Reasons for Employee Attrition and Strategies to Reduce It

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Agenda

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- Objectives
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- Data Visualization
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Introduction

- What is employee attrition?
- Reasons
  - compensation, recognition, career progression, company culture, poor training, and stress
- On average, a company will lose 18% of its workforce annually

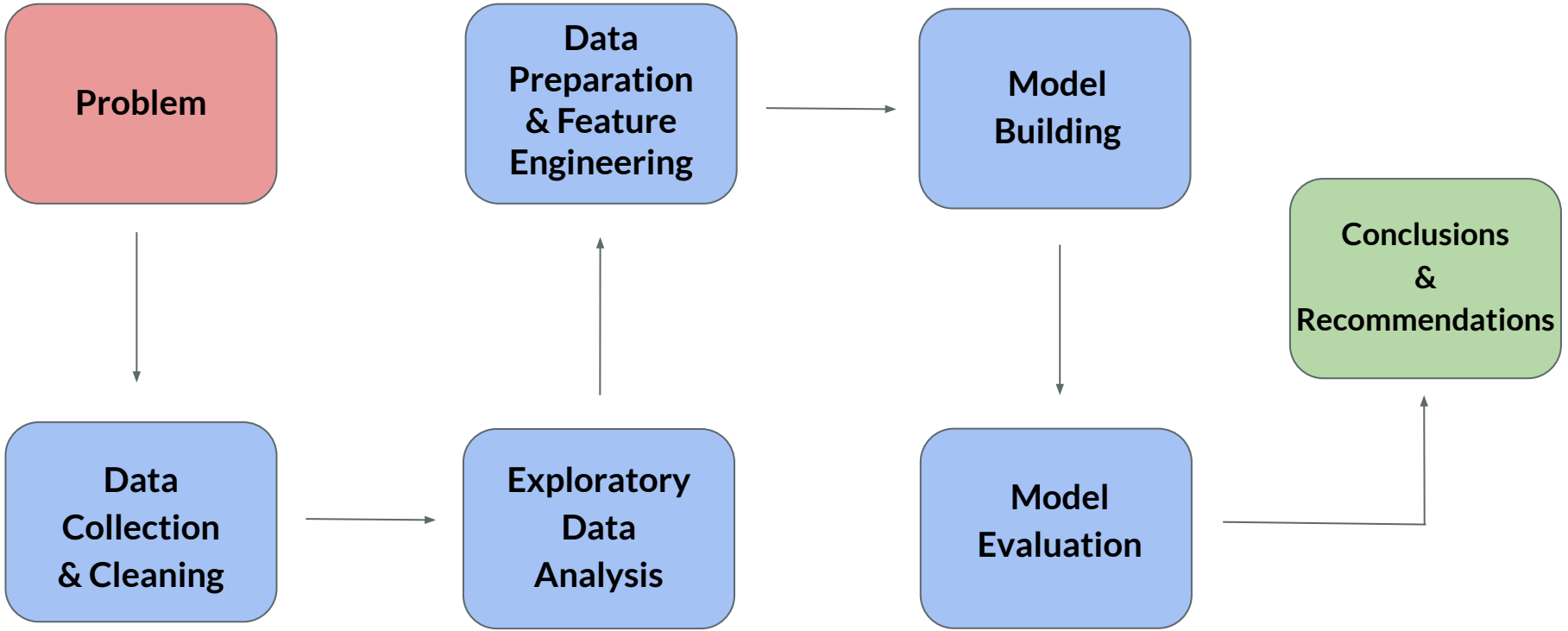
Problem Statement

- **Why are employees leaving the company?**
  - High attrition = loss of talented employees
  - Costly and detrimental
  - Less productivity and efficiency

Objectives

- To identify the reasons for employee attrition
- To build a model to identify which employees are most likely to leave
- Offer strategies to reduce employee attrition for the company

Methodology



Descriptive Statistics

```
      Age
Min.   :18.00
1st Qu.:30.00
Median :36.00
Mean   :36.88
3rd Qu.:43.00
Max.   :60.00
```

```
  YearsAtCompany
Min.   : 0.000
1st Qu.: 3.000
Median : 5.000
Mean   : 7.008
3rd Qu.: 9.000
Max.   :40.000
```

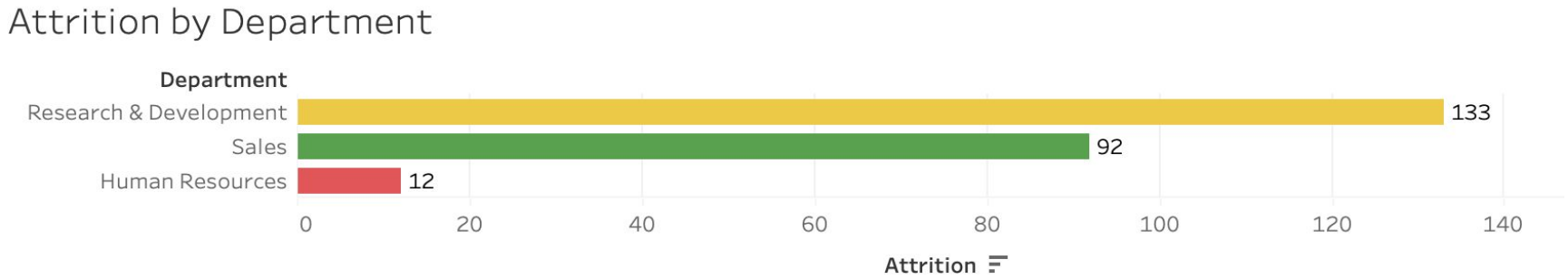
```
                          JobRole
Sales Executive           :326
Research Scientist        :292
Laboratory Technician     :259
Manufacturing Director    :145
Healthcare Representative:131
Manager                   :102
(Other)                   :215
```

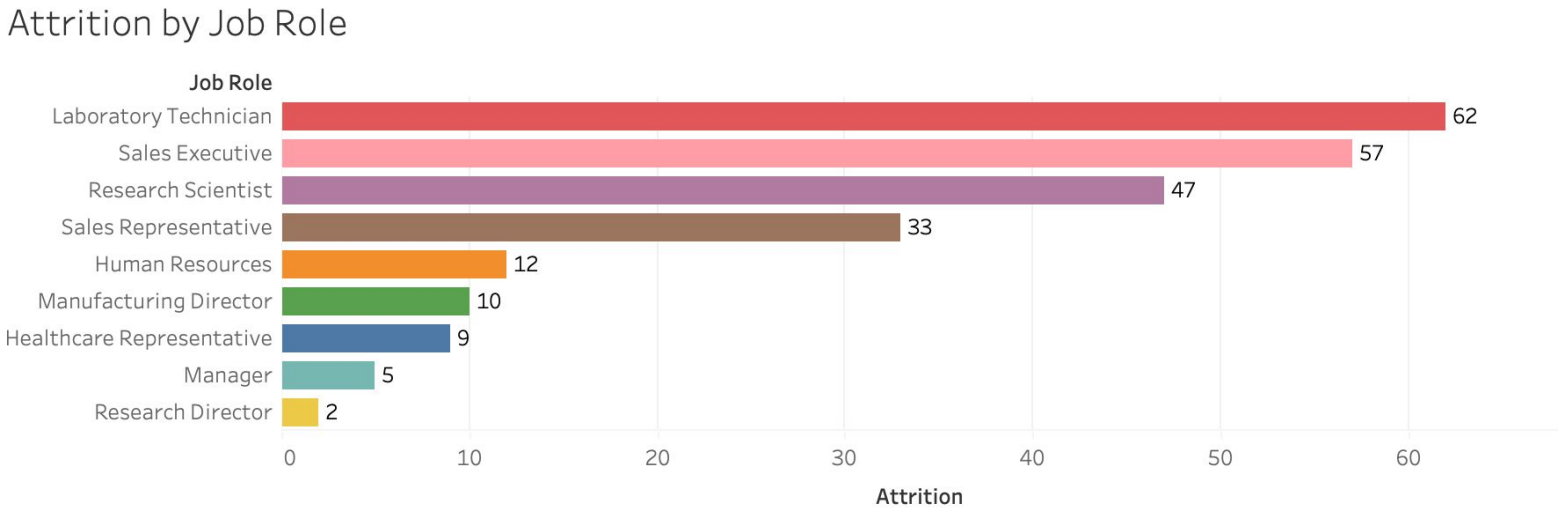
```
    OverTime
Min.   :0.000
1st Qu.:0.000
Median :0.000
Mean   :0.283
3rd Qu.:1.000
Max.   :1.000
```

```
   Attrition
Min.   :0.0000
1st Qu.:0.0000
Median :0.0000
Mean   :0.1612
3rd Qu.:0.0000
Max.   :1.0000
```

```
                        Department
Human Resources         : 63
Research & Development:961
Sales                   :446
```

Data Visualization





Data Analysis

- Binomial Logistic Regression
  - Classifying whether an employee will leave or not
  - $\alpha = 0.05$

```
1                    Age
2         DistanceFromHome
3 EnvironmentSatisfaction
4            JobInvolvement
5           JobSatisfaction
6            MaritalStatus
7            MonthlyIncome
8        NumCompaniesWorked
9                 OverTime
```

$$\hat{y} = \frac{e^{1.22 - 0.05x_1 + 0.03x_2 + \ldots 0.18x_8 + 1.65x_9}}{1 + e^{1.22 - 0.05x_1 + 0.03x_2 + \ldots 0.18x_8 + 1.65x_9}}$$

Coefficients:

	Estimate	Std. Error	z value	Pr(>|z|)	
(Intercept)	1.220e+00	6.962e-01	1.753	0.079583	.
Age	-4.393e-02	1.264e-02	-3.476	0.000508	***
DistanceFromHome	3.241e-02	1.090e-02	2.974	0.002944	**
EnvironmentSatisfaction	-3.971e-01	8.440e-02	-4.706	2.53e-06	***
JobInvolvement	-5.334e-01	1.259e-01	-4.238	2.25e-05	***
JobSatisfaction	-3.607e-01	8.299e-02	-4.347	1.38e-05	***
MaritalStatus	6.089e-01	1.325e-01	4.596	4.31e-06	***
MonthlyIncome	-1.324e-04	3.235e-05	-4.092	4.27e-05	***
NumCompaniesWorked	1.754e-01	3.690e-02	4.754	1.99e-06	***
OverTime	1.650e+00	1.920e-01	8.592	< 2e-16	***

Results

- McFadden's Pseudo R-Squared
  - $R^2 = 0.23$
- Model Accuracy
  - 86.05%
- Model Significance
  - p-value = 0

Prediction	Reference 0	1
0	280	3
1	44	10

	predictor	oddsratio	ci_low (2.5)	ci_high (97.5)	increment
1	Age	0.957	0.933	0.981	1
2	DistanceFromHome	1.033	1.011	1.055	1
3	EnvironmentSatisfaction	0.672	0.569	0.792	1
4	JobInvolvement	0.587	0.458	0.750	1
5	JobSatisfaction	0.697	0.592	0.819	1
6	MaritalStatus	1.838	1.423	2.393	1
7	MonthlyIncome	0.718	0.609	0.836	2500
8	NumCompaniesWorked	1.192	1.109	1.281	1
9	OverTime	5.206	3.585	7.618	1

Conclusions

- Identified the biggest factors contributing to employee attrition
- Created a model that can predict whether an employee will leave or not with high accuracy
  - 86.05%

1	Age
2	DistanceFromHome
3	EnvironmentSatisfaction
4	JobInvolvement
5	JobSatisfaction
6	MaritalStatus
7	MonthlyIncome
8	NumCompaniesWorked
9	OverTime

Recommendations

1. Prevent employees from working overtime
2. Focus on employee well-being
3. Run the model frequently to monitor employees with high risk of leaving

Thank You