Frito-Lay Attrition Study

DDSAnalystics

Consultant: Katon Pang

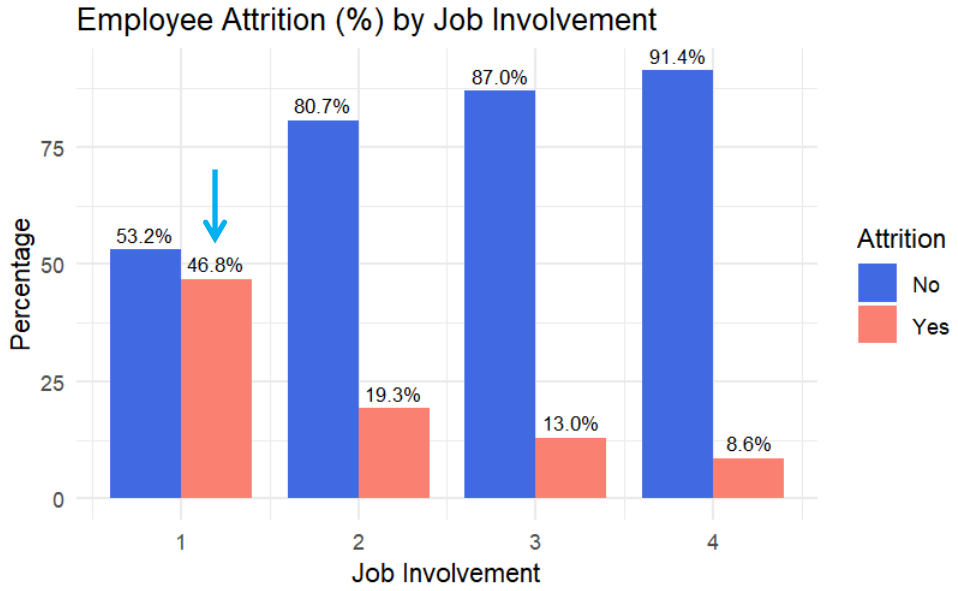
The Study

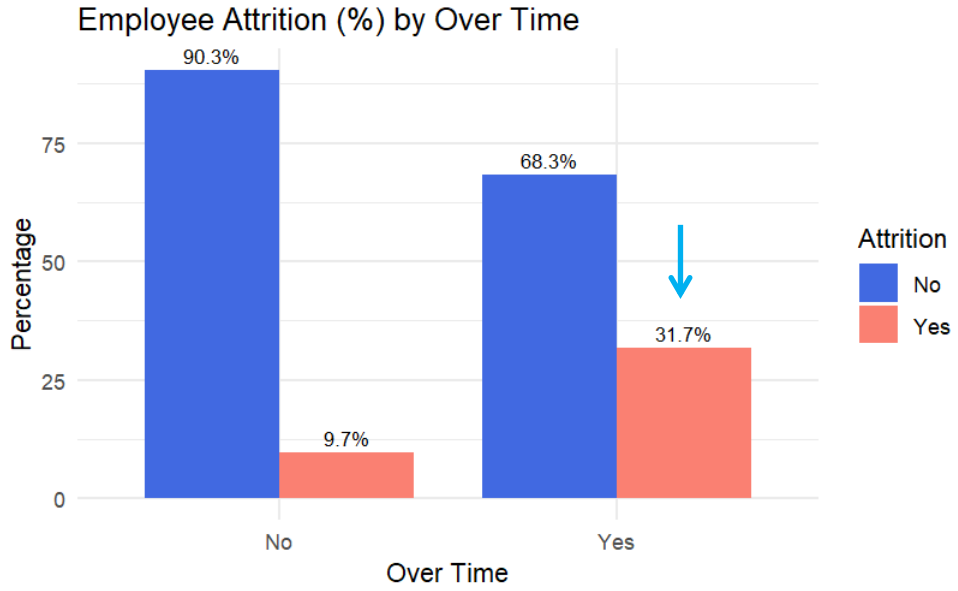
- Obtain, review and analyze existing employee data
- Identify top contributing factors to attrition
- Job role specific trends
- Model building and prediction

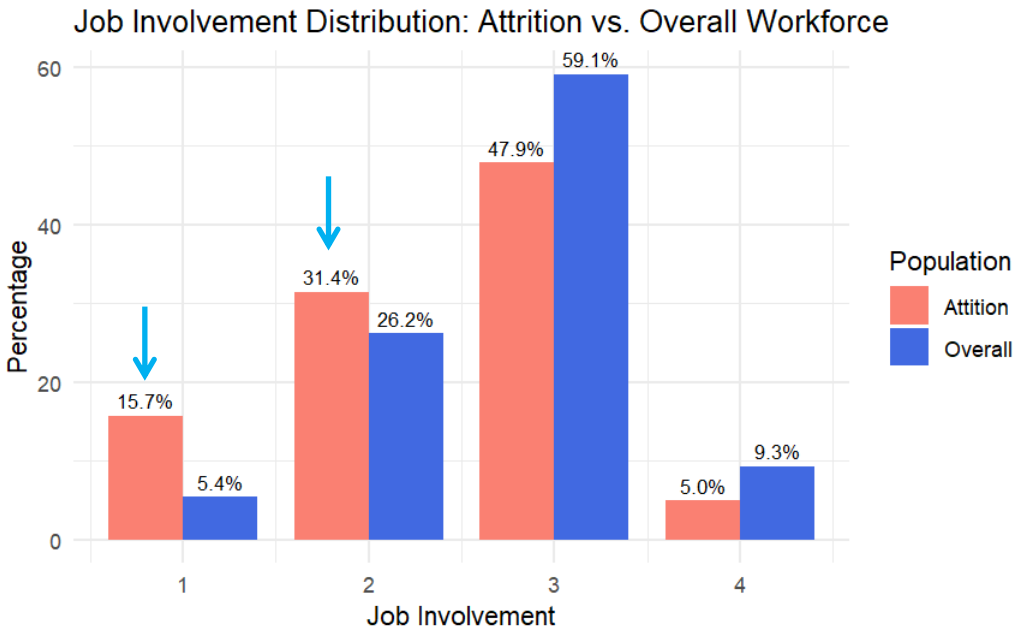
Data

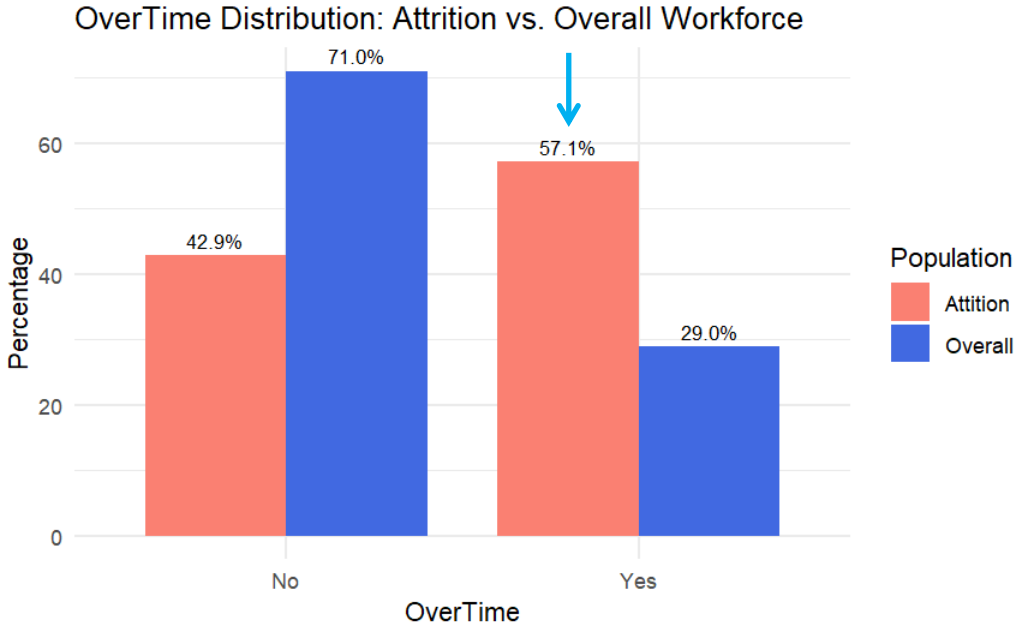
- 870 Employees
- 31 Attributes after employee identification information removed
  - 17 Categorical, 8 non-numeric
  - 14 Continuous
- No missing data
- Investigated correlation between Attrition and other variables

Top Contributing Factors

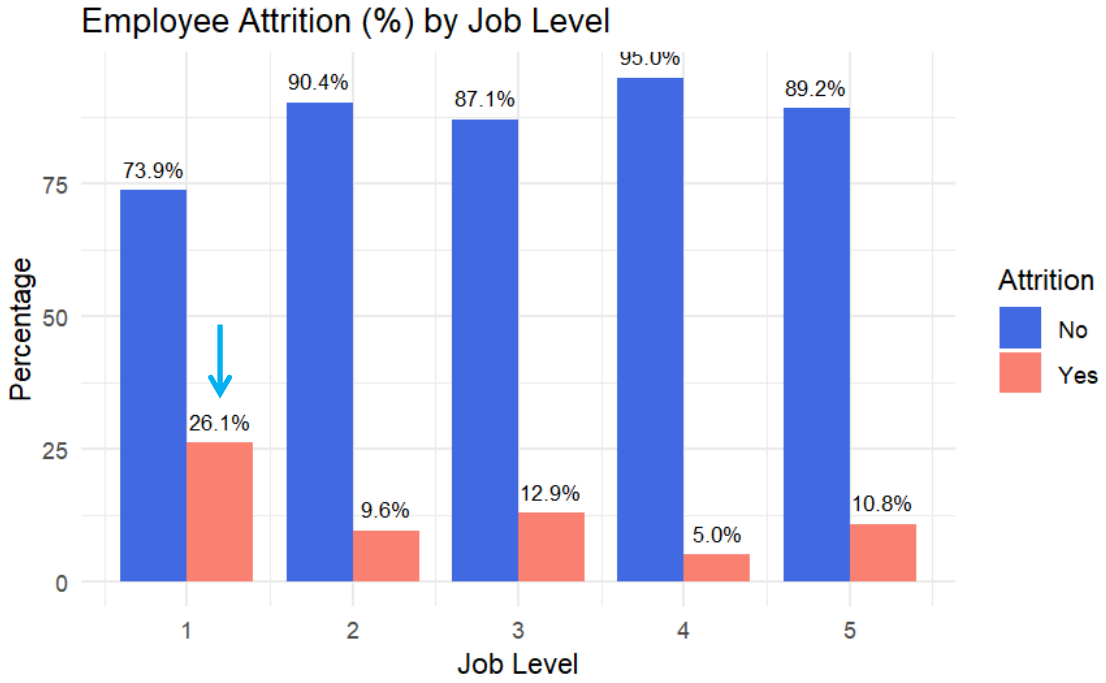


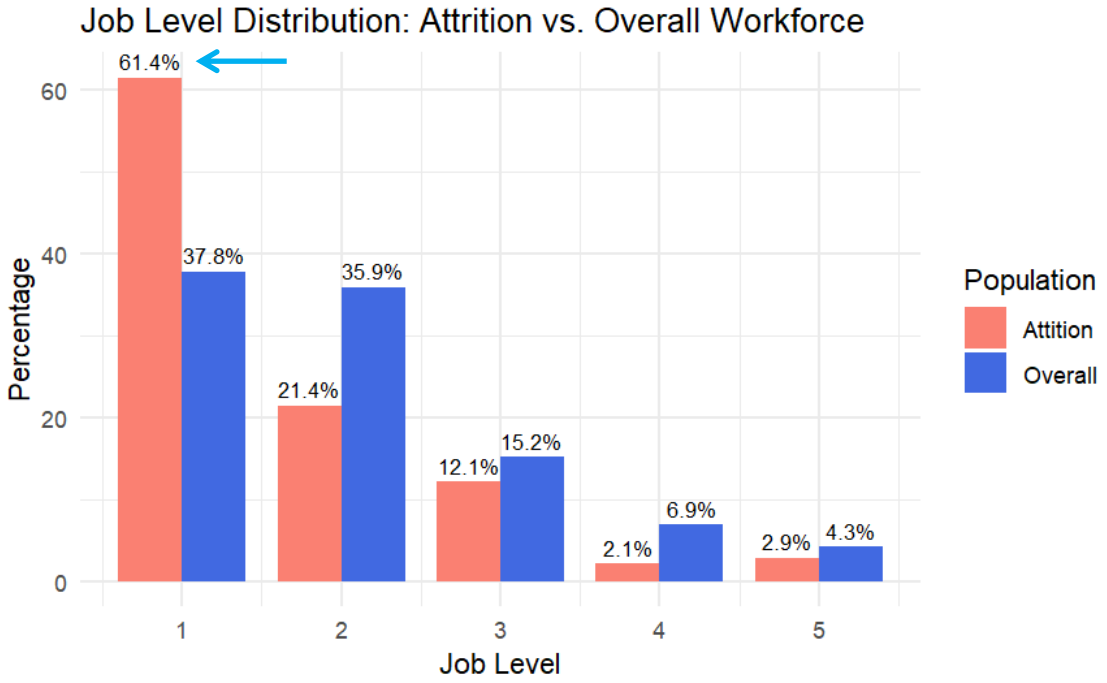




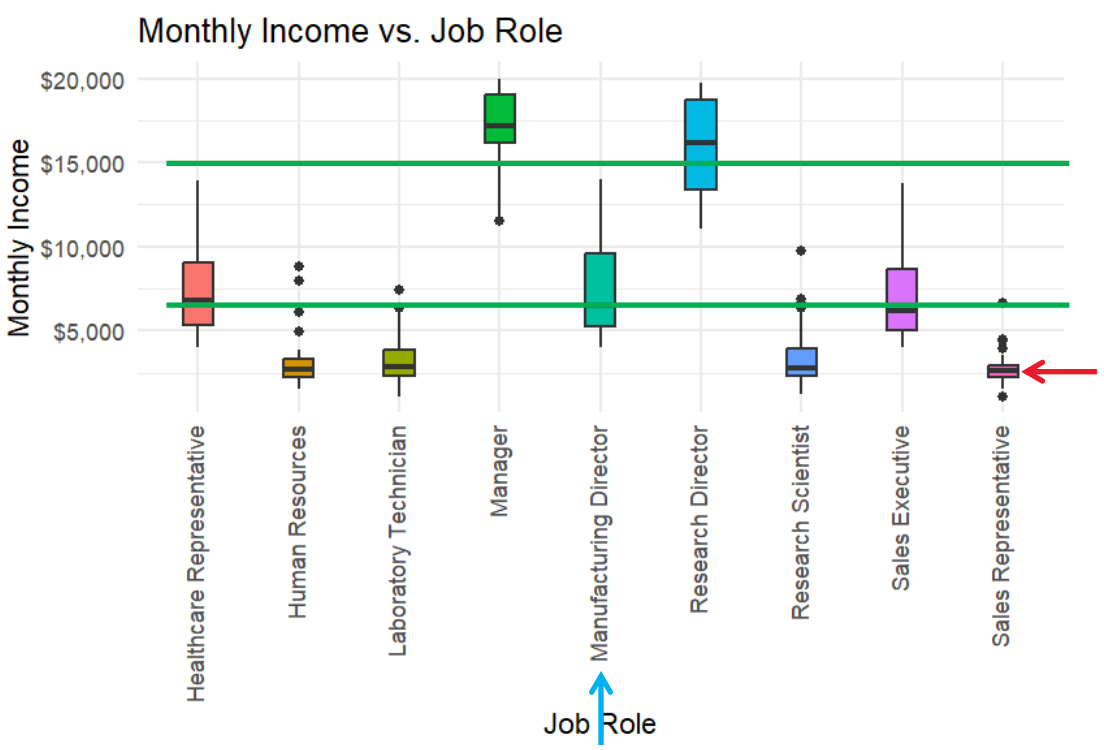


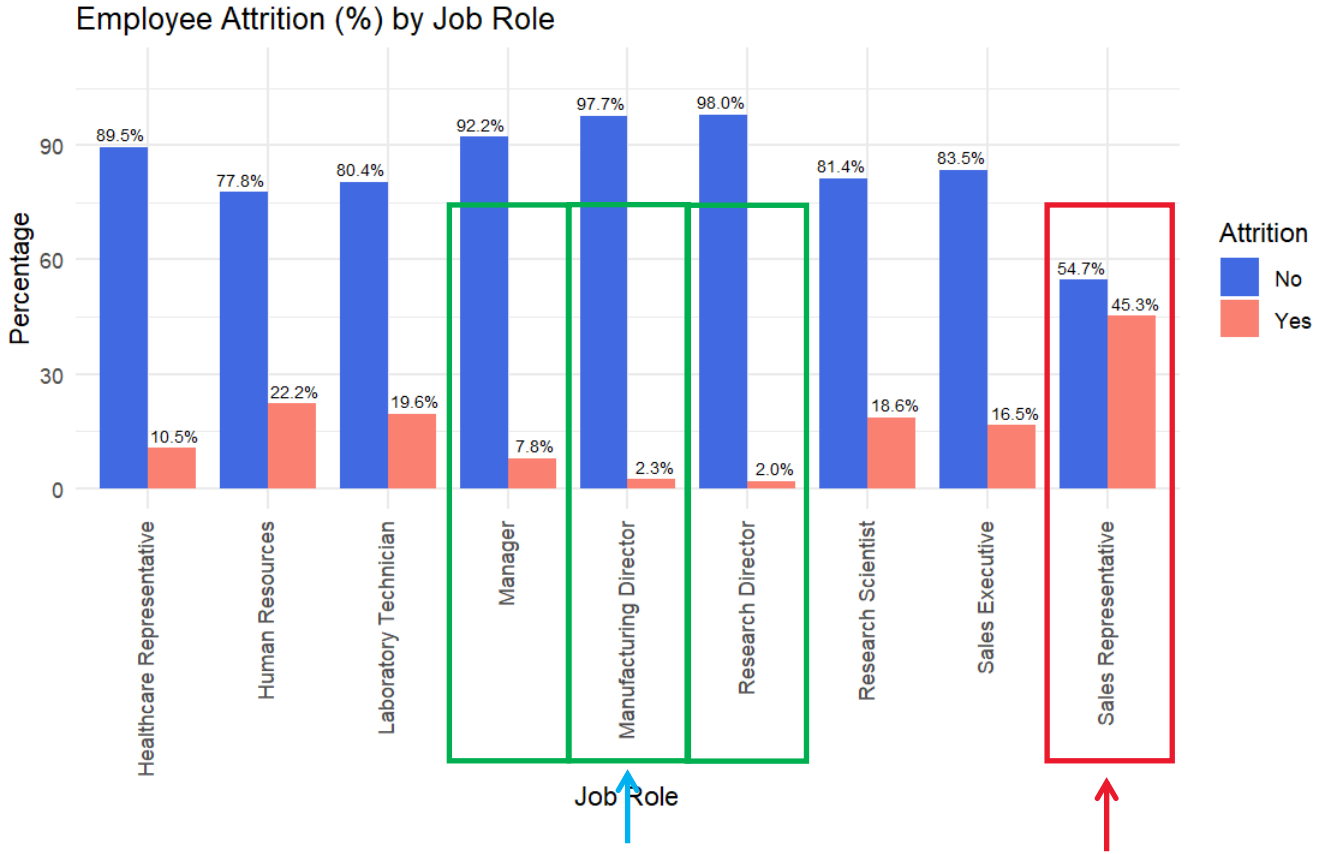
Top Contributing Factors





Job Role Trends



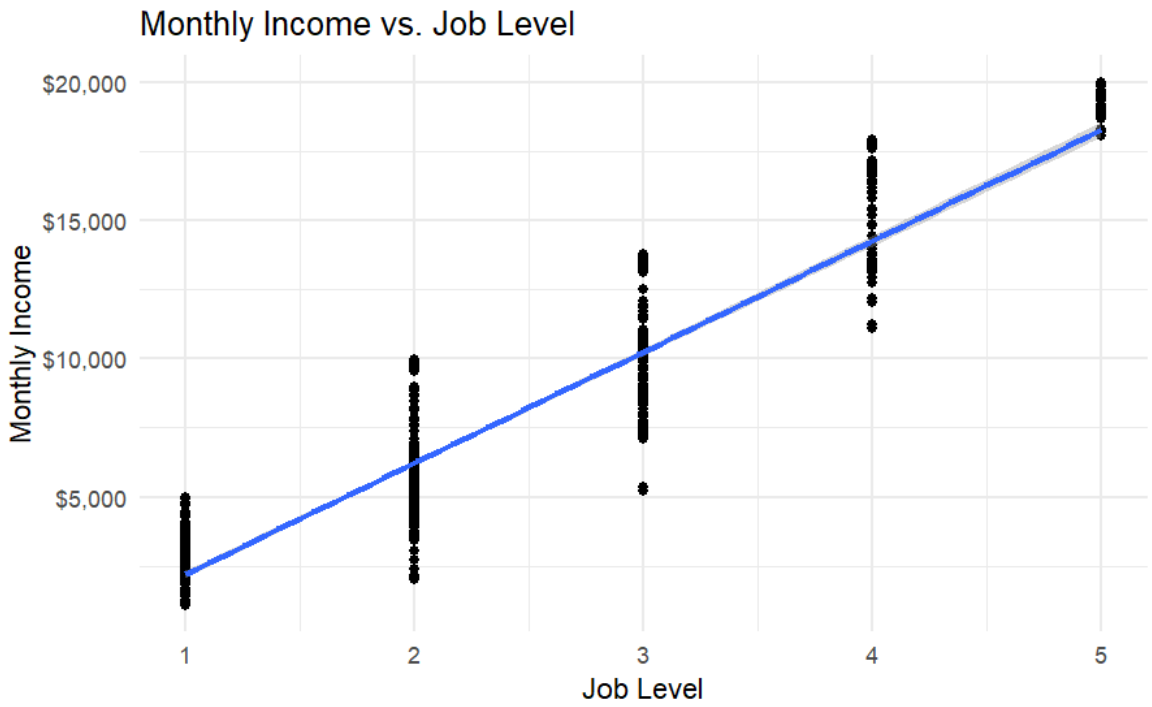


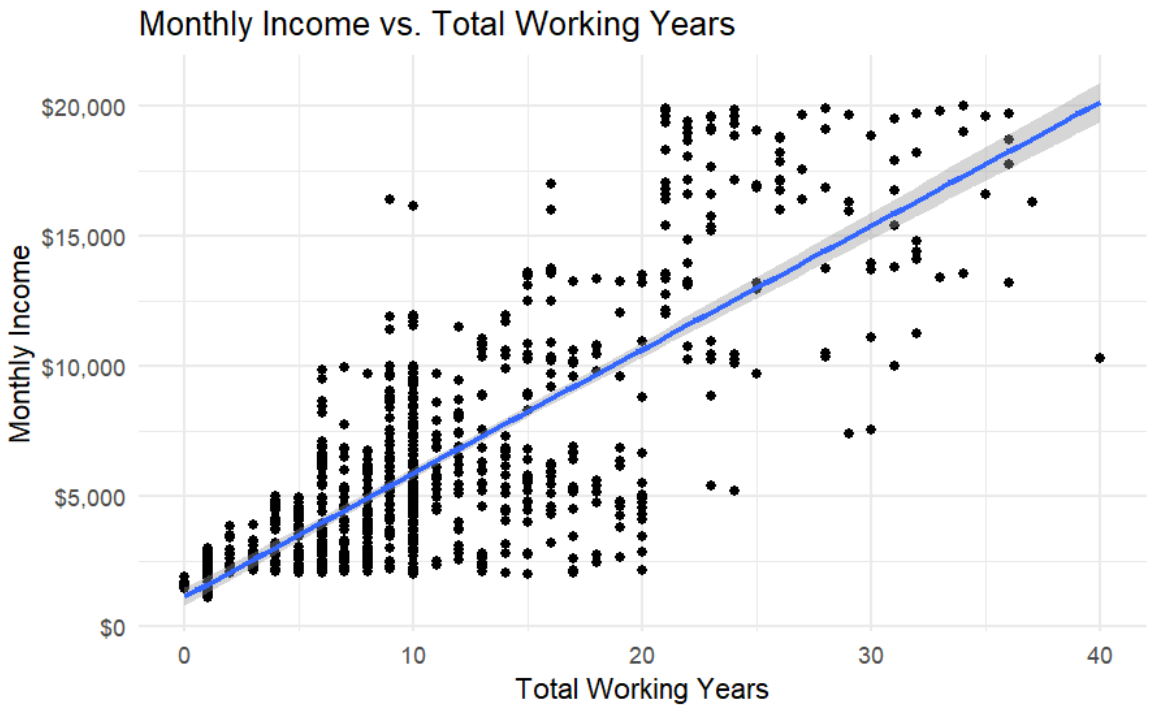
Attrition Models

- Approach:
  - Oversampling for imbalanced dataset
  - 70% train, 30% validate
  - Positive class was set to “Yes” for Attrition
  - Criteria: at least 60% for both sensitivity and specificity
- Two algorithms: Naïve Bayes, k-Nearest Neighbors (k-NN)
  - Variables: Job Involvement, Overtime, Stock Option Level, Marital Status, Job Role
- k-NN was used to predict a new dataset of 300 observations (employees)

Model	Naïve Bayes	k-NN
Accuracy	0.7237	0.7626
Sensitivity/Recall (True Positive Rate)	0.7565	0.8087
Specificity (True Negative Rate)	0.6875	0.7115
Precision	0.7280	0.7561
'Positive' Class	“Yes”	“Yes”

Monthly Income





Monthly Income Models

- Approach:
  - Linear Regression
  - Leave-one-out cross validation
  - Criterion: attain RMSE (Root Mean Squared Error) below 3,000
- Models' variables:
  - Model 1: JobLevel
  - Model 2: TotalWorkingYears
  - Model 3: JobLevel + TotalWorkingYears
  - Model 4: JobLevel + TotalWorkingYears + (JobLevel) * (TotalWorkingYears)
- Model 4 was used to predict a new dataset of 300 observations (employees)

Model	R-Square	RMSE
Model 1	0.9052	1,415
Model 2	0.6037	2,893
Model 3	0.9081	1,393
Model 4	0.9165	1,328

Summary

- The top three contributing factors to employee attrition are:
  - Job Involvement
  - Overtime
  - Job Level/Monthly Income
- Manufacturing Directors showed a significantly lower attrition rate compared to other job roles with similar median monthly income. There is potential for further study in this area, applying any lessons learned to enhance retention of other job roles.

Thank you!

Katon Pang

katonp@smu.edu