



ANALYSIS OF EMPLOYEE SATISFACTION

ADVAIT KULKARNI
SUHIT DATTA
VARAD TUPE

Objective

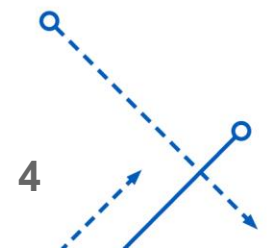
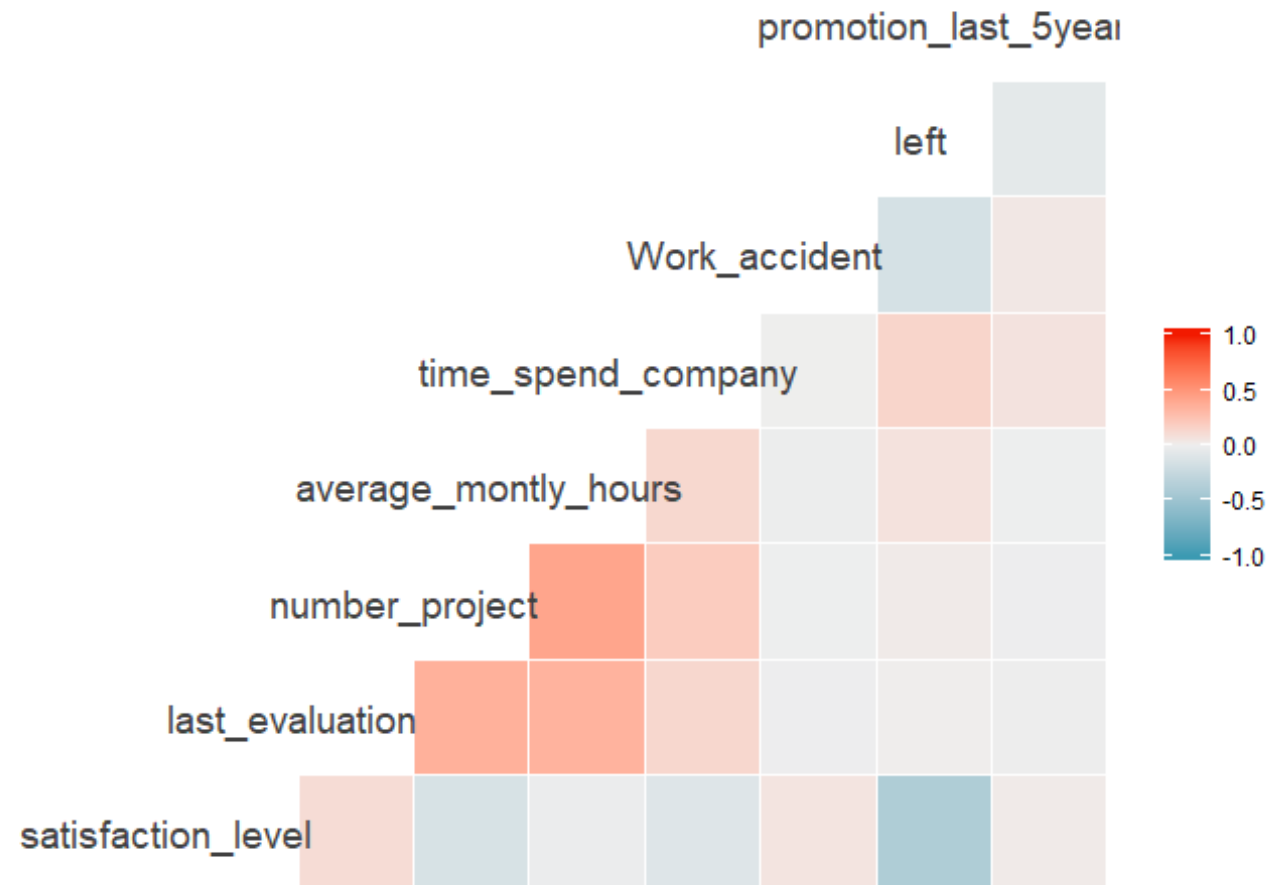
- What drives an employee to make career decisions.
- What factors contribute to employee satisfaction and his/her decision to leave the company.
- To analyze why some experienced employees leave prematurely from a company.
- Building an optimal model to predict employee satisfaction and decision.



Data Description

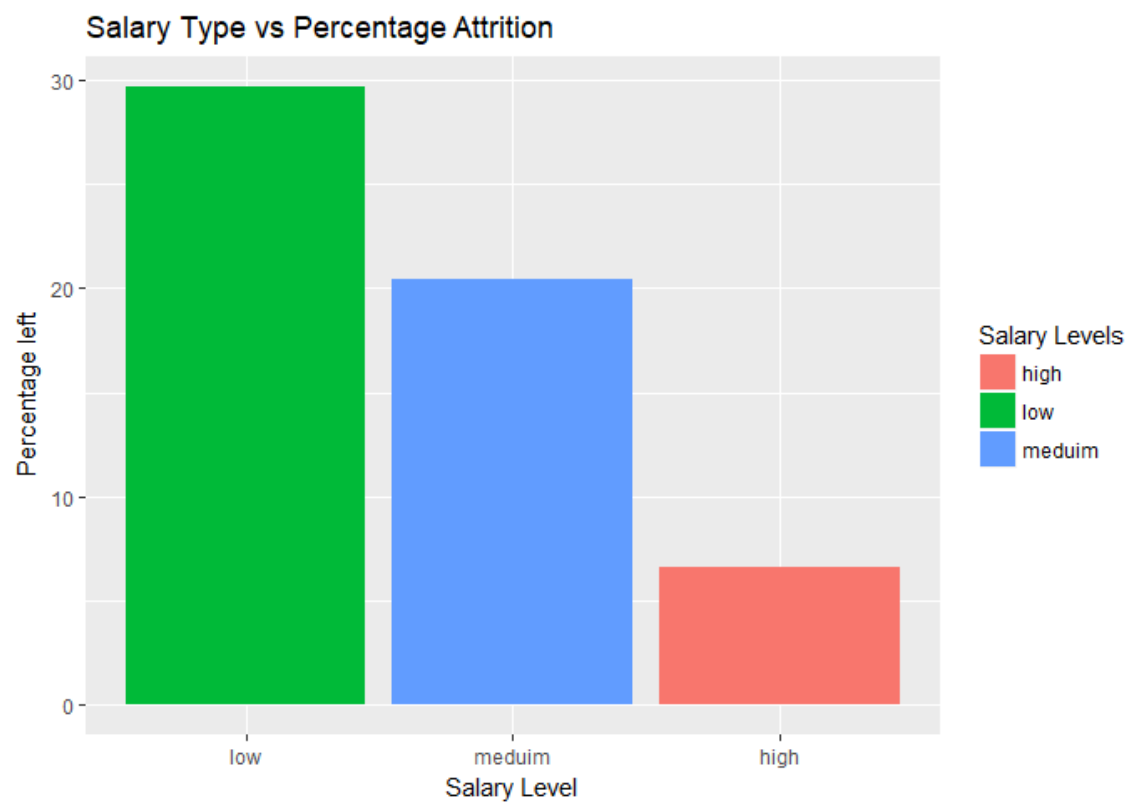
Field Name	Description
satisfaction_level	Level of satisfaction (0-1)
last_evaluation	Time since last performance evaluation (in Years)
number_project	Number of projects completed while at work
average_monthly_hours	Average monthly hours at workplace
time_spend_company	Number of years spent in the company
Work_accident	Whether the employee had a workplace accident
left	Whether the employee left the workplace or not (1 or 0) Factor
promotion_last_5years	Whether the employee was promoted in the last five years
sales	Department in which they work for
salary	Relative level of salary (high, medium, low)

Correlation Plots

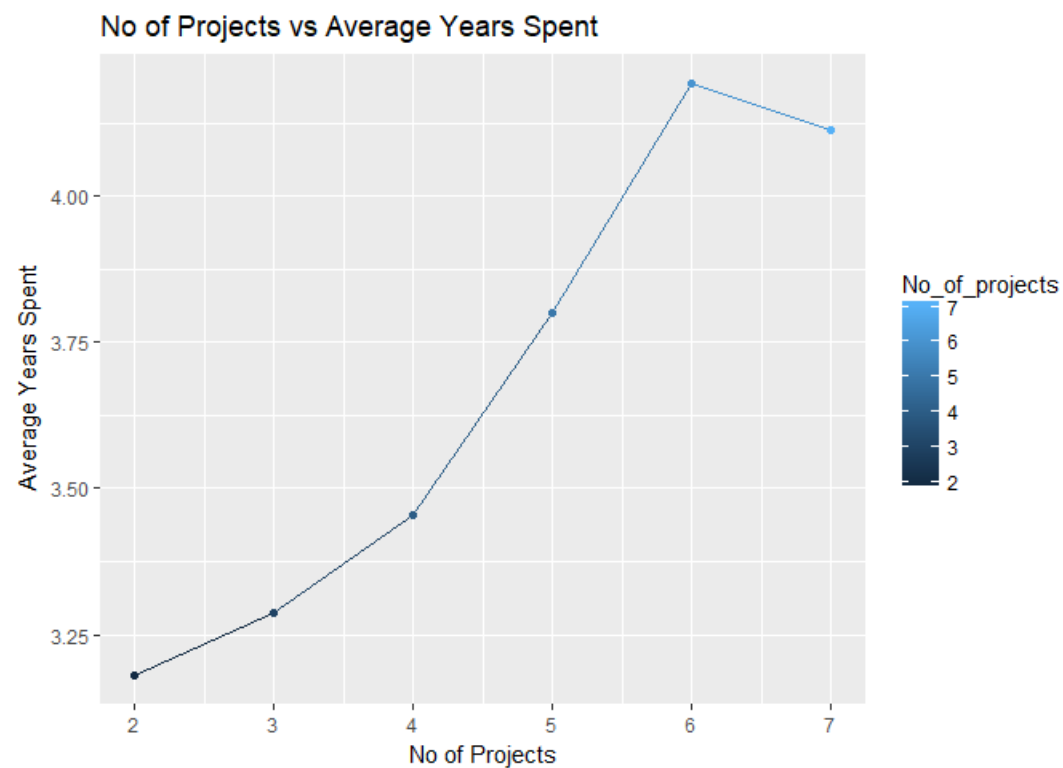




Distribution of the Salary Category vs Attrition Percent

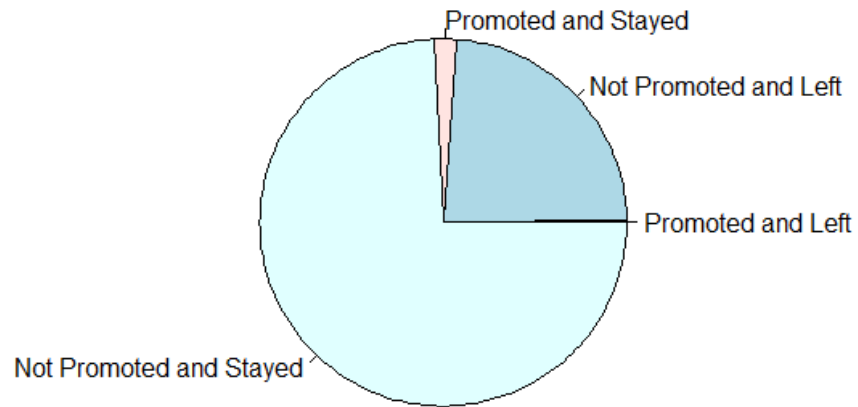


Relationship between No of Projects and the Average Years spent in the Company

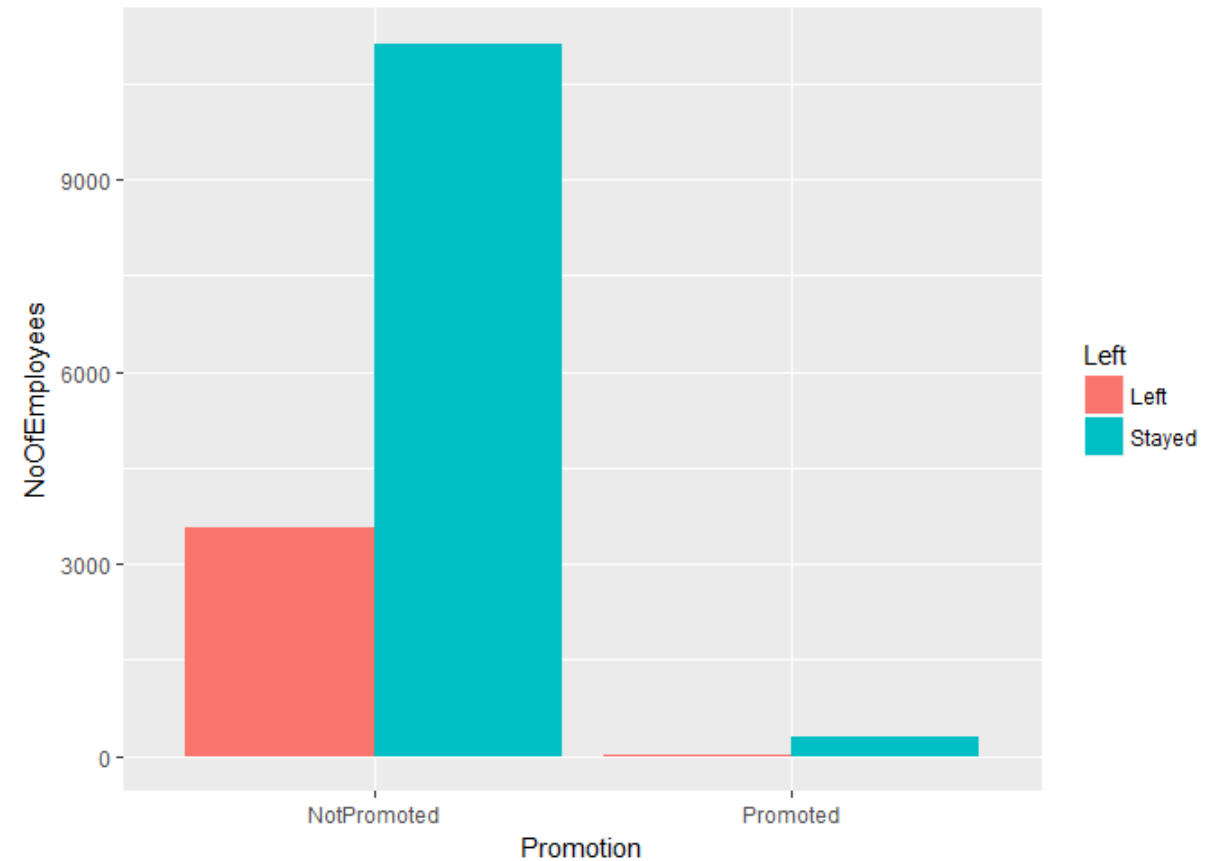


By Promotion in the last 5 years

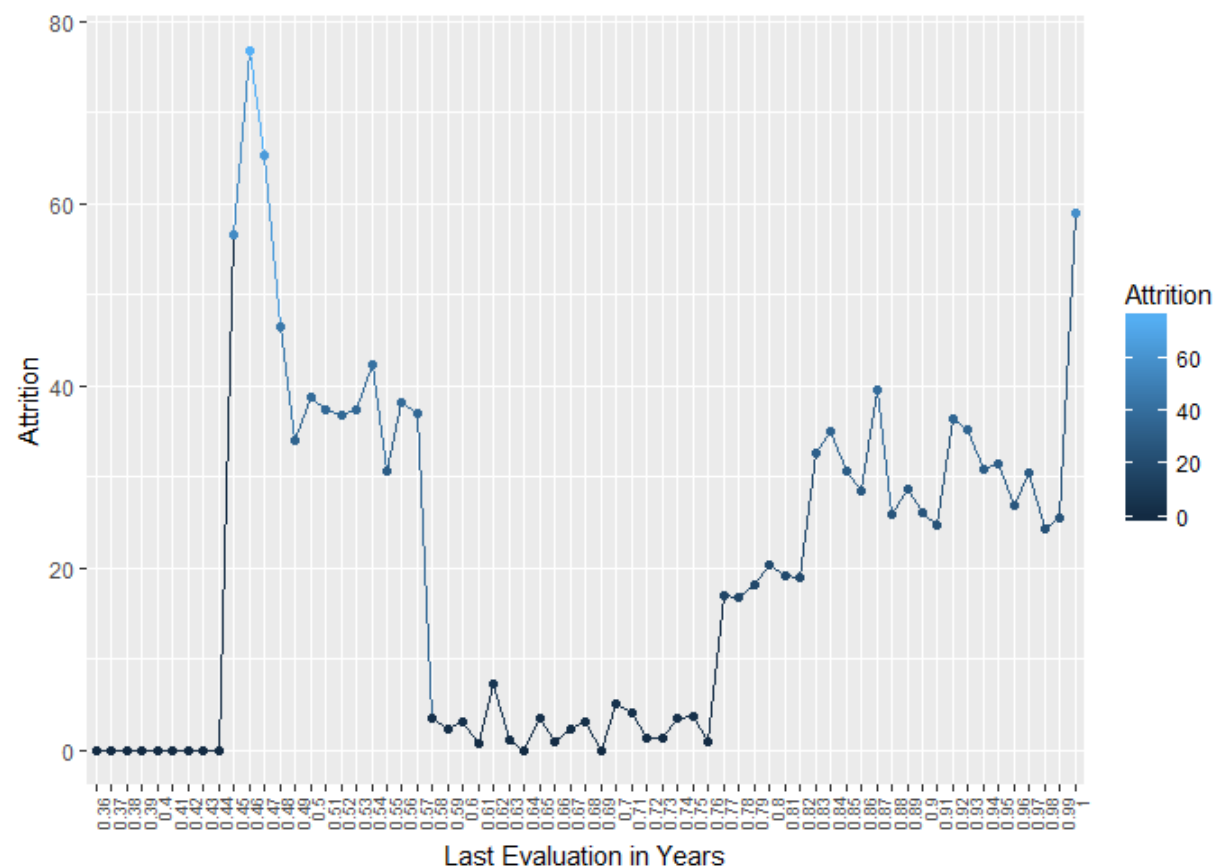
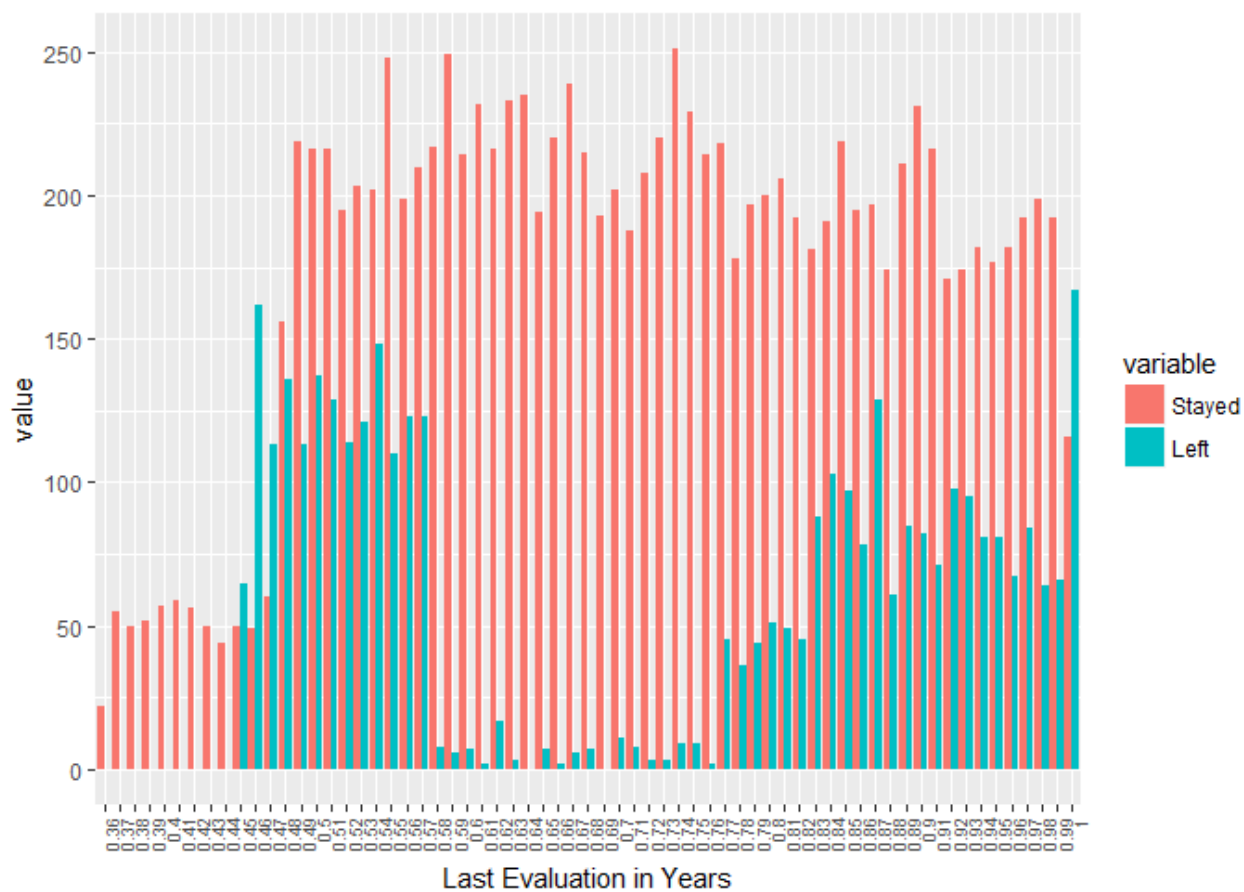
Representation of People



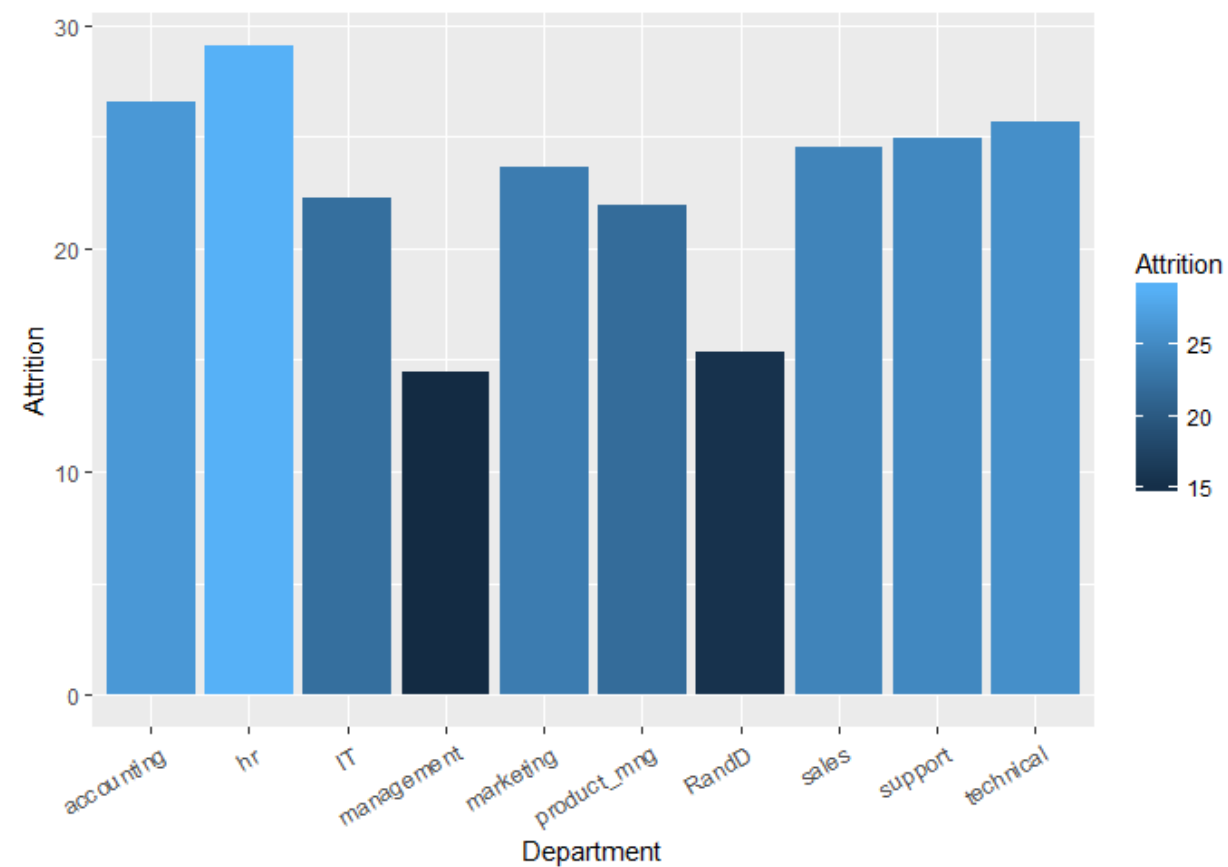
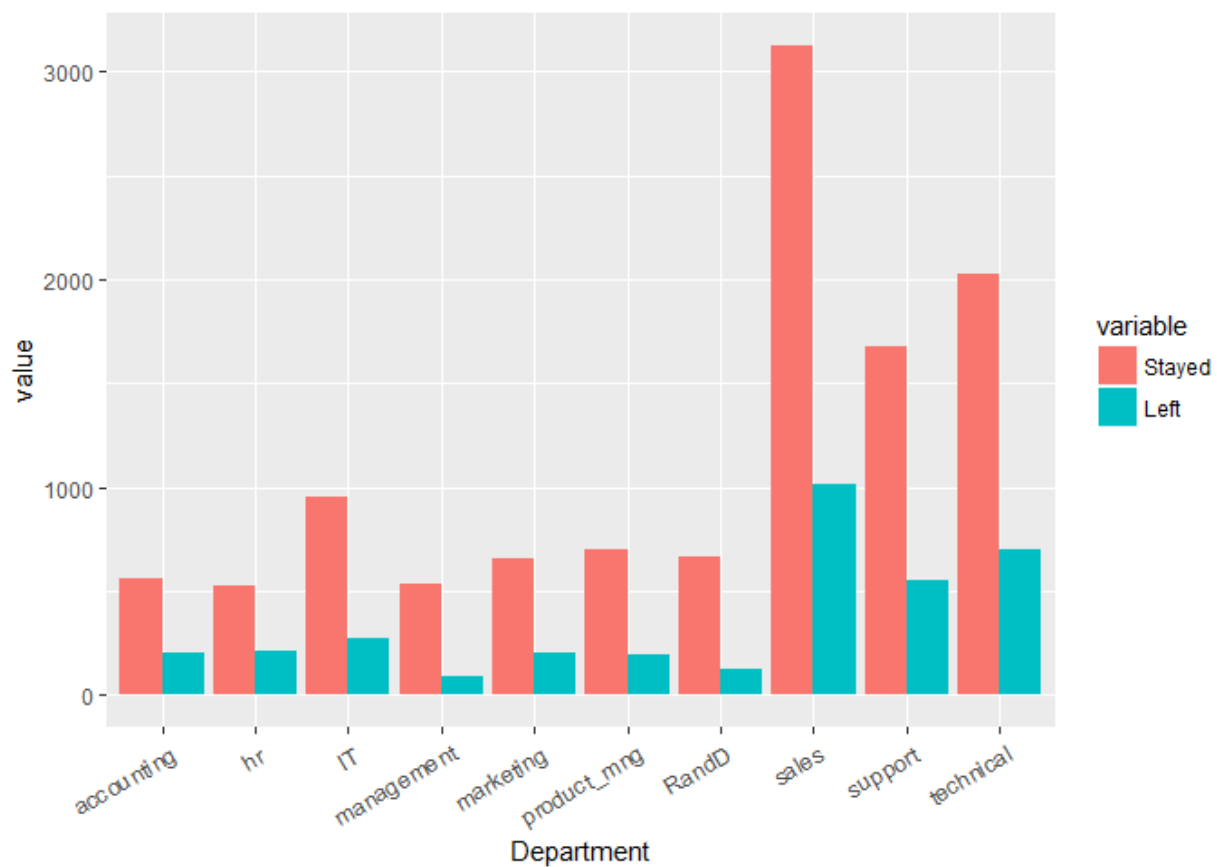
Almost $\frac{1}{4}$ th of the people left !



By Last Evaluation

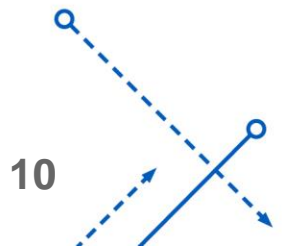


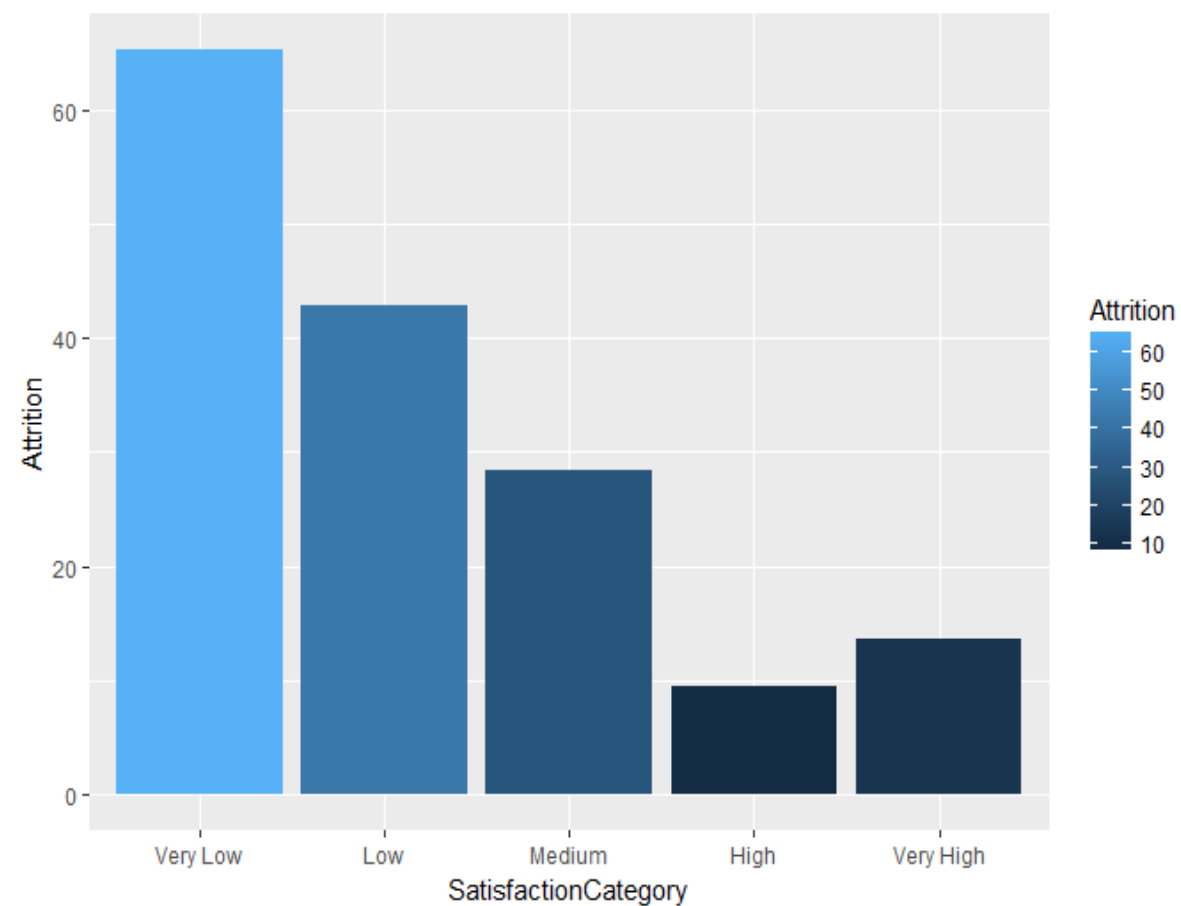
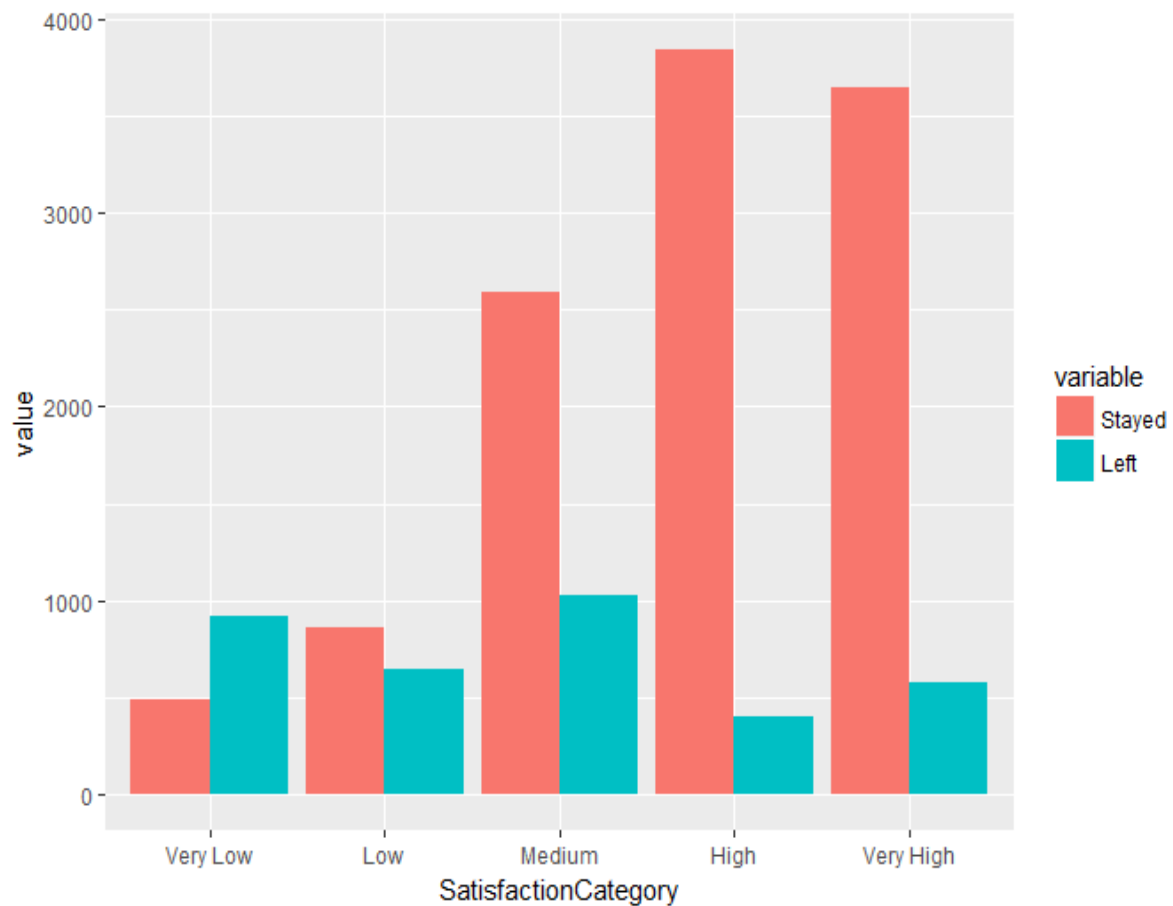
By Department



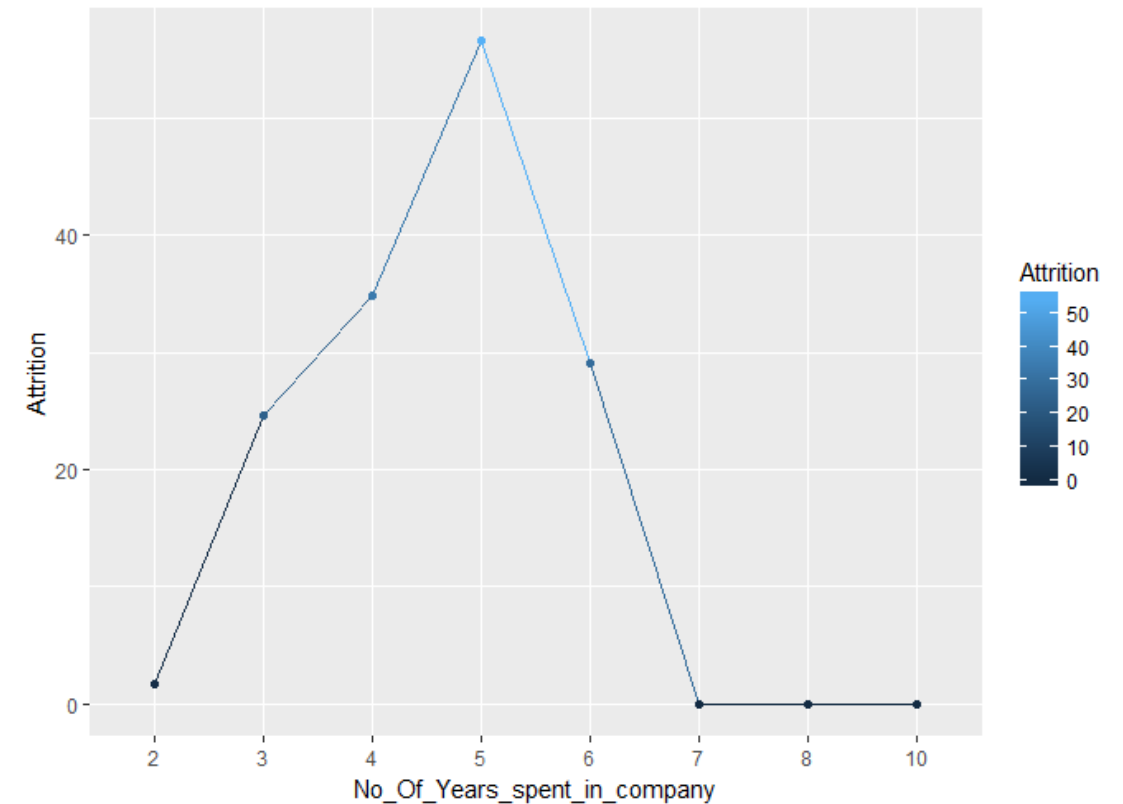
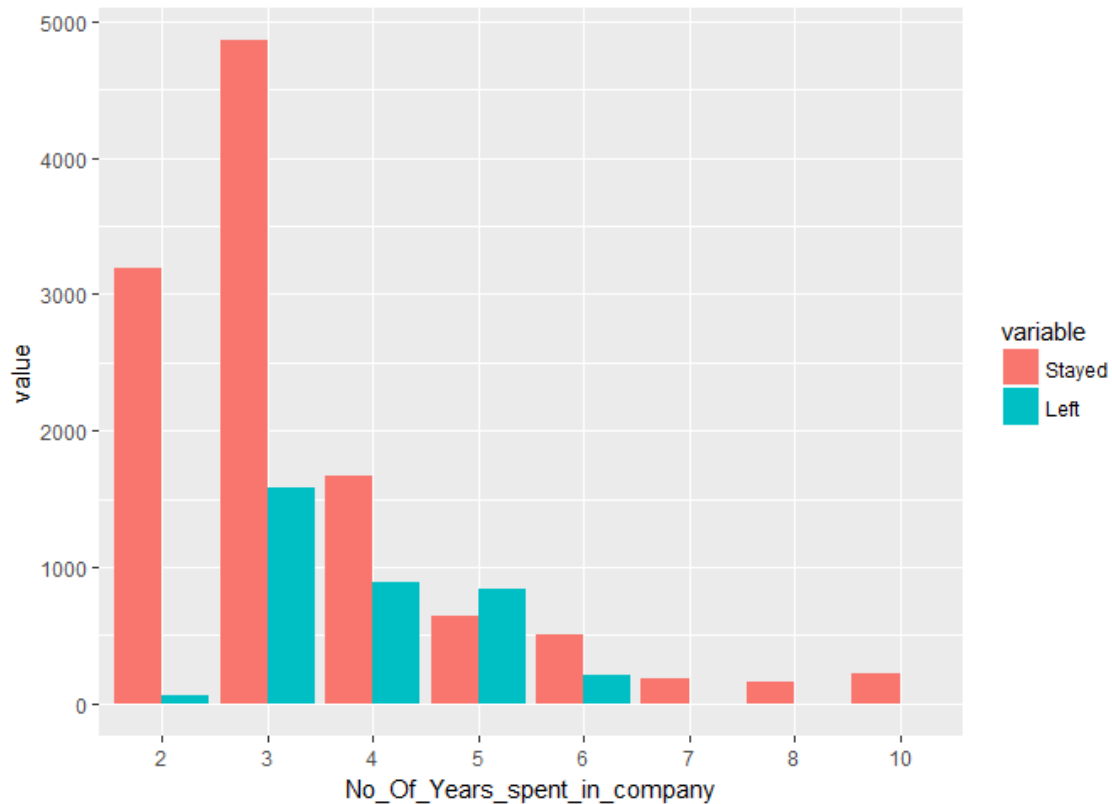
By Satisfaction Level

Satisfaction Level	Qualitative Equivalent
Greater than 0.8	Very High
Between 0.6 and 0.8	High
Between 0.4 and 0.6	Medium
Between 0.2 and 0.4	Low
Less than 0.2	Very Low

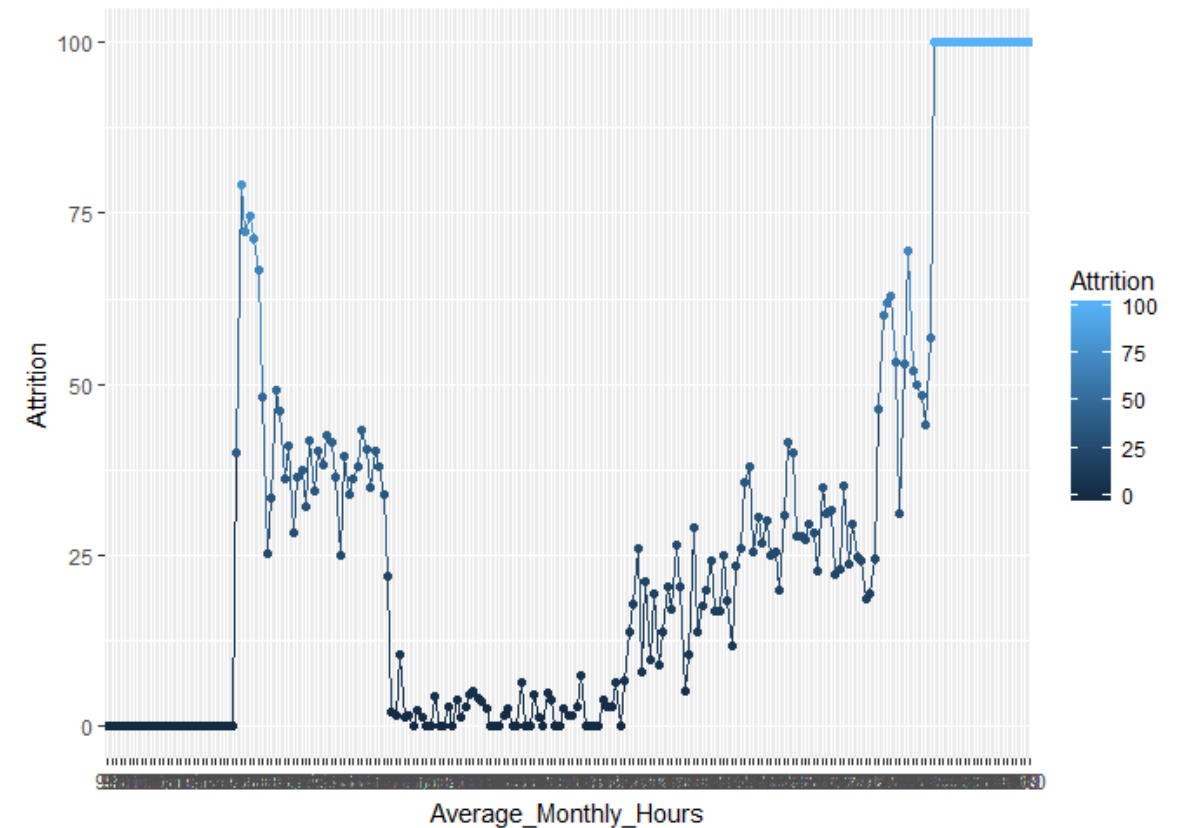
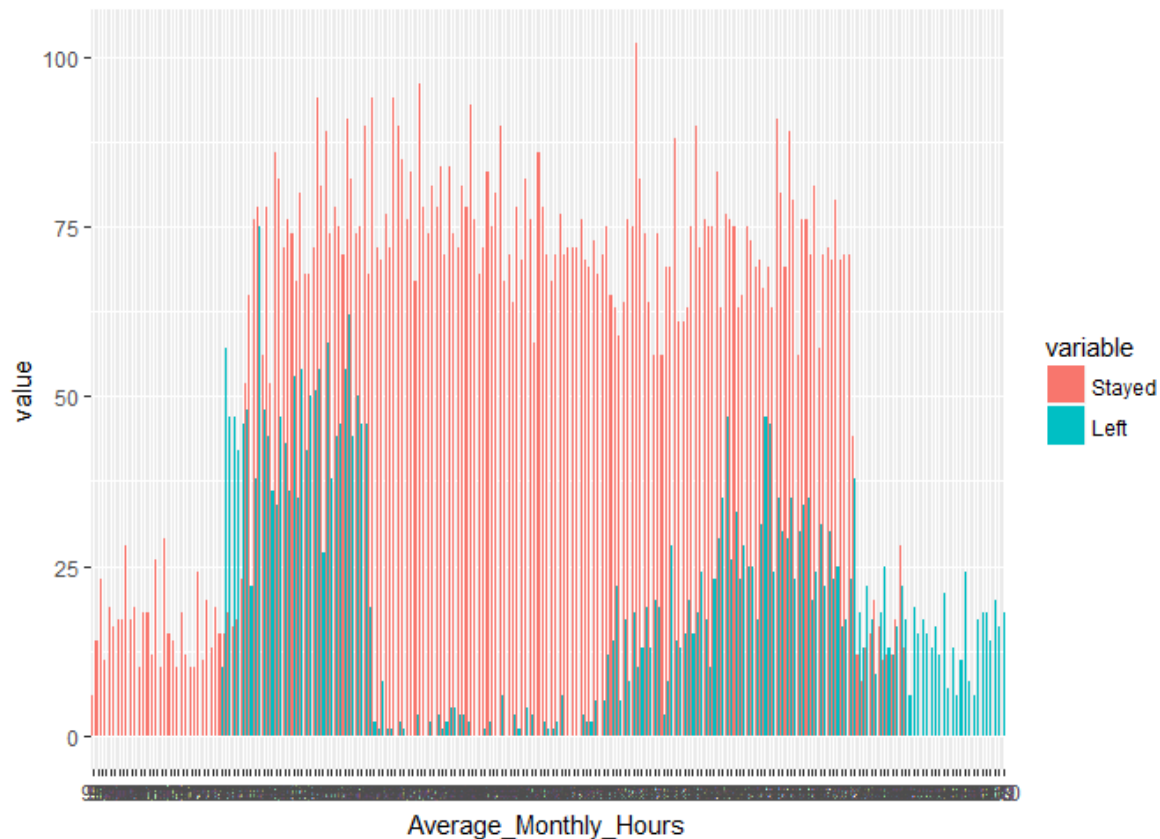




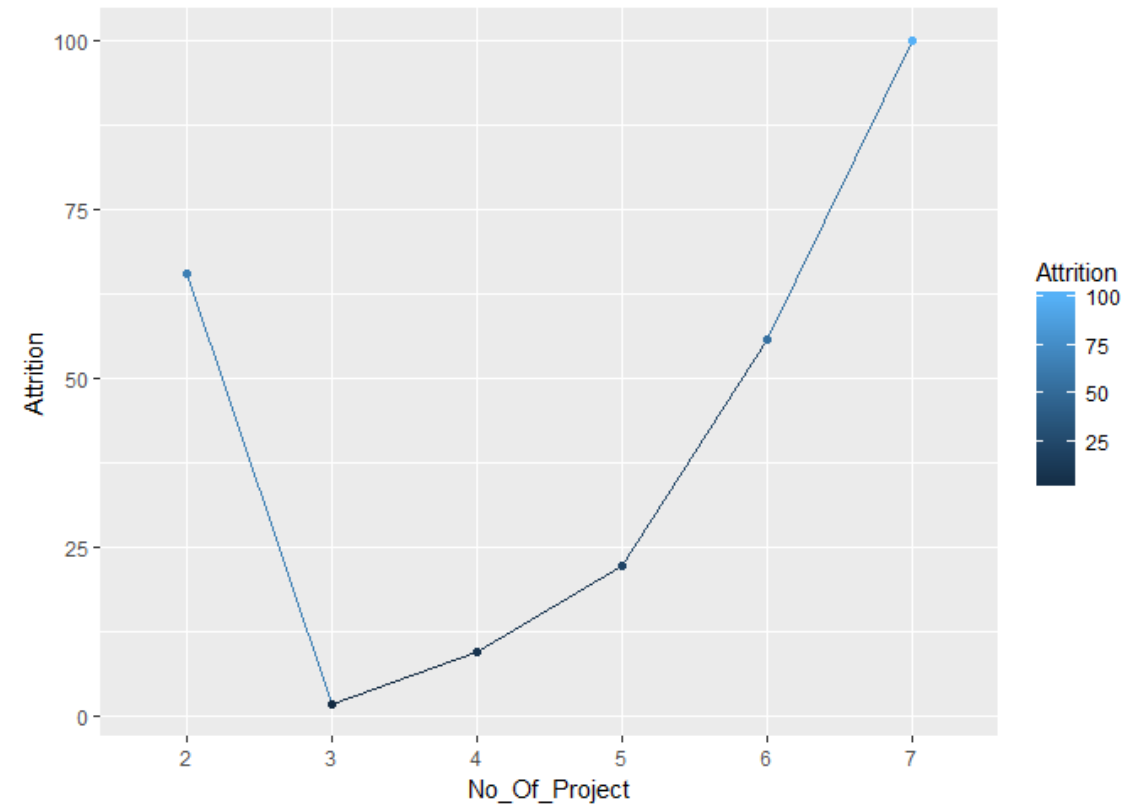
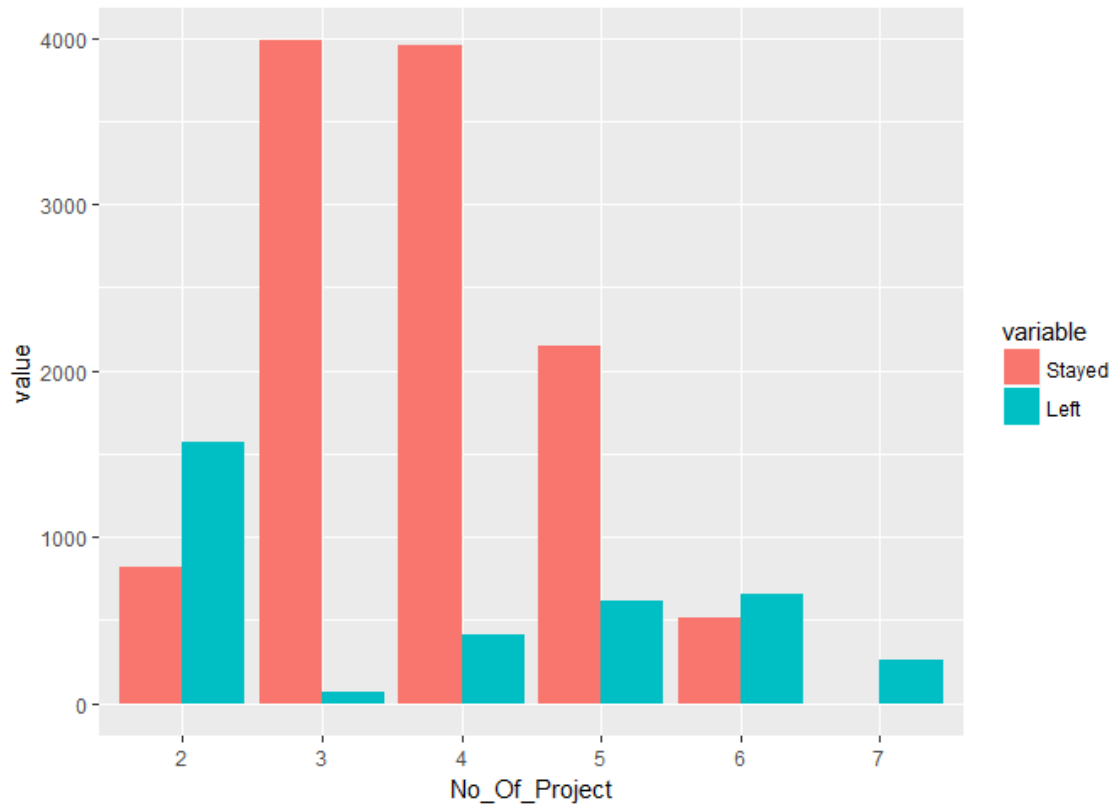
By Number of Years spent in the Company



By Average monthly hours spent at Workplace



By Number of Projects



Prepping the Data

- Predicting Employee Satisfaction using **Linear Regression**
 - 'Left' Parameter indicates if the employee has left the company or not. 1 indicates the person has left and 0 implies the person still works in the company.
 - Using all variables except the left parameter to predict the Employee Satisfaction.
- Predicting if an Employee left or not using **Classification Techniques**
 - Excluded the Satisfaction Level for building the Model.



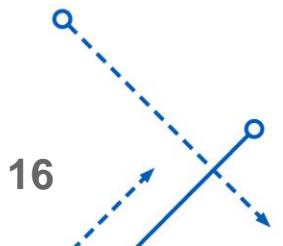
Regression

Objective:

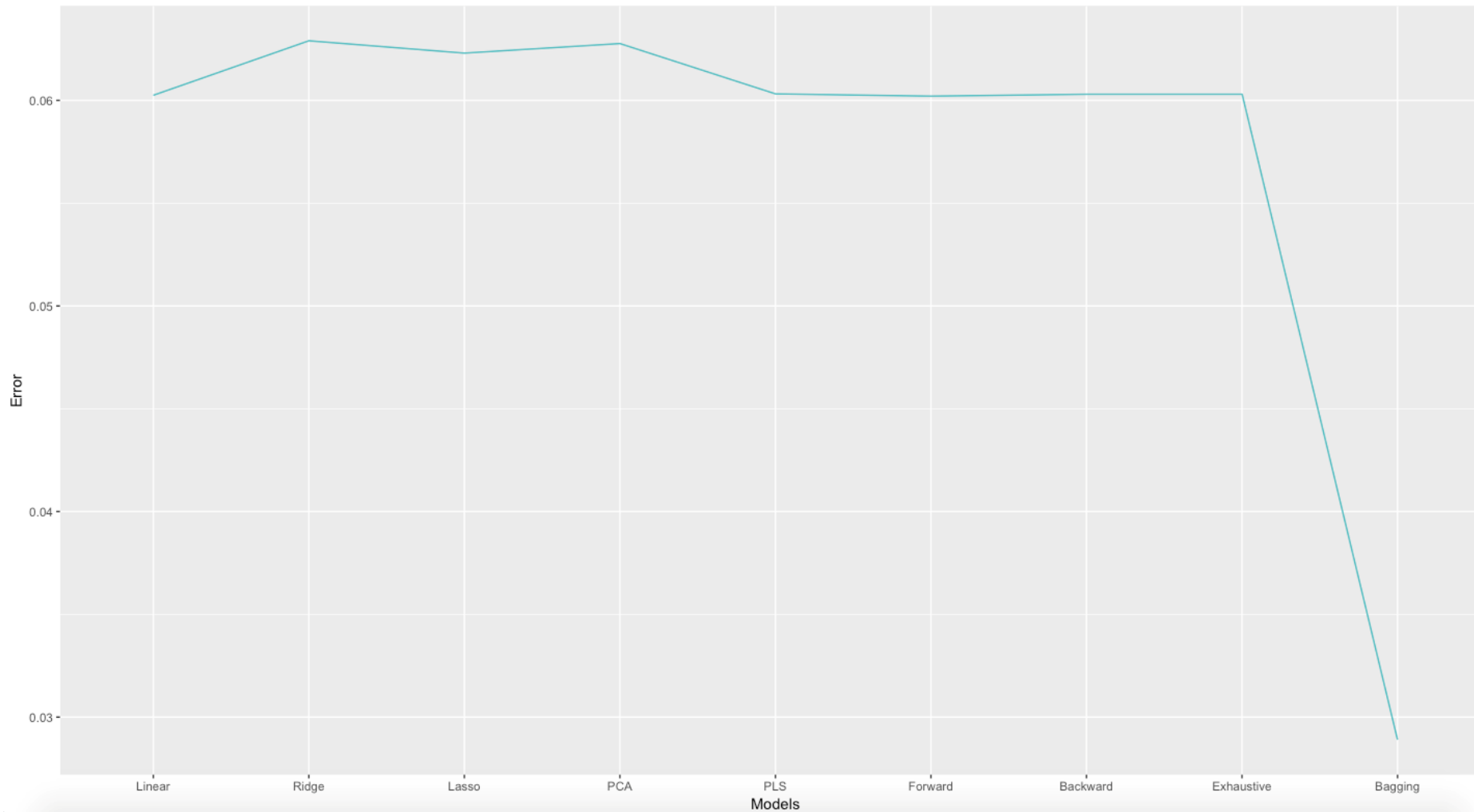
- Analyzing the predictors which contribute to employee's satisfaction.
- Predicting the value of Employee satisfaction.

Methods used:

- Linear Model
- Forward/Backward Subset
- Lasso/Ridge
- PCA
- PLS
- Bagging



Regression errors :



Classification

Objective:

- To efficiently predict which person will leave the company.
- Identifying the predictors impacting a person's decision to leave the company.

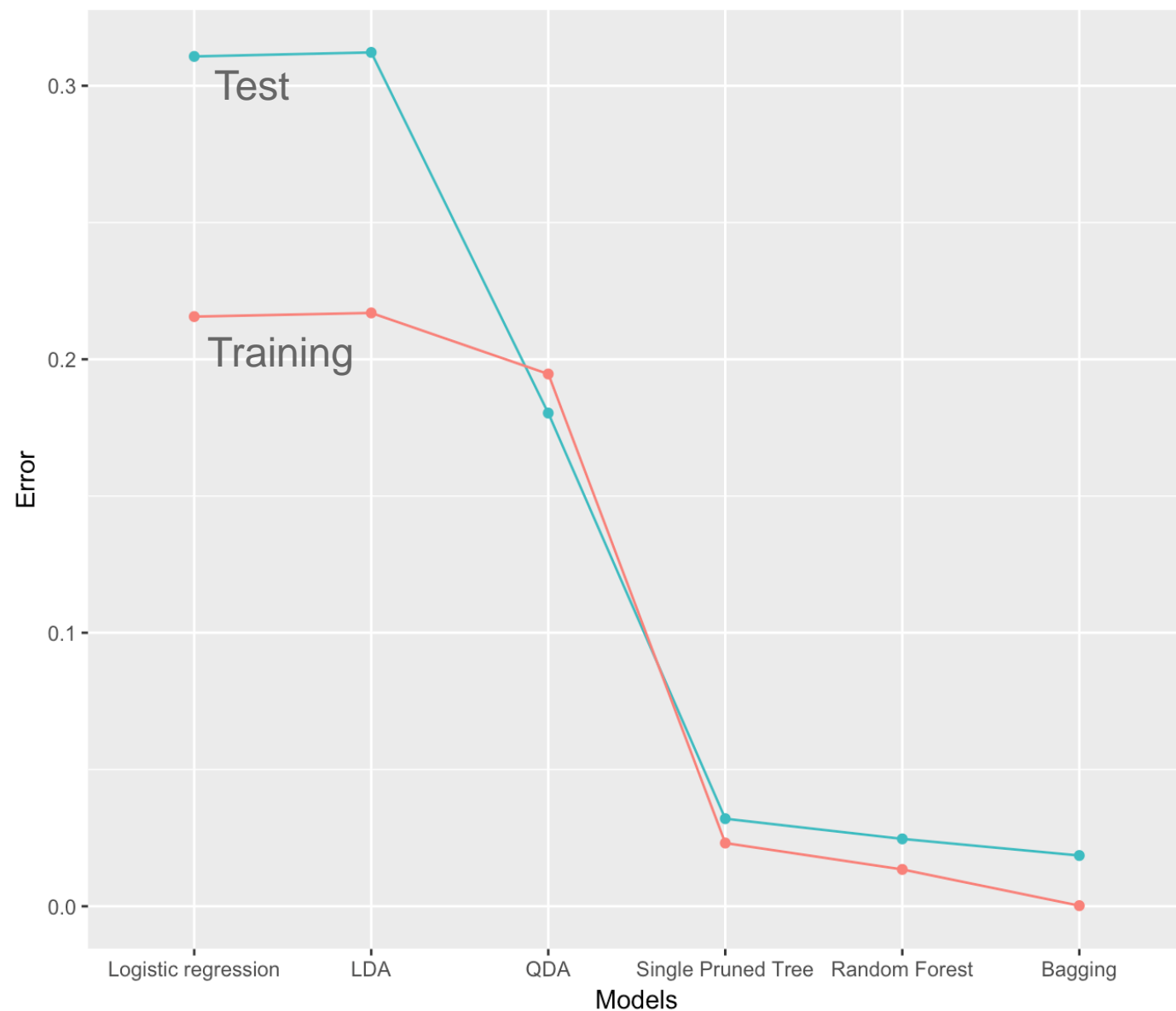
Methods used:

- Logistic Regression
- Linear Discriminant Analysis
- Quadratic Discriminant Analysis
- Classification Trees
- Random Forest
- Bagging



Model Performance

Model	Training Error	Test Error
Logistic regression	21.56%	31.07%
LDA	21.69%	31.22%
QDA	19.46%	18.03%
Single Pruned Tree	2.31%	3.20%
Random Forest	1.35%	2.46%
Bagging	0.02%	1.86%



Confusion Matrix for Bagging

Test Data

		Actual	
		Stayed	Left
Predicted	Stayed	4290	43
	Left	73	1683

DETAILS

Sensitivity 0.983	Specificity 0.975	Precision 0.99	Recall 0.983	F1 0.987
Accuracy 0.981		Kappa 0.953		

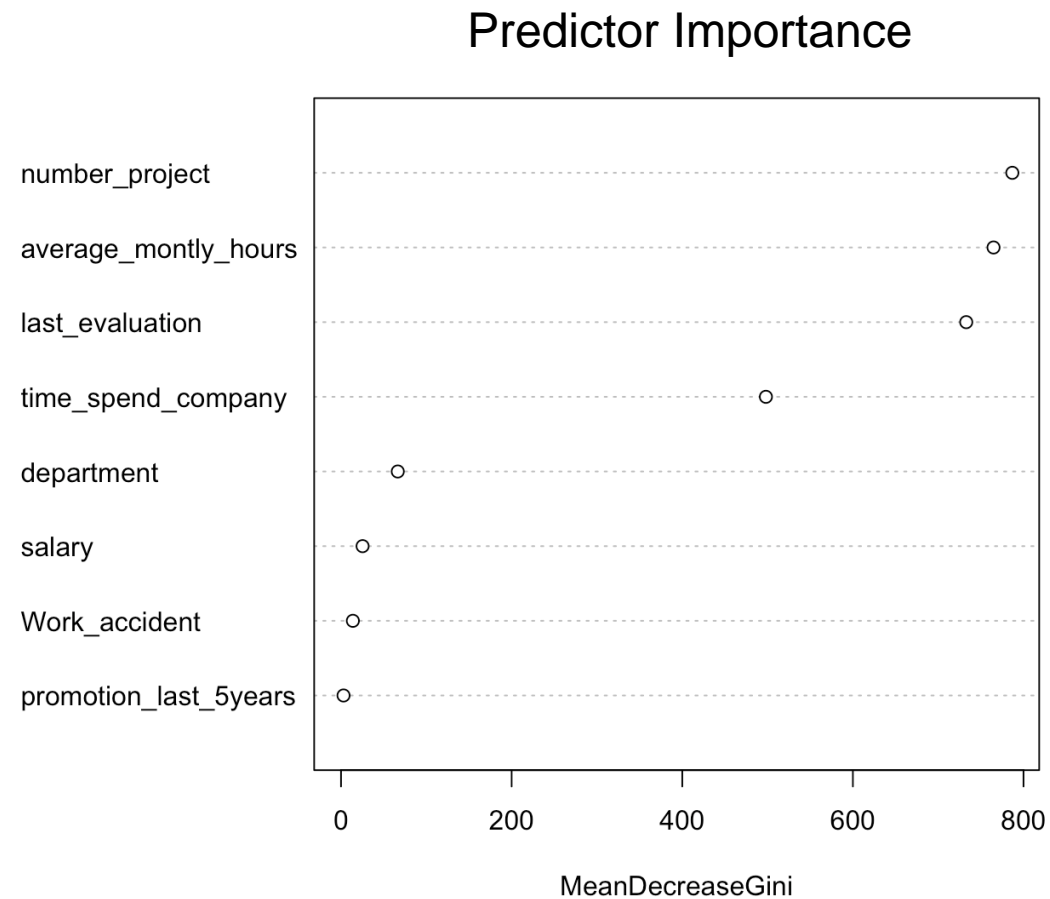
Validation Data

		Actual	
		Stayed	Left
Predicted	Stayed	1139	5
	Left	8	347

DETAILS

Sensitivity 0.993	Specificity 0.986	Precision 0.996	Recall 0.993	F1 0.994
Accuracy 0.991		Kappa 0.976		

Predictor importance for attrition



Future Scope

- More predictors can be included for a very comprehensive analysis of the satisfaction level of an employee.
- The Employee Satisfaction is quantified in the data set. How an abstract value can be quantitatively interpreted needs to be thoroughly understood.
- An attempt can be made to generalize the model for catering to different organizations.

Conclusion

- High negative correlation between satisfaction level and employee's decision to leave.
- Bagging Technique yields optimal result in predicting employee leaving company.
- Number of Projects, average monthly hours and last evaluation play important factors in employee's satisfaction level and his/her decision to leave.

