

HR Analytics Case Study

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Case study of a large Company named XYZ that employs around 4000 employees and has about 15% attrition every year.

Business Objective

To understand the driving factors (or driver variables) behind attrition so the company could take steps to address those variables to reduce the attrition rate.

Data Gathered

Dataset containing general data related to all their 4000+ employees, in and out-time over an year, Employee and Manager survey data.

Types of Analysis carried out

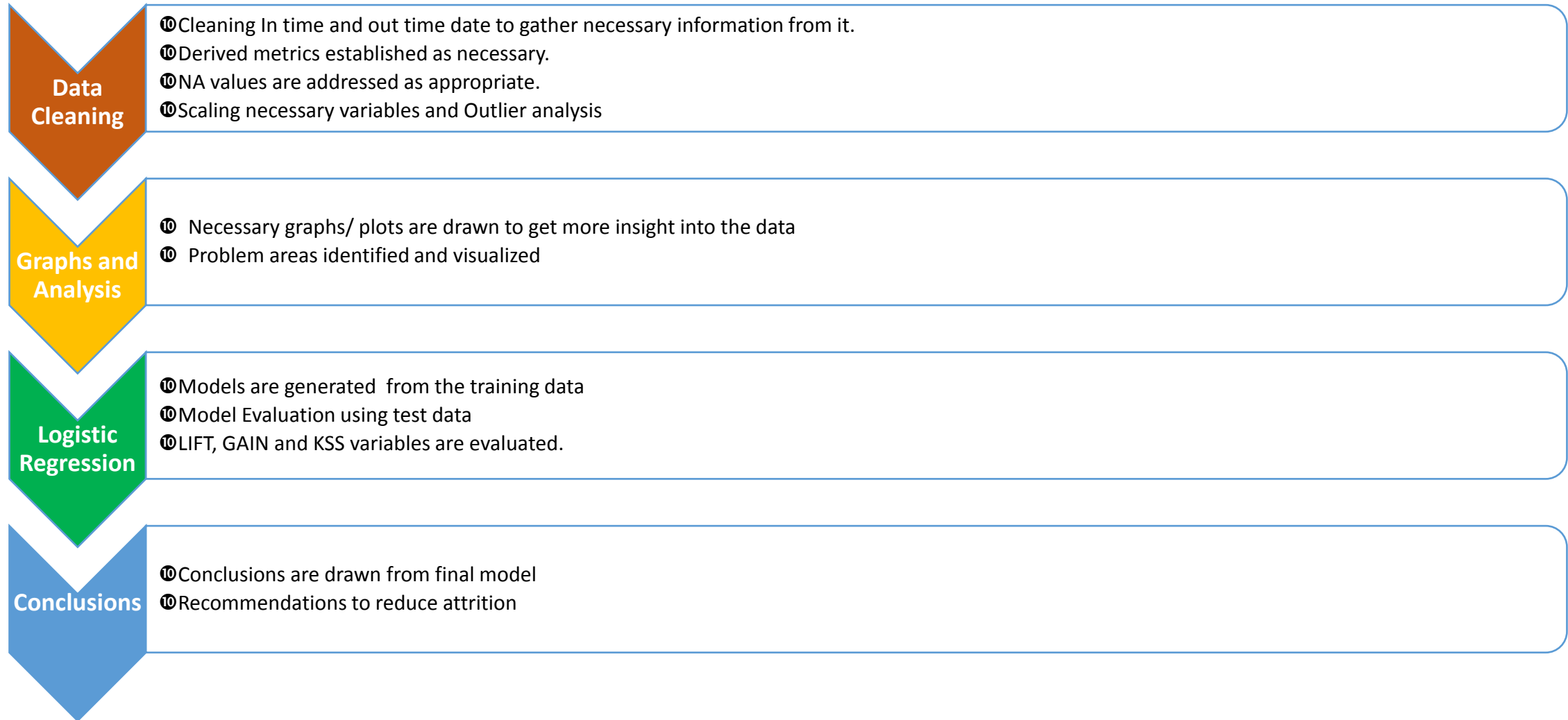
- Exploratory Data Analysis
- Plots to visualize the findings
- Logistic regression

Outcome of Analysis

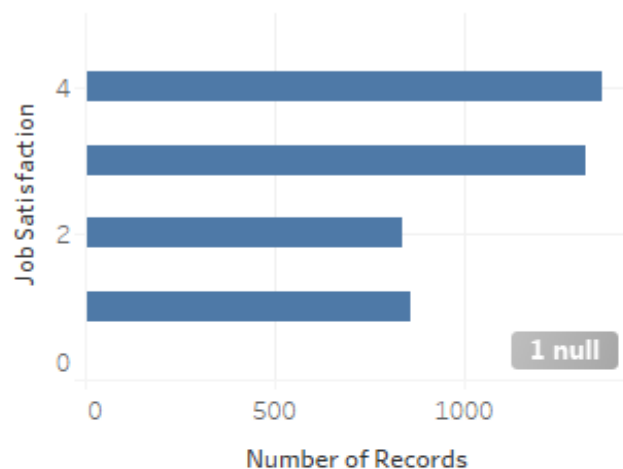
Strong driving factors for employee churn are -

- Environment Satisfaction
- Number of Companies Worked
- Total Working Years
- Year with Current Manager
- Over Time worked
- Job Satisfaction
- Work Life Balance
- Marital Status Single

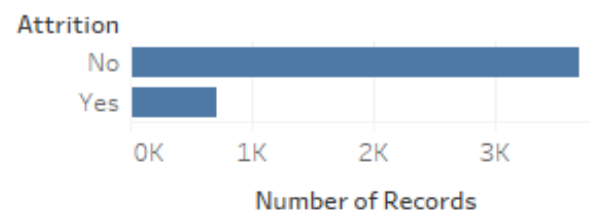
Analysis is carried out in the below fashion



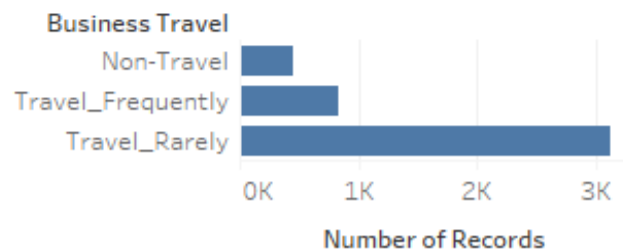
Job Satisfaction level



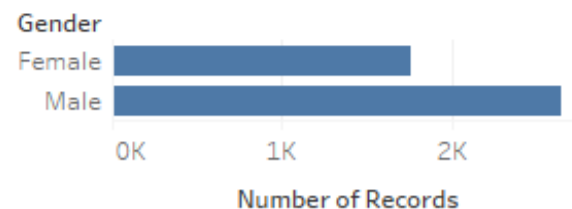
Attrition Distribution



Business Travel



Gender



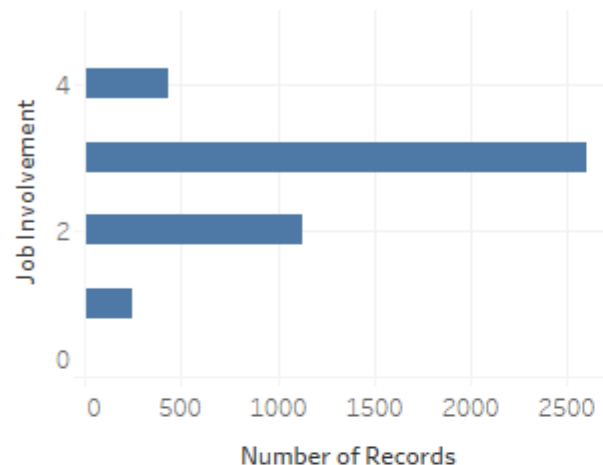
Plots to the left shows the univariate analysis on the following Variables

- **Job Satisfaction Level** - Employees with higher job satisfaction levels (3 and 4) are more compared to lower job satisfaction levels.
- **Attrition** – Attrition is around 15%
- **Business Travel** – Employees that travel rarely are very high compares to frequent or non-travel employees
- **Gender** – Male employees and marginally higher than female employees

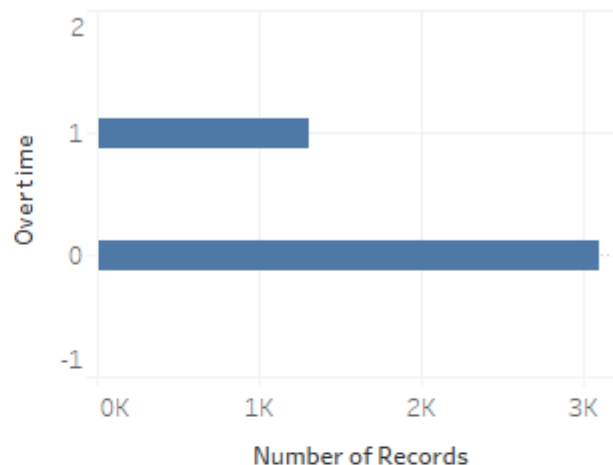


Exploratory Analysis..2

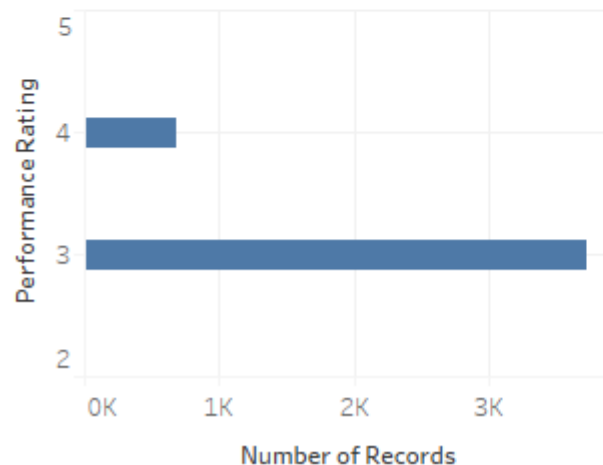
Job Involvement



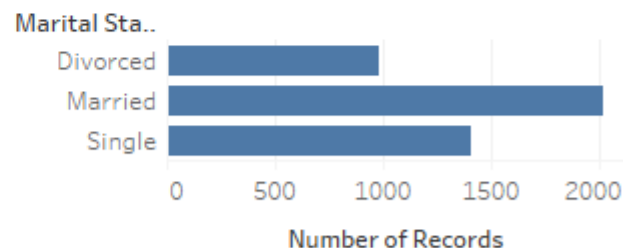
Overtime



Performance Rating

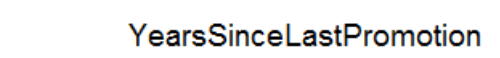
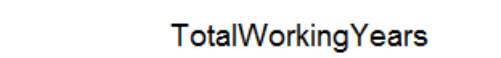
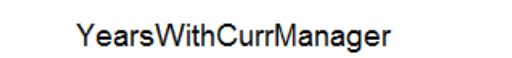
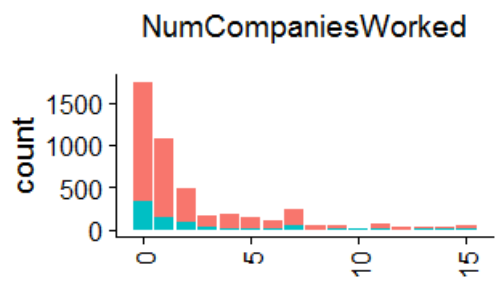
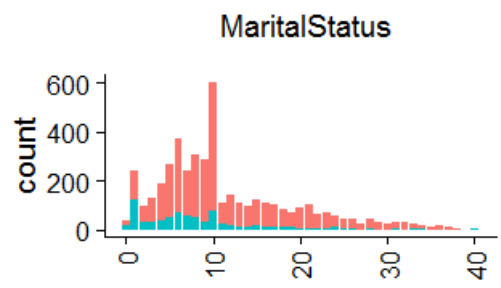
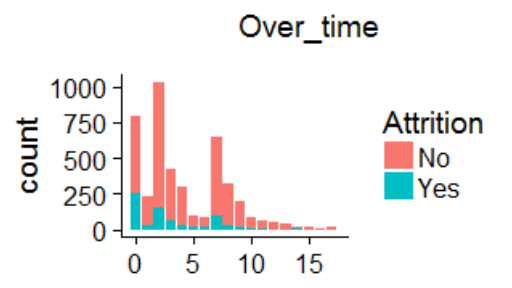
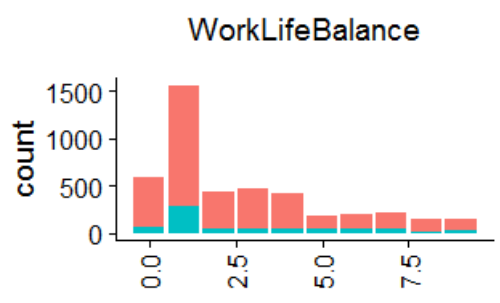
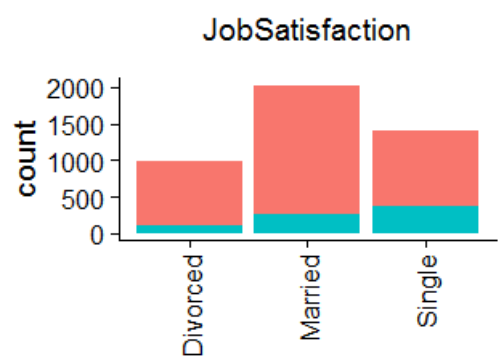
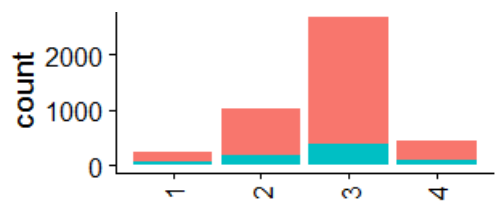
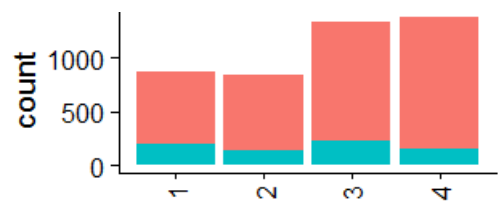
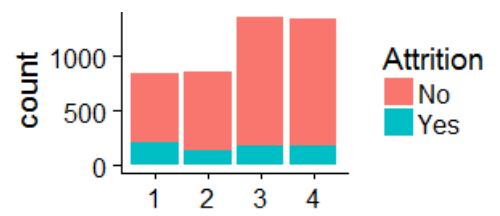


Marital Status



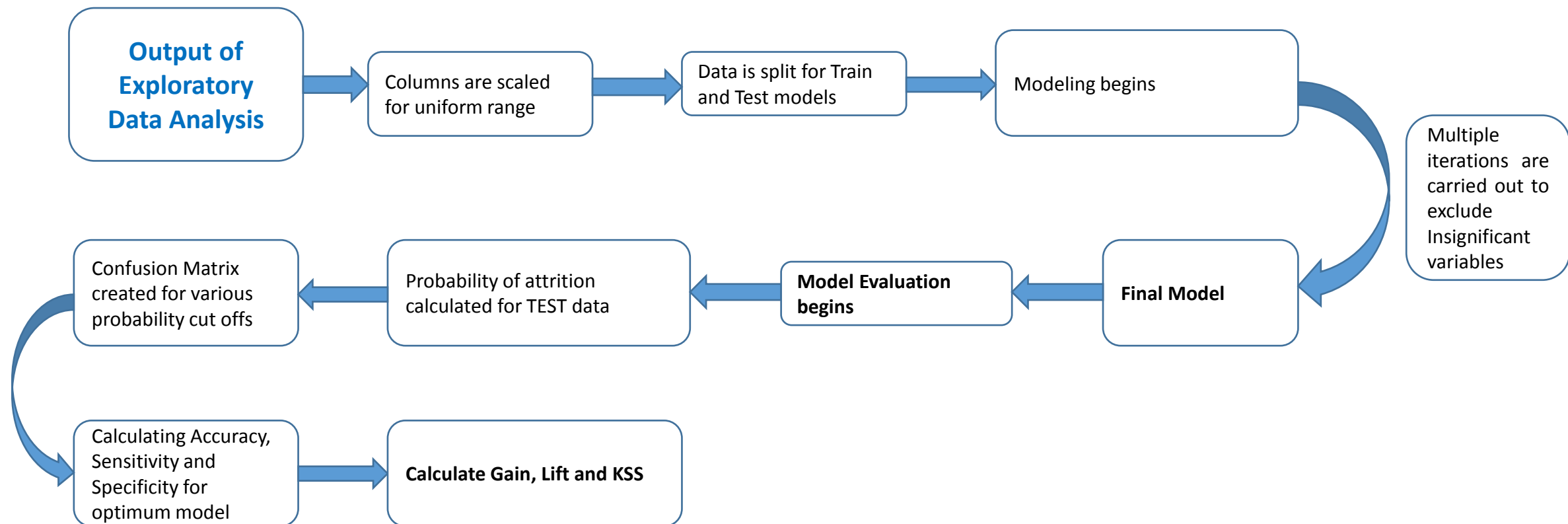
Plots to the left shows the univariate analysis on the following variables

- **Job Involvement** - Employees with average job involvement (2 and 3) are higher than low or very high involvement
- **Overtime** - Just over 1k people work overtime compared to the total employee population
- **Performance Rating** - Employees are given either Excellent or Outstanding Rating of which Excellent ones are significantly higher in number
- **Marital Status** - Married ones are higher than Single or Divorced employees

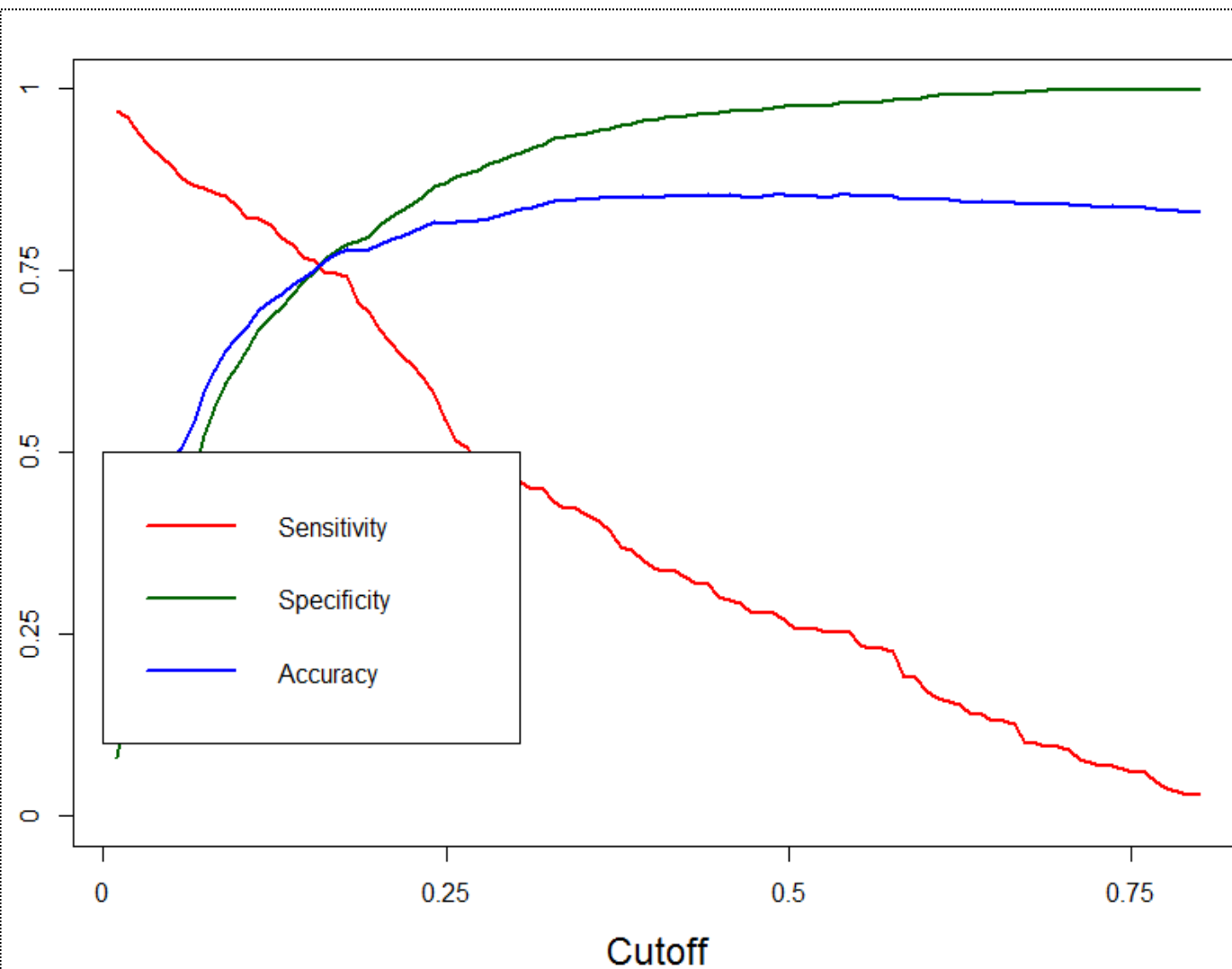


Following Graphs shows key variables that leads to attrition from EDA –

- **Environment Satisfaction** – Lower the environment satisfaction, higher are the chances of attrition.
- **Job Satisfaction** – Lower the Job satisfaction, higher are the chances of attrition
- **Work Life Balance** – Higher work life balance leads to better retention of employees
- **Over time** – Employees that work overtime are more likely to quit
- **Marital Status** – Single employees are more likely to quit
- **Number of Companies Worked** - If the person has worked in many companies then the chances that he/she will leave the company increases.
- **Years with Current manager** - Employee working with the same manager for a longer period of time are less likely to quit the company.
- **Total Working Years** – Employees that are more experienced are less likely to quit.
- **Years Since Last Promotion** – Employees are more likely to quit if career is stagnated



Accuracy, Sensitivity and Specificity of the model



After multiple iterations with different probability values to find optimum accuracy, sensitivity and specificity, optimum probability is calculated which will give the best values for sensitivity, specificity and Accuracy of the model

In a nutshell -

Accuracy - Ability of the model to predict the churn (attrition)/ non churn (retention) accurately

Sensitivity – Churn accuracy – proportion of yesses correctly predicted

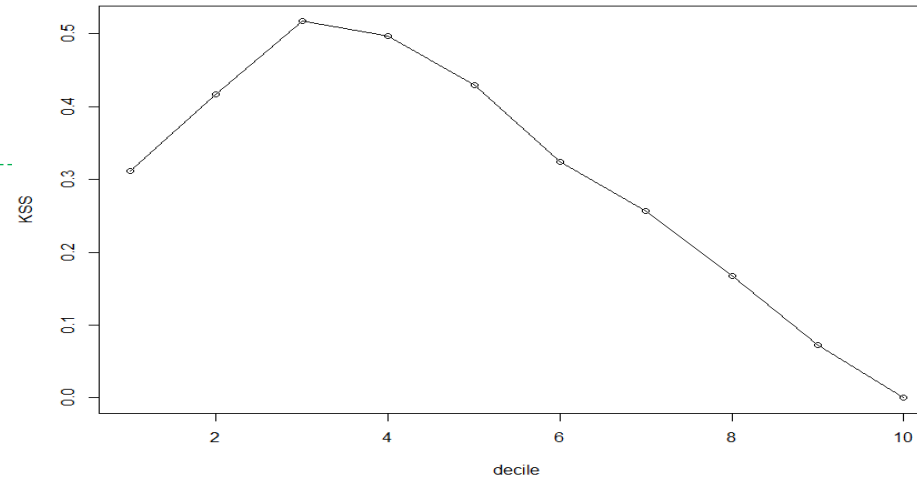
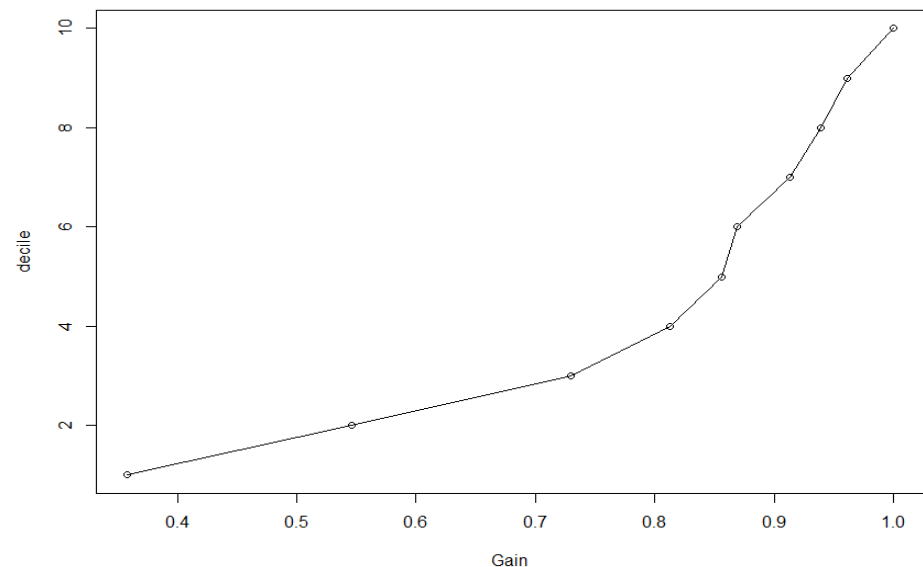
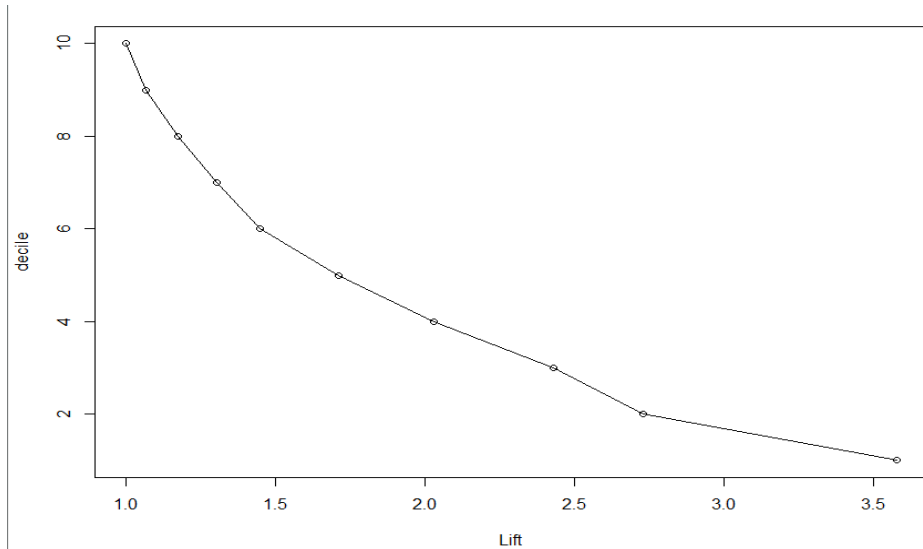
Specificity – Non-churn accuracy – proportion of nos correctly predicted.

From the graph, it is evident that for a probability ~0.2, accuracy, sensitivity and specificity almost meet with the values

Accuracy : 0.7513

Sensitivity : 0.7642

Specificity : 0.7486











Gain : We know that gain tells us how accurate my model is in predicting at any decile. Thus, we can say that we can identify 80% of the employees who are likely to leave the company by just looking at the 40% of the total employees.

Lift : By looking at the Lift vector, we can observe the cumulative Lift for top two deciles is 2.72 which means that when we select 20% of the records based on the model, one can expect 2.72 times the total number of employees found than by randomly selecting 20% of the data without a model.

KS statistic : An indicator of how well our model discriminates between the two classes. For our model the max KS statistic is 0.51 which is in 3rd decile which is sign of a good model.

Key factors impacting Churn (Attrition)

Key Factors	Correlation on churn (attrition)	Rationale
Environment Satisfaction		Higher the satisfaction, lower are the chances of churn
Number of Companies Worked		More the number of companies worked, higher is the possibility of churn
Total Working Years		Higher the work experience, lower is the possibility of Churn
Year with Current Manager		Higher the years with current manager, lower are the possibility of churn
Over Time worked		Employee working over time is more likely to churn
Job Satisfaction		Higher the satisfaction, lower are the chances of churn
Work Life Balance		Better the work life balance, lower are the chances of churn
Marital Status Single		Single employees are more likely to churn

Recommendations to address employee churn are

- Improve work environment satisfaction of the employees by making their work time more enjoyable and stress free. For ex –
 - Company could include a power nap window and facility after lunch hours to include productivity
 - Games within the office premises to reduce stress etc.
- Hiring – When hiring from the job market, company can avoid -
 - Hiring single (marital status) people as they do not have any obligations and are more likely to churn
 - Hiring people who have worked in more companies in the past. (General thumb rule is an employee more likely to quit an organization after every 2 years)
 - Having total work years more than 5 years as they will look for stability.
- Improve Job Satisfaction by (but not limited to)
 - Reducing over time. This increases stress and is one of the key factors for churn.
 - Giving out appreciations which leads to morale boost and a sense of belonging within a team.
- Keeping an employee working under a manager for longer durations leads to bonding and mutual trust which will reduce churn
- Enabling work life balance by -
 - Allowing work from home (remotely) etc.