# DDSAnalytics: Attrition Study

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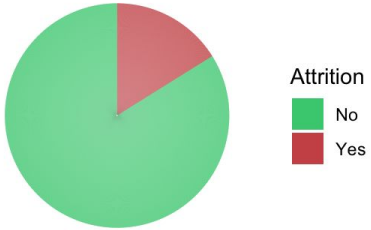


# Agenda

- Business objectives
- Data source
- Methodology
- Evaluation/results
- Summary

# Business Objectives

DDSAnalytics

- Analytics company that specializes in talent management solutions for Fortune 1000 companies
- Talent management is defined as the iterative process of developing and retaining employees

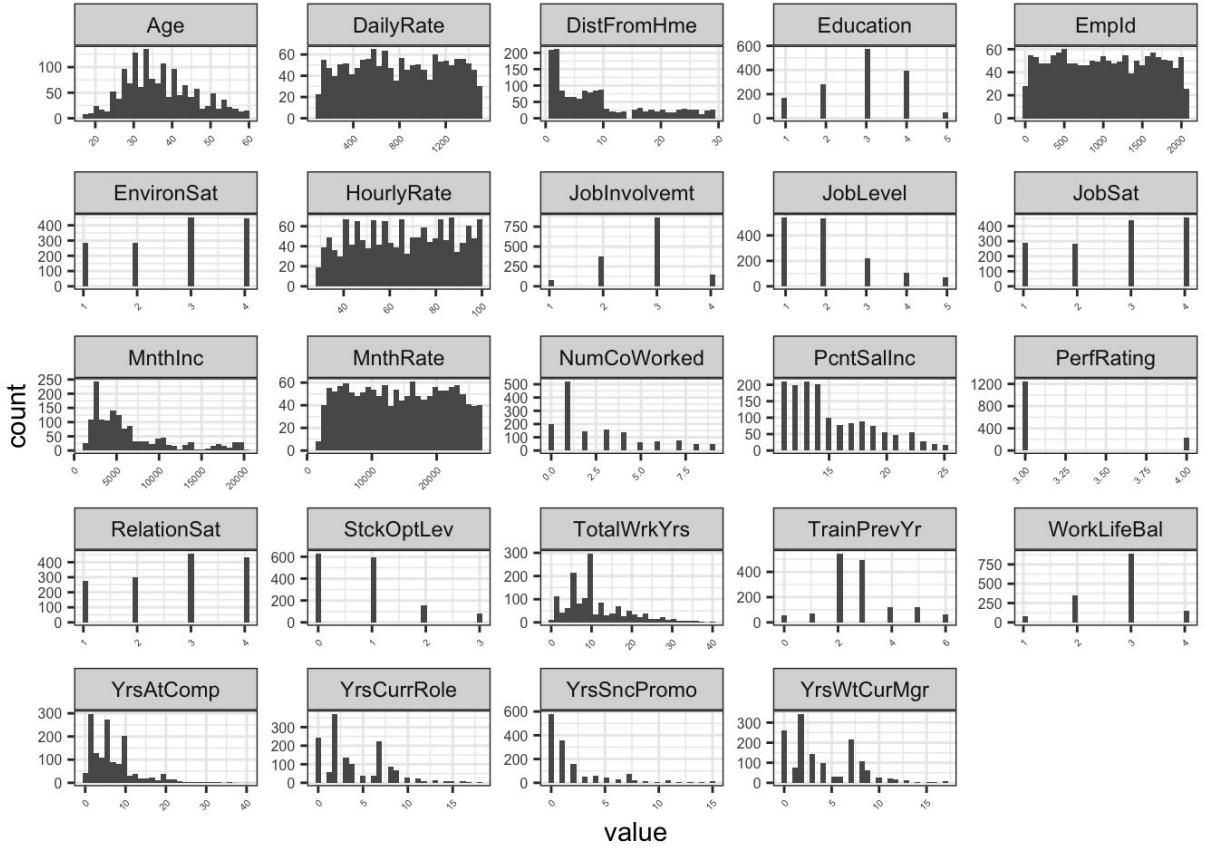
Objective

- 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

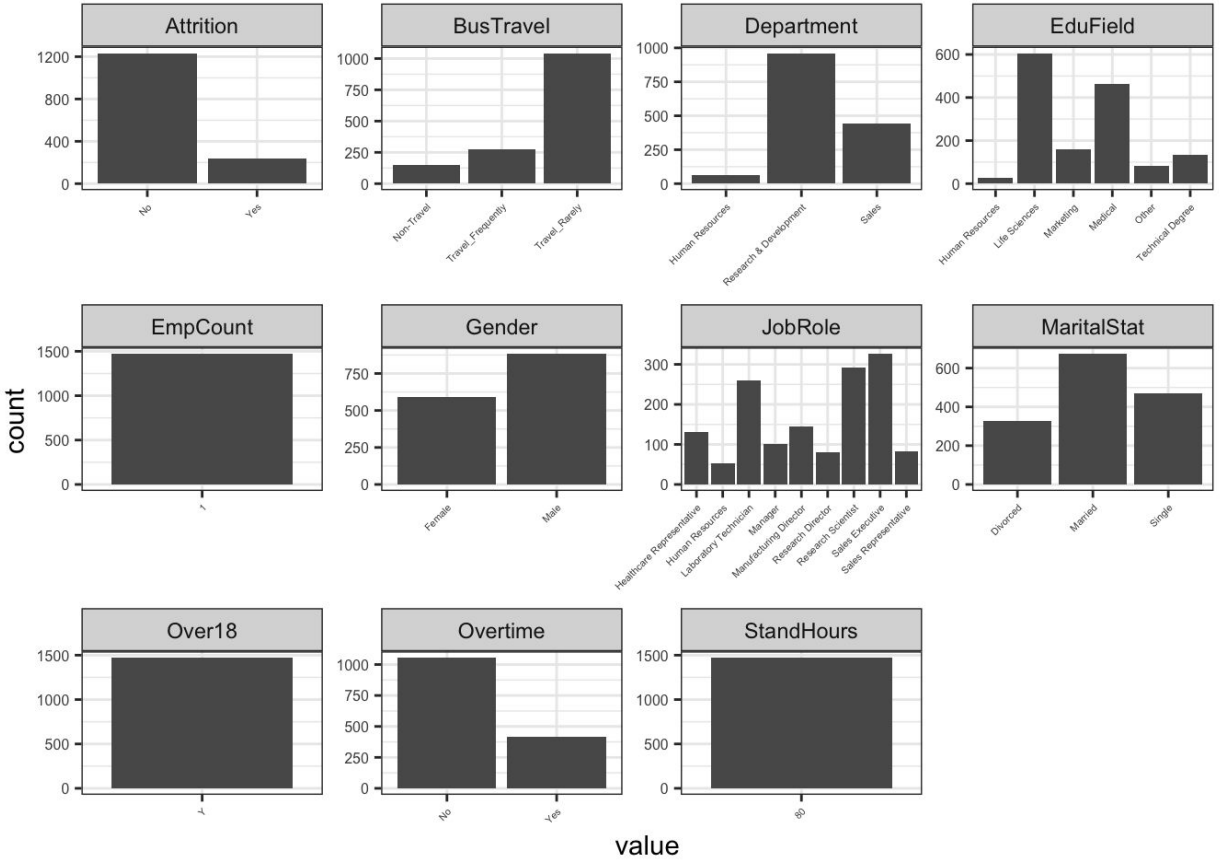
# Data Source

Our team has been given a dataset (CaseStudy2-Data.xlsx) to conduct exploratory data analysis (EDA) to determine factors that lead to attrition

Raw Employee data set provided in csv format

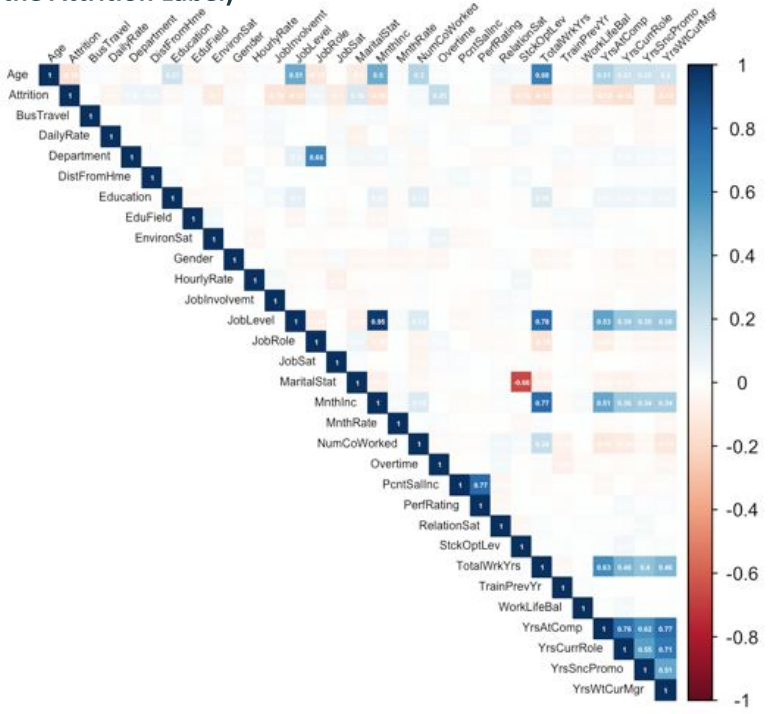


# Data Source

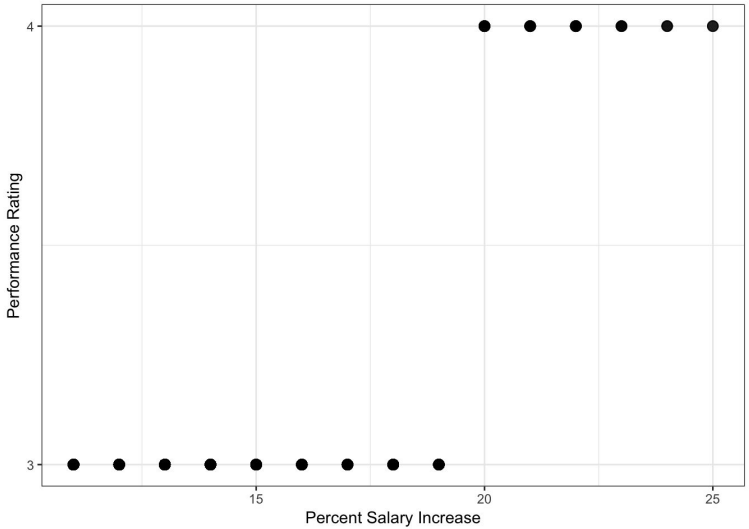

Attrition
No
Yes
BusTravel
Non-Travel
Travel_Frequently
Travel_Rarely
Department
Human Resources
Research & Development
Sales
EduField
Human Resources
Life Sciences
Marketing
Medical
Other
Technical Degree
EmpCount
Gender
Female
Male
JobRole
Healthcare Representative
Human Resources
Laboratory Technician
Manager
Manufacturing Director
Research Director
Research Scientist
Sales Executive
Sales Representative
MaritalStat
Divorced
Married
Single
Over18
Overtime
No
Yes
StandHours
count
value

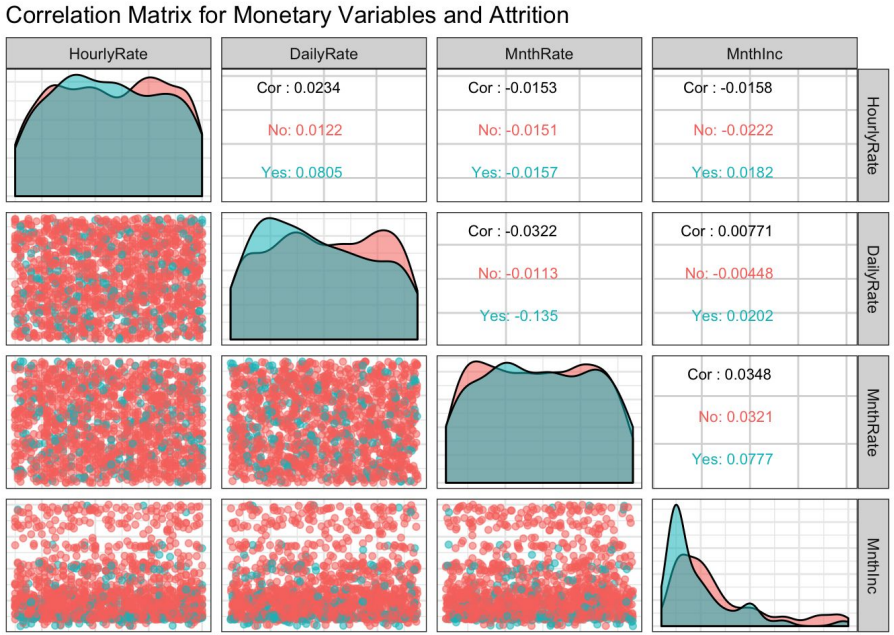
# Methodology

- Steps/Workflow
  - Variable Identification
    - Data size and shape (1470 observations, 35 Features including the Attrition Label)
    - Of the 35 Features
      - 1 Label: Attrition
      - 26 Numerical Features
      - 9 Categorical Features (1 being the Label of Attrition)
  - Univariate Analysis
    - Label
    - Numeric Features
    - Categorical Features
  - Bivariate Analysis
    - Attrition to Age
    - Attrition to Income
    - Insights using correlogram
  - Data Manipulation
    - Feature Manipulation (log transformation on Income)
    - Create new features (life satisfaction)
  - Model creation / prediction
    - Linear Regression / Decision Tree / Random Forest

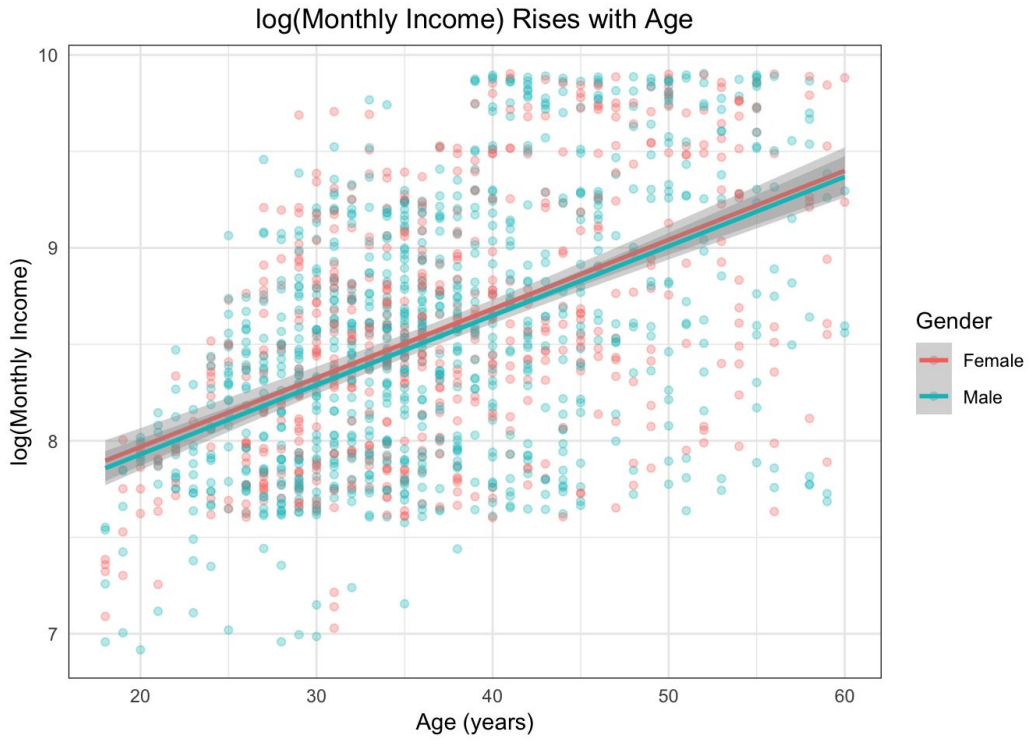


# Results:  Misc Trends

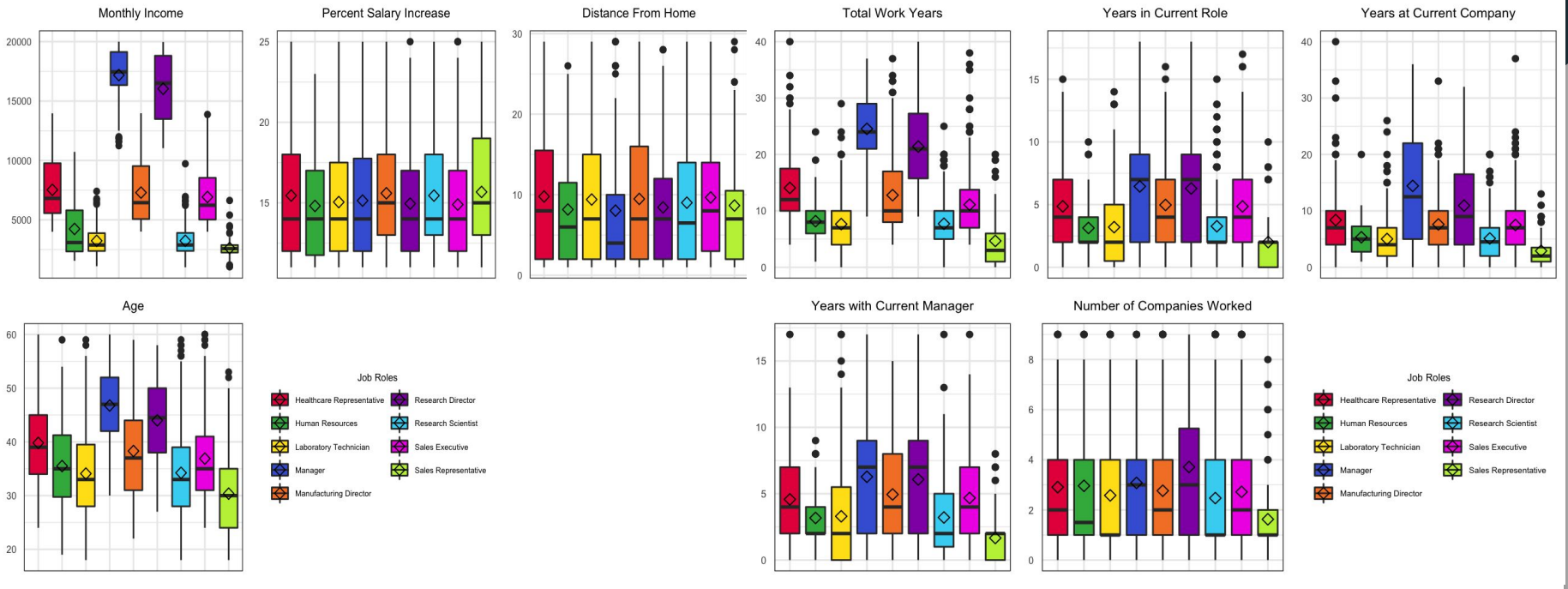


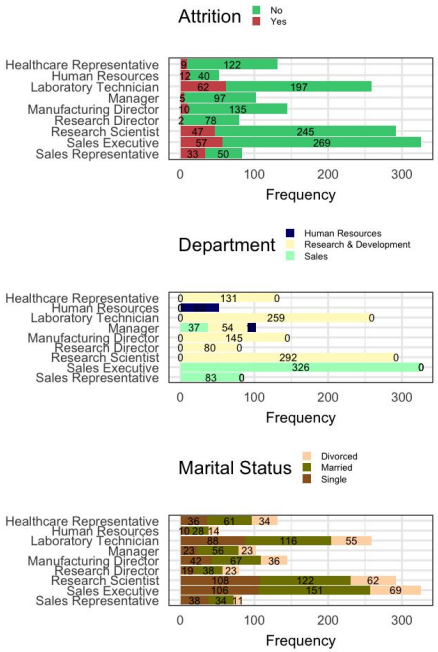
# Results:  Age & Income

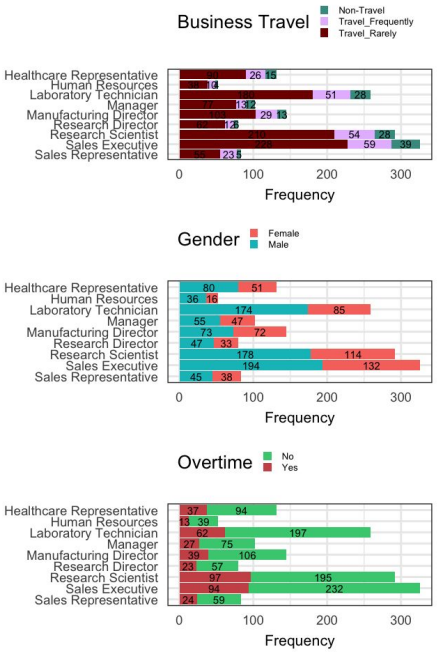


# Results: Job Trends



# Results: Job Trends





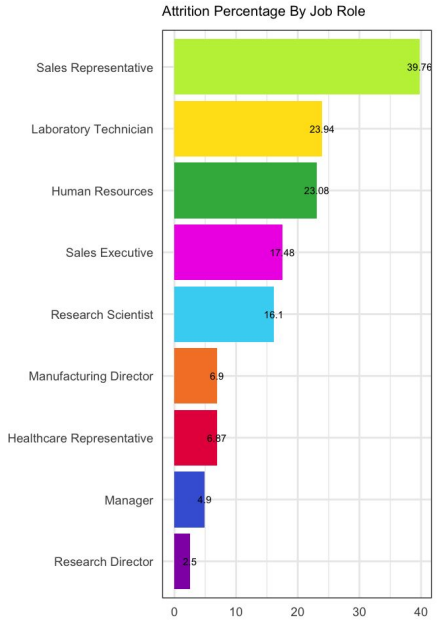


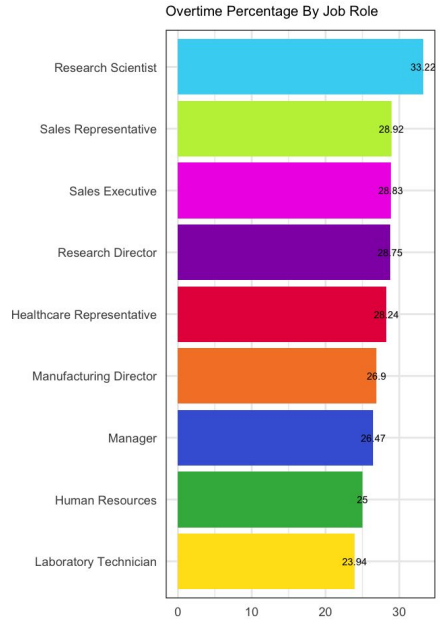




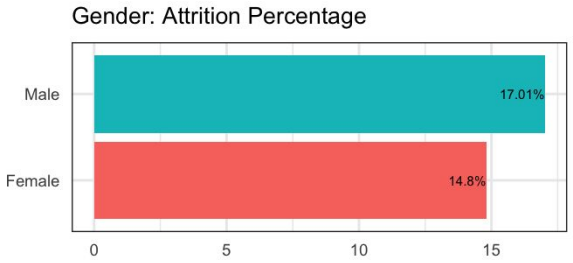


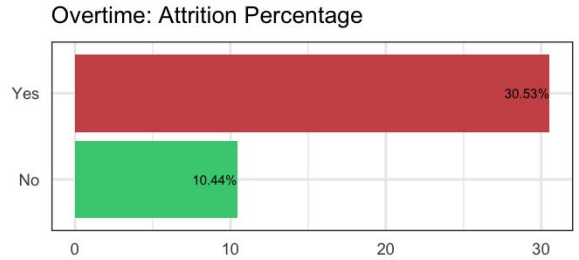


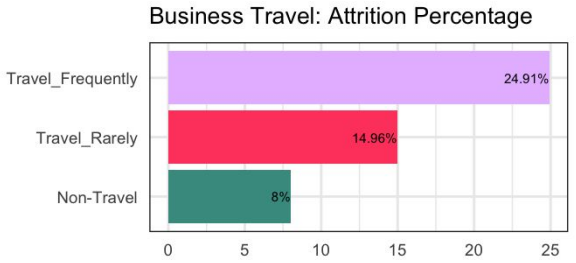



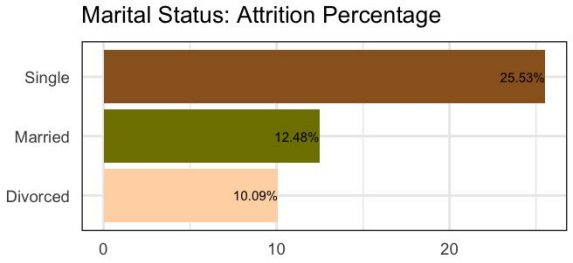



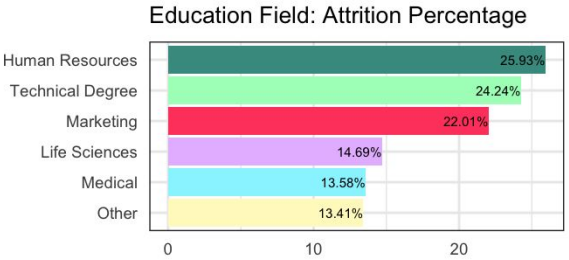
# Results: Developing an Attrition Profile

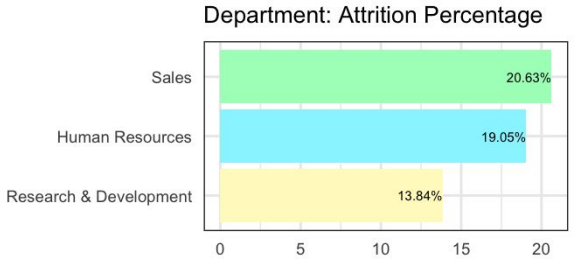


# Evaluation: Building a Predictive Model

| Model | Accuracy | Sensitivity | Specificity |
|---|---|---|---|
| Logistic Regression | 80.38% | 67.80% | 82.79% |
| k-Nearest Neighbors | 82.83% | 6.78% | 97.40% |
| Decision Tree | 85.29% | 32.20% | 95.46% |
| Random Forest | 86.92% | 27.12% | 99.35% |

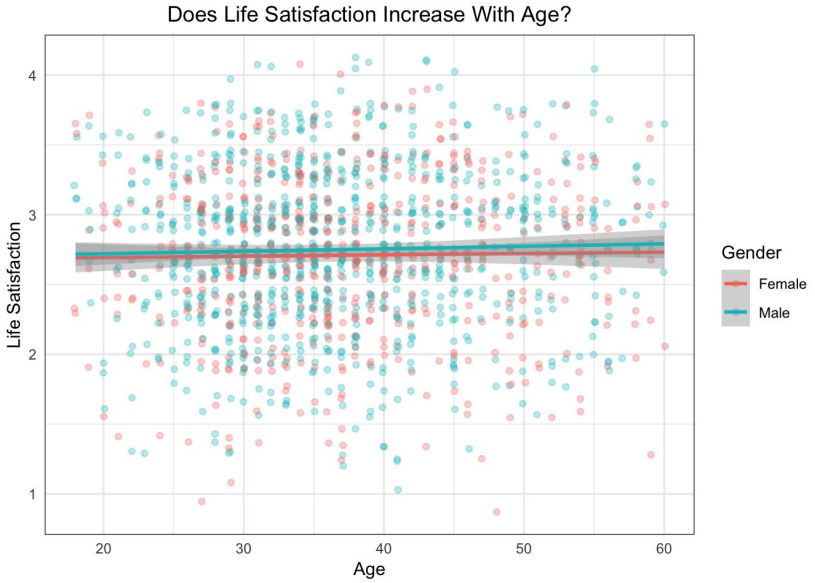
# Results: Predicting Attrition

## Random Forest: Top Predictors for Attrition=Yes

| | **Predictor** | **Level / Trend** |
|---|---|---|
| 1 | Overtime | Yes |
| 2 | Job Level | 1, 2 |
| 3 | Stock Option Level | 0, 1 |
| 4 | Job Satisfaction | 1, 2 |
| 5 | Age | younger |
| 6 | Monthly Income | lower |

# Results: Life Satisfaction

- **Defined as μ(Job Satisfaction, Relationship Satisfaction, Work-Life Balance)**




# Summary - Insights

1. Component that we discovered during our analysis is that overtime was quite high among those employees that left.
2. The employees that had lower job level (1, 2) most likely the ones to leave
3. Those employees with stock options at level (0, 1) contributed to attrition
4. Those employees that rated their job satisfaction level 0, 1 most likely to leave
5. The younger aged employees fit the profile of those employees leaving
6. Employees that make a lower income are contributing to attrition

# Summary - Recommendation

1. Reduce Overtime
2. Create career Technical Track for employees not wanting to be managers
3. Offer stock options for new hires and refresh packages
4. Increase job satisfaction with meal incentives/travel incentives
5. Encourage 20% projects that allow employees to engage in other parts of the business
6. Be more competitive and aggressive by increasing starting salary for new employees

# Summary - Recommendation

1. Provide concrete definition for Life Satisfaction so that it can be included in future analysis
2. Define the Stock Option levels in more detail and what that means

# Questions

Comments?  Questions?