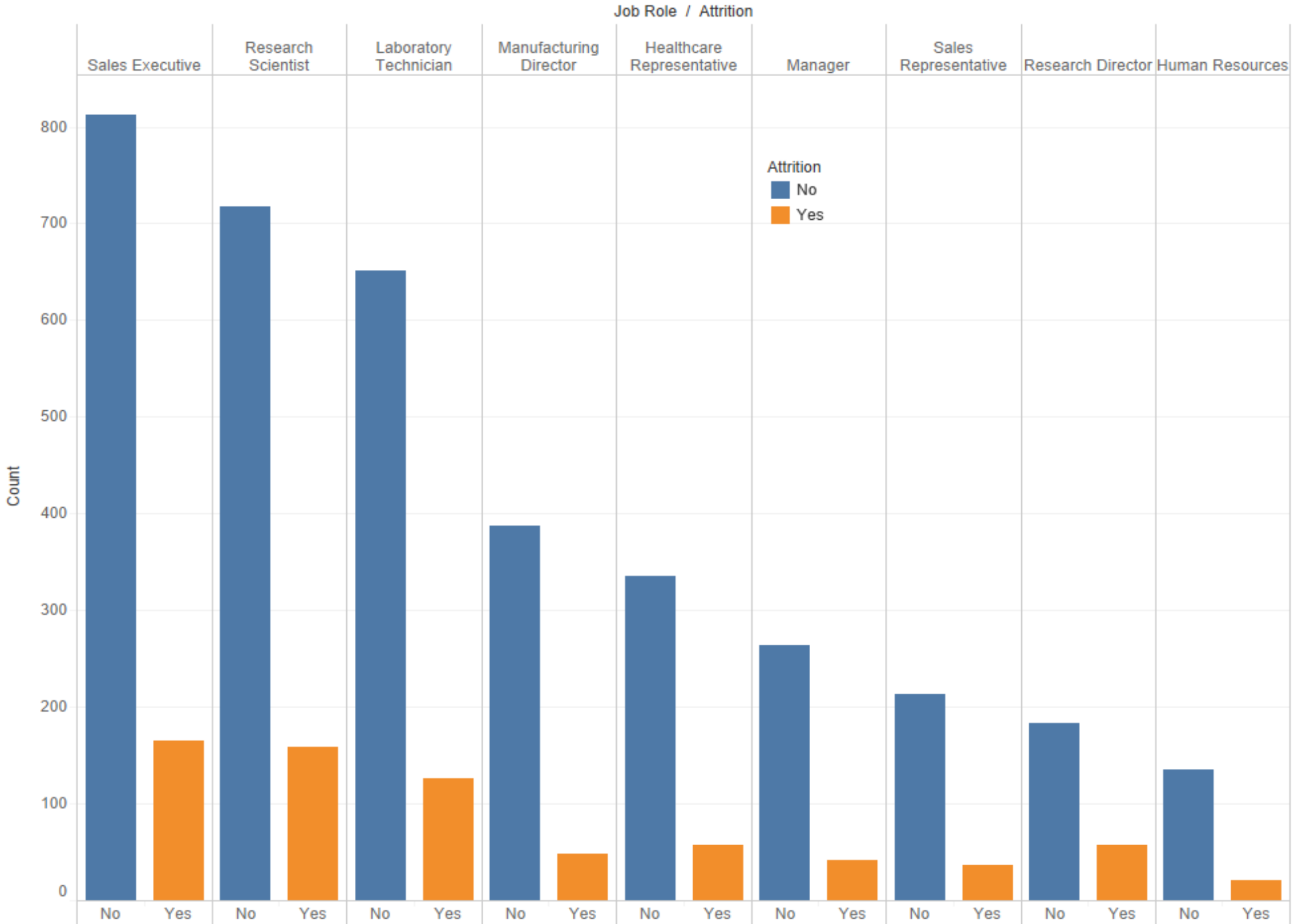

Job Satisfaction / Attrition
Very High
High
Low
Medium
Count
1200
1000
800
600
400
200
0
No
Yes

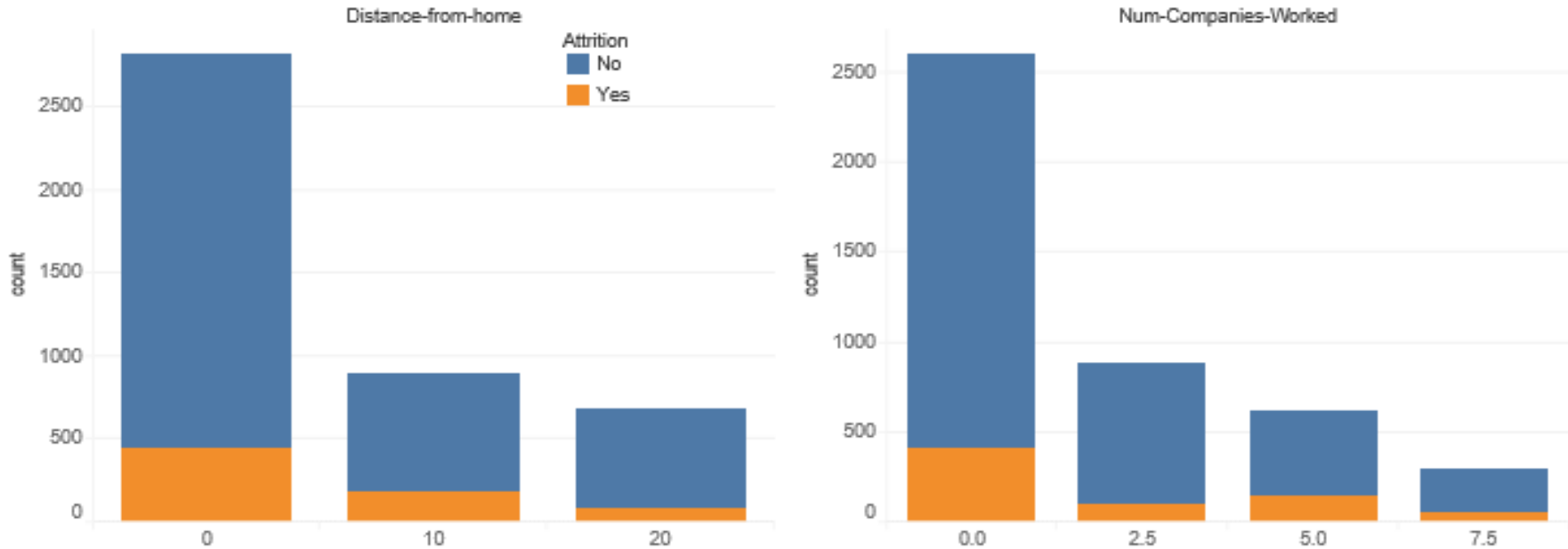

Income Level / Attrition
Medium
Low
High
Count
1500
1000
500
0
No
Yes
No
Yes
No
Yes


Attrition
No
Yes
Marital Status / Attrition
Married
Single
Divorced
Count
1500
1000
500
0
No
Yes
No
Yes
No
Yes

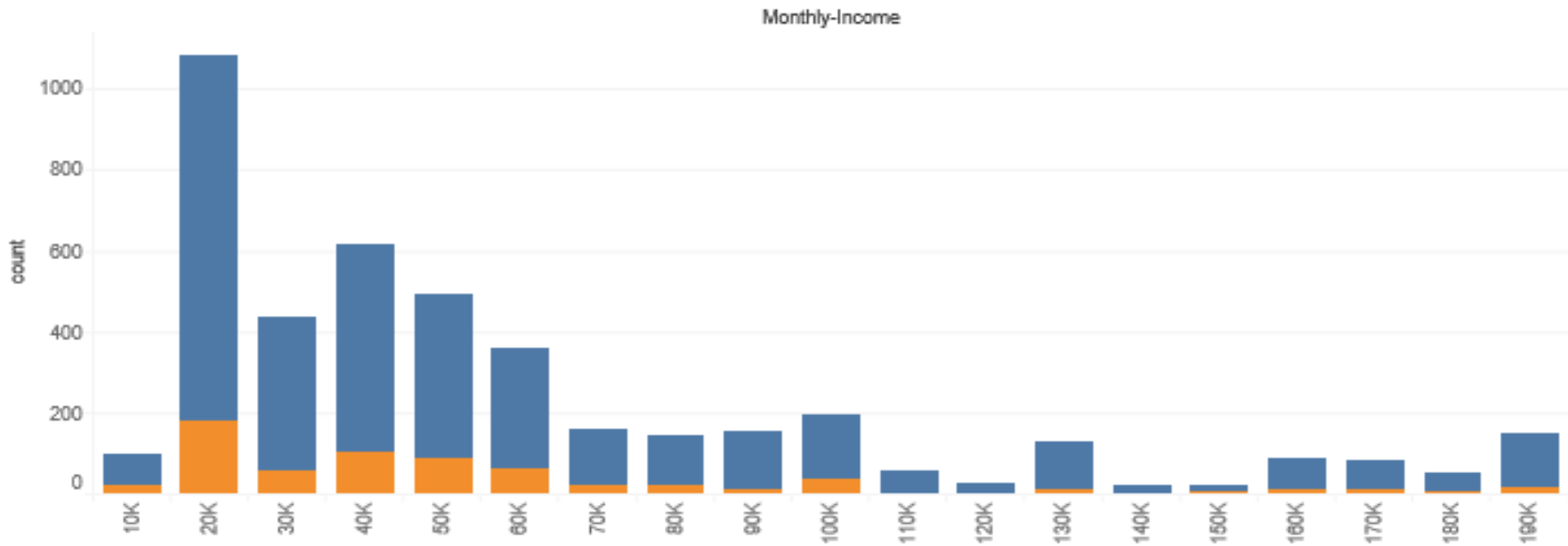

Performance Rating / Attrition
Excellent
Outstanding
Count
3000
2500
2000
1500
1000
500
0
No
Yes
No
Yes

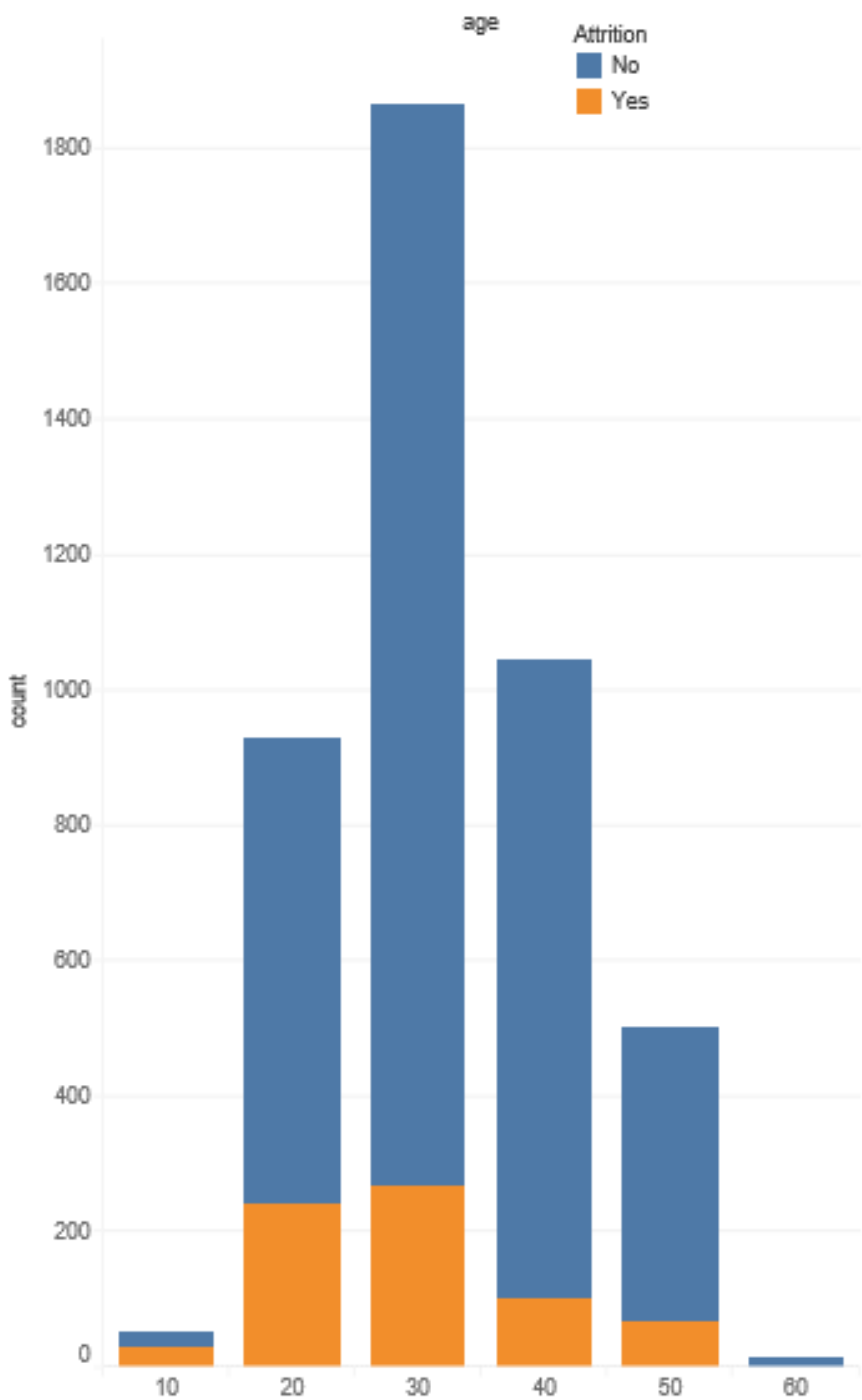

Work Life Balance / Attrition
Better
Good
Best
Bad
Count
2000
1500
1000
500
0
No
Yes
No
Yes
No
Yes
No
Yes

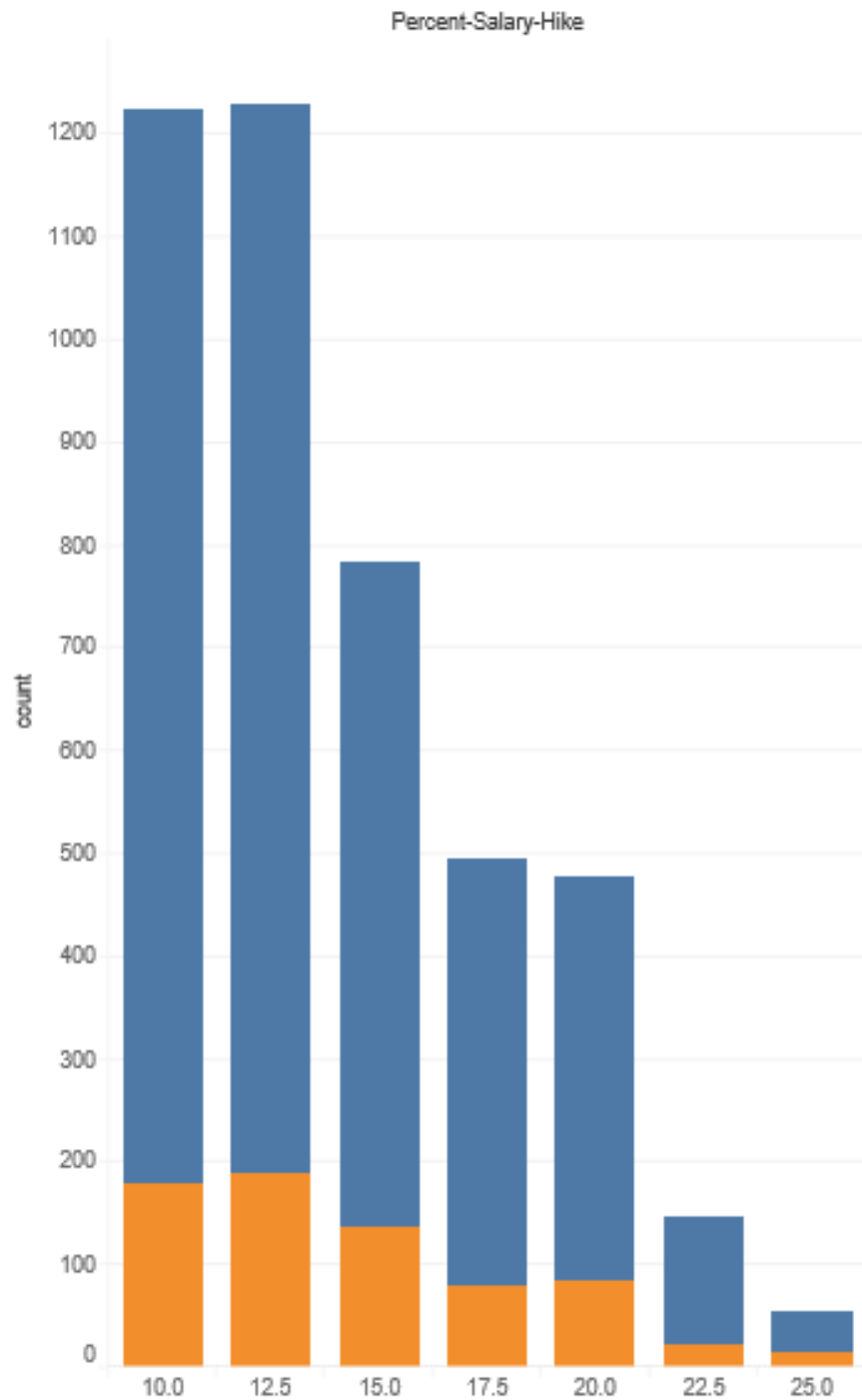

Job Role / Attrition
Sales Executive
Research Scientist
Laboratory Technician
Manufacturing Director
Healthcare Representative
Manager
Sales Representative
Research Director
Human Resources
Attrition
No
Yes
Count
800
700
600
500
400
300
200
100
0
No
Yes

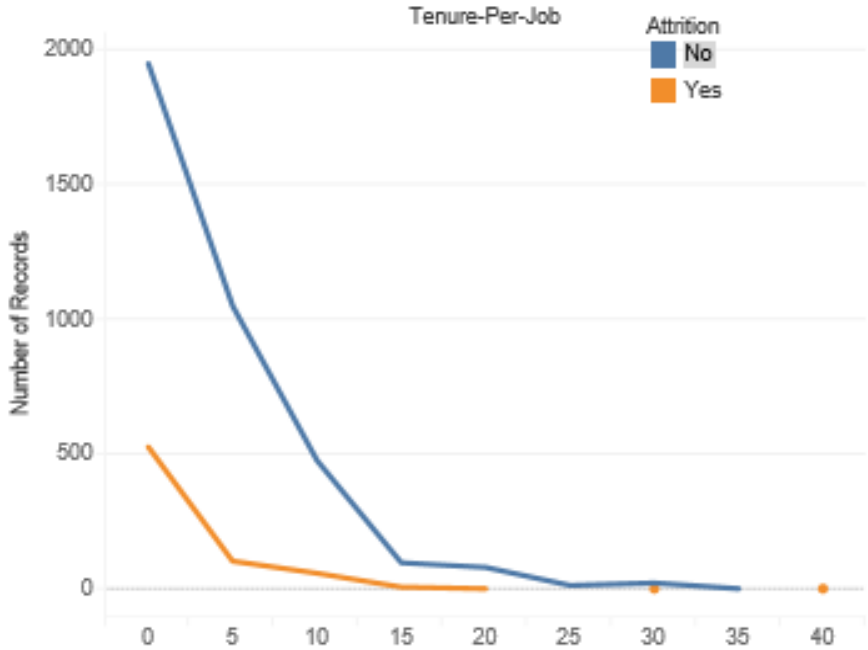

Distance-from-home
Attrition
No
Yes
count
2500
2000
1500
1000
500
0
0
10
20

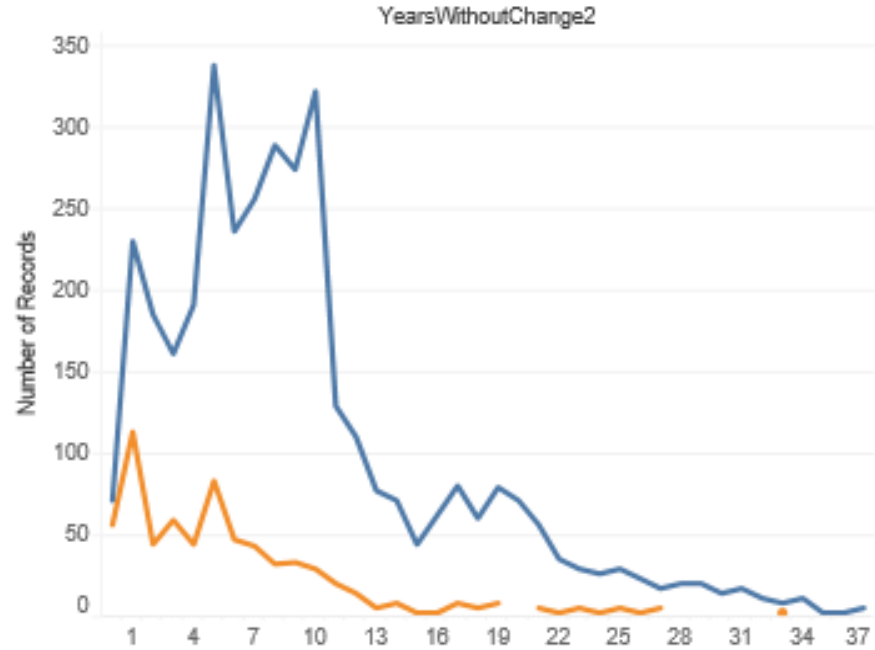
Num-Companies-Worked
count
2500
2000
1500
1000
500
0
0.0
2.5
5.0
7.5

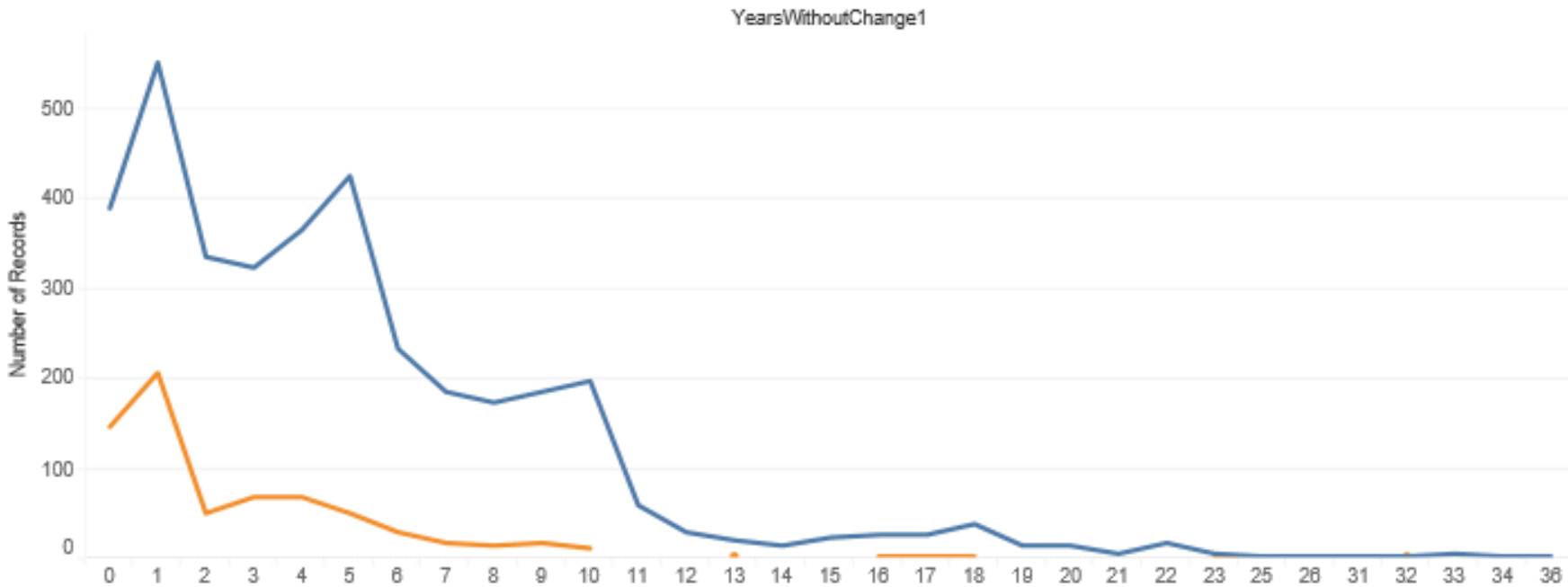

Monthly-Income
count
1000
800
600
400
200
0
10K
20K
30K
40K
50K
60K
70K
80K
90K
100K
110K
120K
130K
140K
150K
160K
170K
180K
190K


age
Attrition
No
Yes
count
0
200
400
600
800
1000
1200
1400
1600
1800
10
20
30
40
50
60


Percent-Salary-Hike
count
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
10.0
12.5
15.0
17.5
20.0
22.5
25.0


Tenure-Per-Job
Attrition
No
Yes
Number of Records
2000
1500
1000
500
0
0 5 10 15 20 25 30 35 40


YearsWithoutChange2
Number of Records
350
300
250
200
150
100
50
0
1 4 7 10 13 16 19 22 25 28 31 34 37


YearsWithoutChange1
Number of Records
500
400
300
200
100
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 25 26 31 32 33 34 36

MODEL EVALUATION

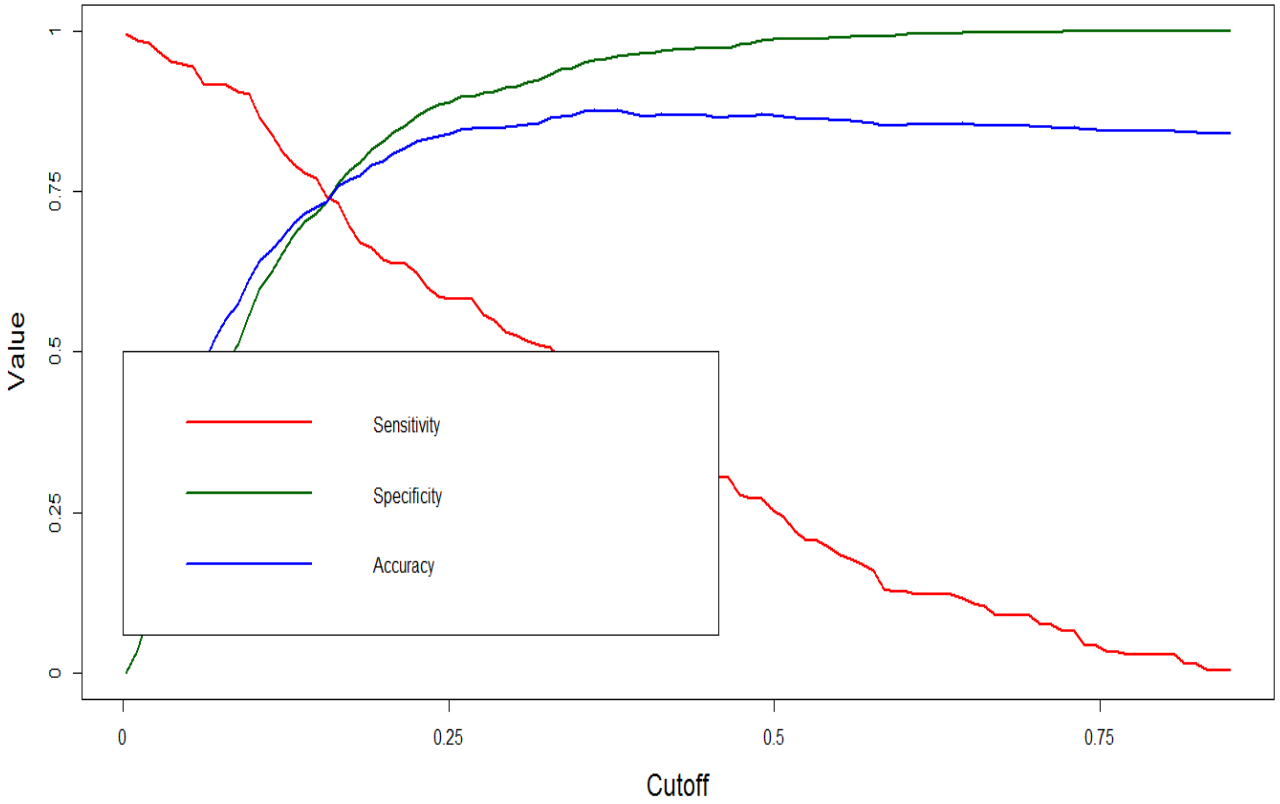
Top factors leading to attrition:

Coefficients:				
	Estimate	Std.Error	z value	Pr(>|z|)
(Intercept)	-2.91306	0.13699	-21.264	<2.00E-16 ***
NumCompaniesWorked	0.32364	0.05565	5.816	6.04E-09 ***
YearsWithCurrManager	-0.33127	0.06792	-4.878	1.07E-06 ***
YearsWithoutChange2	-0.70848	0.07415	-9.555	<2.00E-16 ***
BusinessTravel.xTravel_Frequently	0.77436	0.12874	6.015	1.80E-09 ***
MaritalStatus.xSingle	1.02349	0.11111	9.212	<2.00E-16 ***
EnvironmentSatisfaction.xLow	1.04796	0.12689	8.259	<2.00E-16 ***
JobSatisfaction.xLow	0.55966	0.13538	4.134	3.56E-05 ***
JobSatisfaction.xVery.High	-0.63536	0.13714	-4.633	3.60E-06 ***
WorkLifeBalance.xBetter	-0.39448	0.11109	-3.551	0.000384 ***
Overtime	1.31834	0.11311	11.656	<2.00E-16 ***

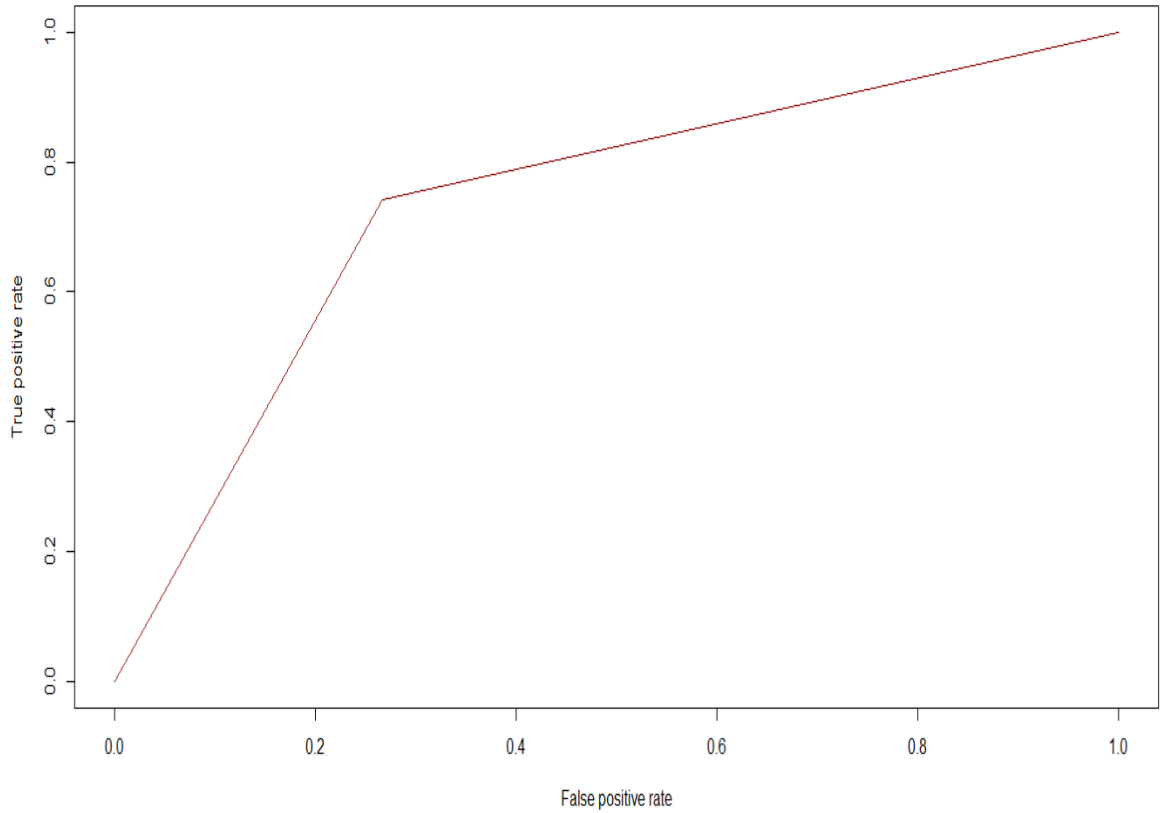
Model Evaluation (test data)

- Selected Cutoff value of probability = 0.1566024
- Accuracy = 0.7346939
- Sensitivity = 0.741784
- Specificity = 0.733333
- KS –statistic = 0.475

Best Cutoff Probability and ROC Curve

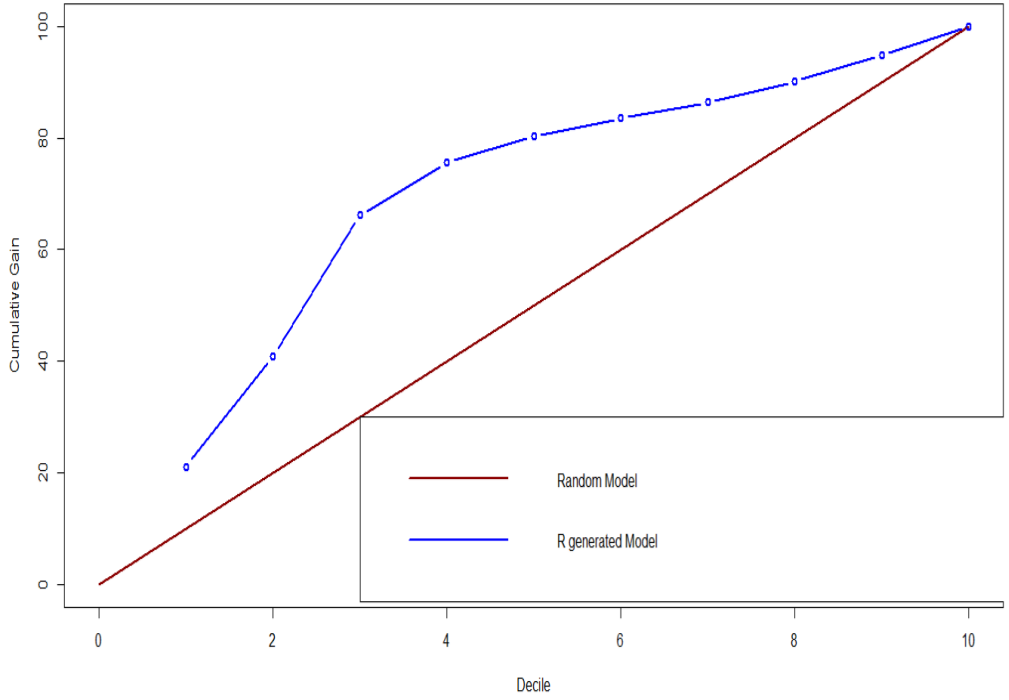


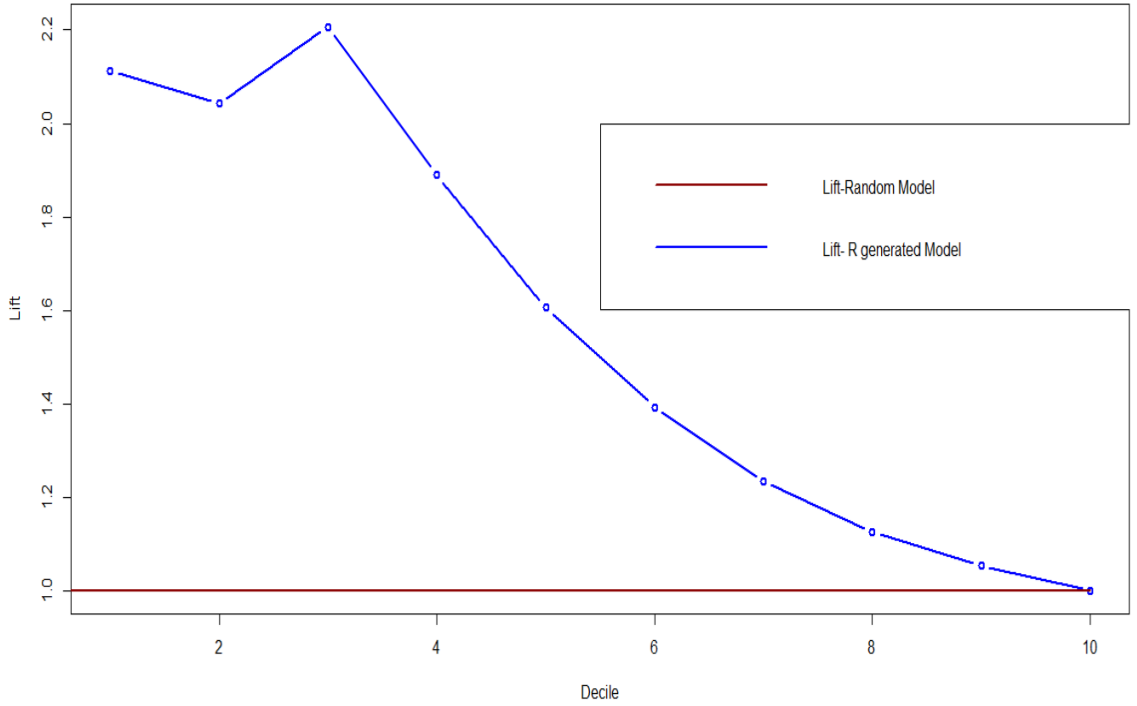
Choosing a cutoff where these 3 lines meet.
And hence cutoff=0.1566



Plotting true Positive against false positive

Gain Chart & Lift Chart





Gain:

- Among the top 40% employees sorted according to probability, 75.6% of all employees are likely to leave the company.

Lift:

- Model's gain by the end of the 4th decile is 1.89 times that of a random model's gain at the end of 4 deciles.

CONCLUSIONS

- **Number of Companies Worked:** We see a clear indication that many people who have worked only in One company before quit a lot.
- **Years With Current Manager:** New Manager is a big cause for quitting. So, If Years With Current Manager is more, Probability of attrition will be less.
- **Business Travel:** Among people who leave, most travel frequently.
- **Environment Satisfaction:** People who are least satisfied with the environment tend to leave.
- **Gender:** We see that majority of separated employees are Male and the reason might be because around 61% of employees in our dataset are Male.
- **Job Satisfaction:** We see higher attrition levels in among lower Job Satisfaction levels.
- **Marital Status:** Attrition is on higher side for Single and lowest for Divorced employees.
- **Overtime:** Larger Proportion of Overtime Employees are quitting.
- **Work Life Balance:** People with better Work Life Balance tend to quit.

RECOMMENDATIONS

- Thus, The company's management should not make employees travel too much.
- They should be kept under great leaders (managers).
- The management should keep a track of employees working for more number of hours and should be given breaks in regular intervals of time or their workload should be distributed equally along with other team members.
- More female employees should be encouraged. (Preferably married)
- While selecting a new candidate the HR should check on how many companies has the person worked in earlier.
- The environment satisfaction should be addressed right away as it is the key to creating better workforce.