Doing Data Science: Case Study 2

Frito Lay – Employee Attrition & Salary Prediction

Sterling Beason, Data Scientist @DDSAnalytics

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Objective

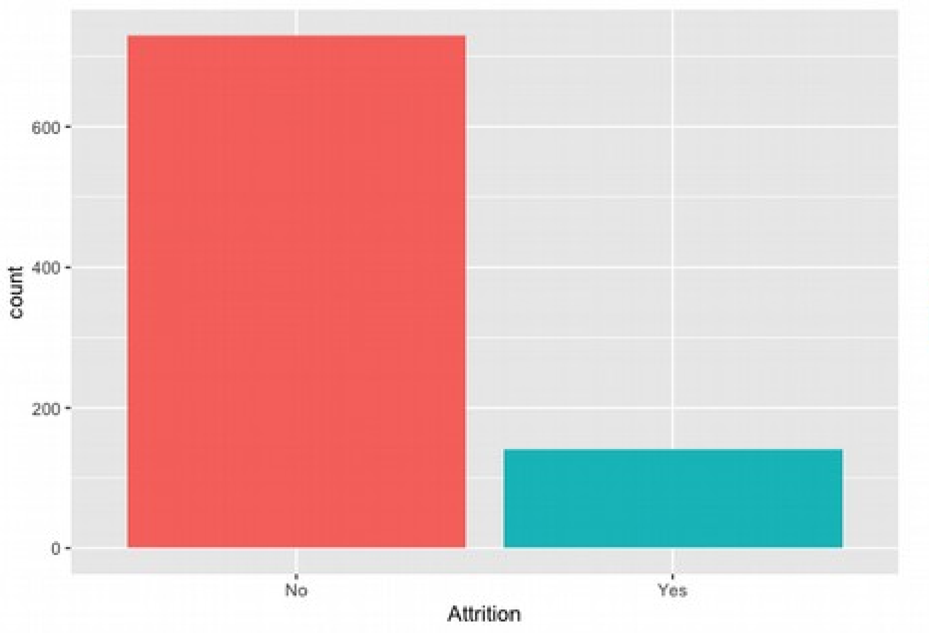
Analyze & build accurate predictive models for employee attrition and salary (monthly income) for Frito Lay.

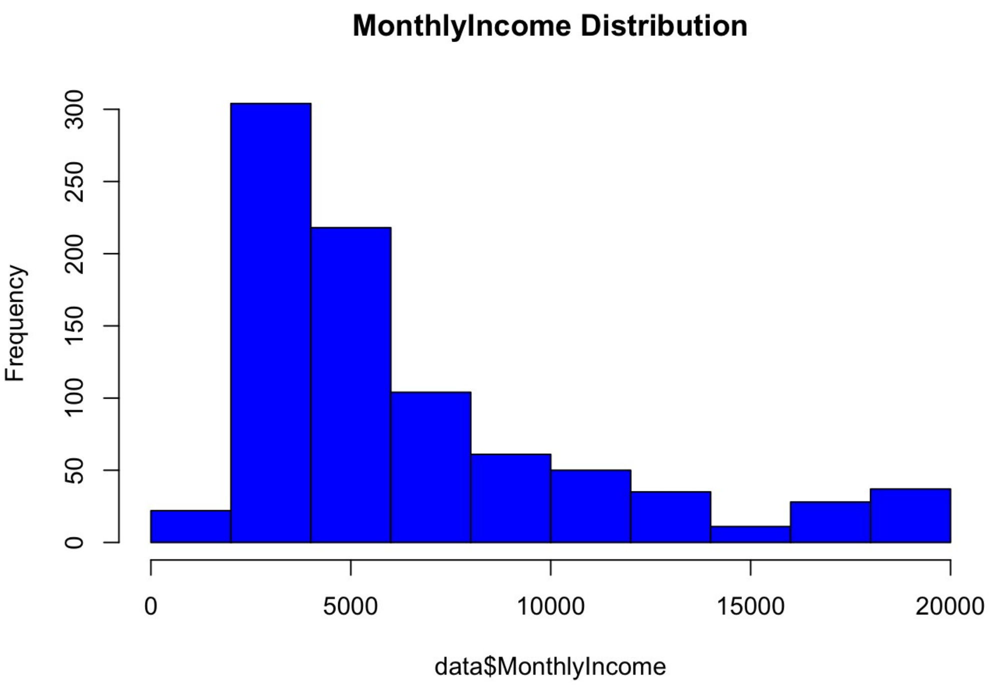
Dataset

For our analysis and modeling, Frito Lay provided the ***CaseStudy2-data.csv*** dataset. This dataset includes features on employees; such as, job levels, stock option levels, total working years, overtime required, etc...

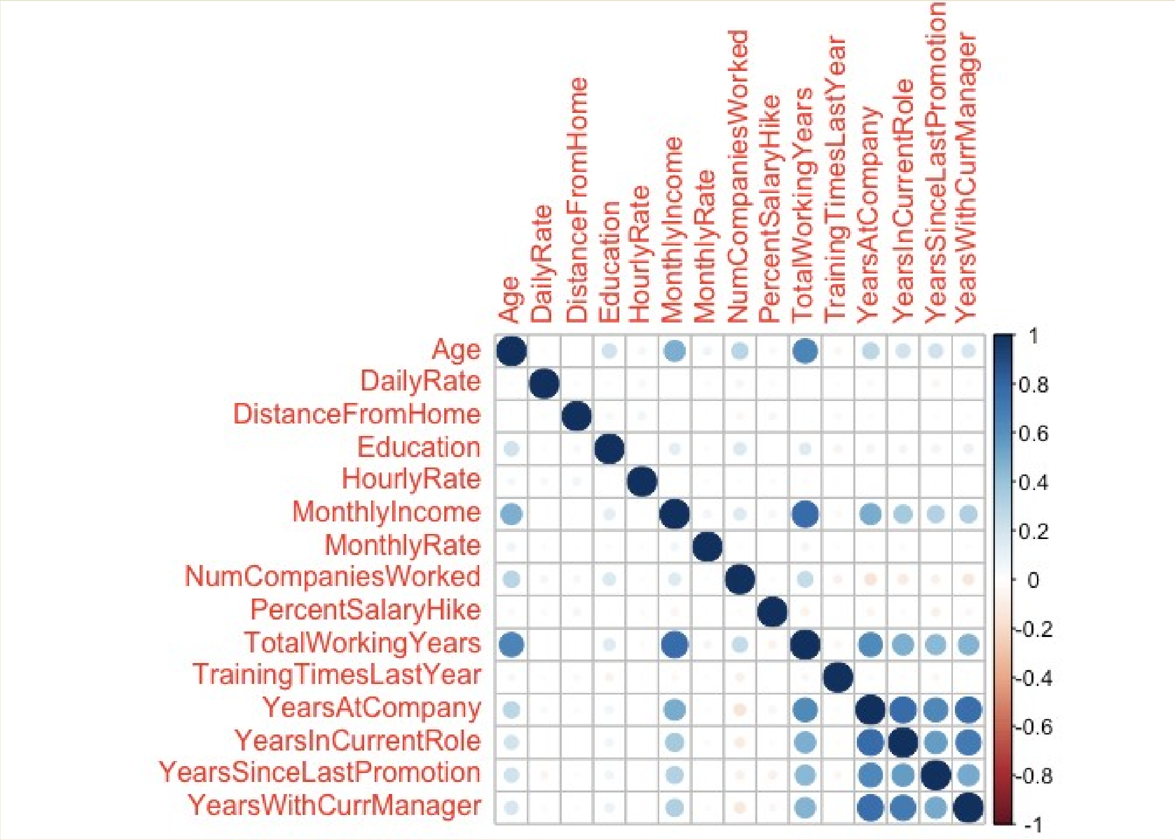
- 870 observations
- 36 features

Exploratory Data Analysis (EDA)


Attrition Distribution


MonthlyIncome Distribution

EDA continued – Numeric Correlations



The numeric correlations don’t have any strong negative relationships.

The years derived features share relationships.

As a whole, the strong relationships are intuitive.

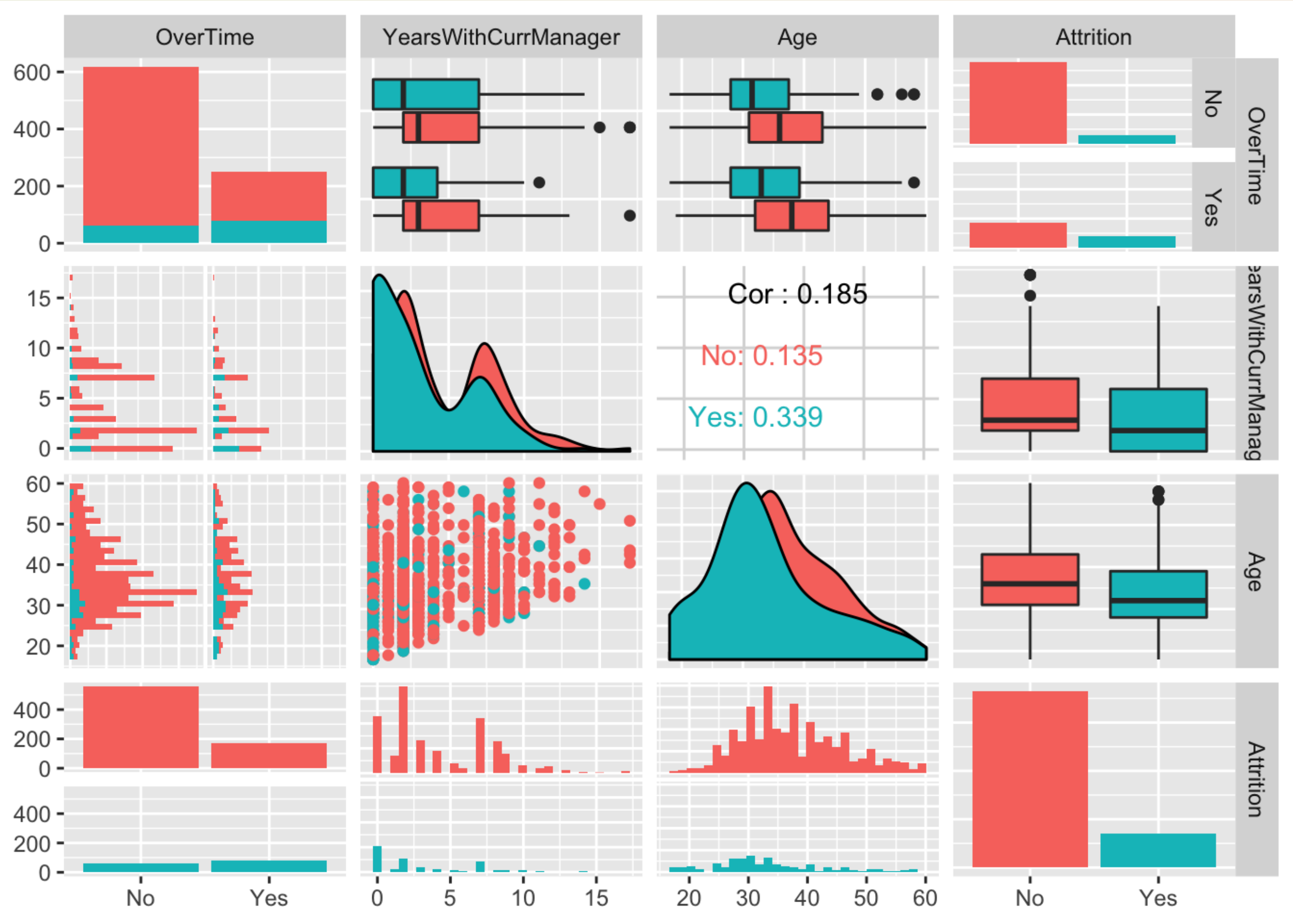
Feature Selection

- We used several algorithms for top feature selection (most important/predictive)
  - Multivariate Adaptive Regression (MARS)
  - Random Forest
  - Step-wise Regression

Feature Selection - Attrition

- Top Three Predictors for Attrition:
  - Overtime
  - Years With Current Manager
  - Age

Feature Selection – Attrition Visual

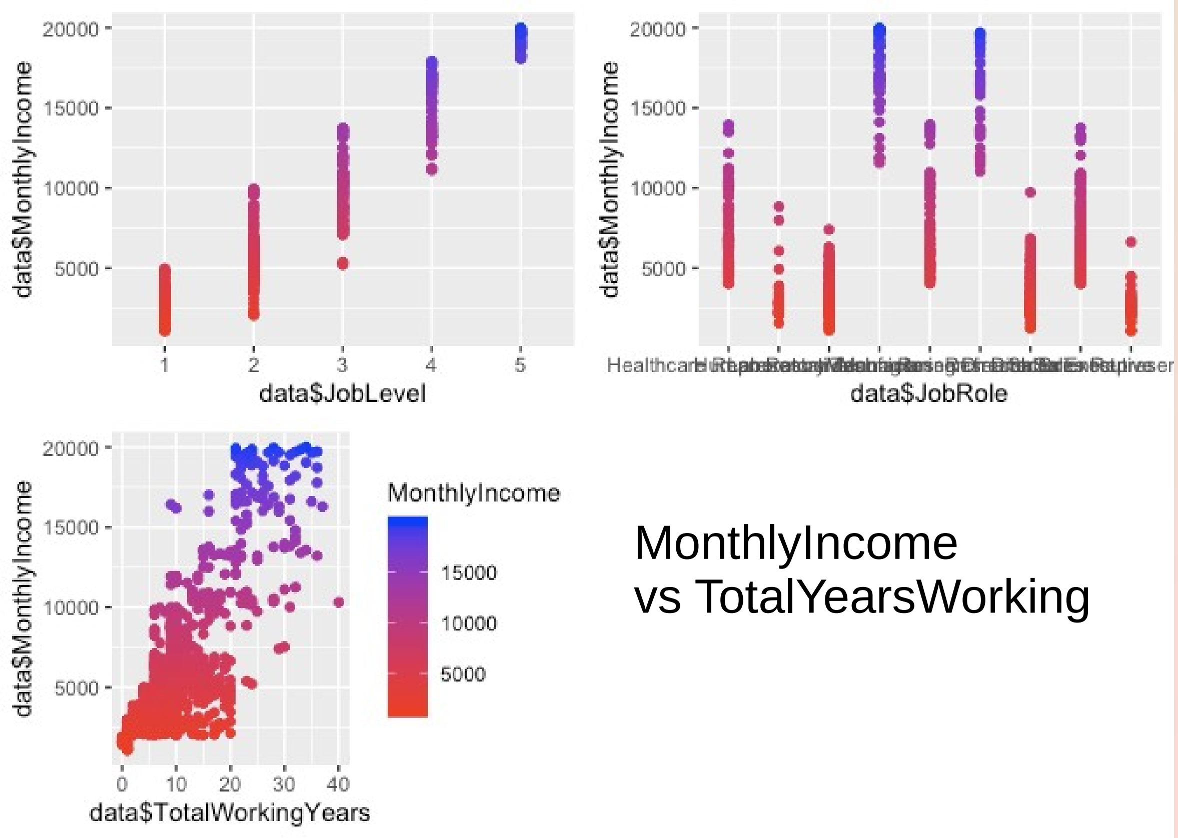


Feature Selection – MonthlyIncome (Salary)

- Top Three Predictors for Monthly Income:
  - Job Level
  - Job Role
  - Total Working Years

Feature Selection – MonthlyIncome Visual

MonthlyIncome
vs JobLevel



MonthlyIncome
vs JobRole

MonthlyIncome
vs TotalYearsWorking

Modeling - Attrition

- The naive Bayes performed better than k-nearest neighbor (kNN)
- Accuracy ~84%
- Sensitivity ~90%
- Specificity > 60%

Modeling - MonthlyIncome

- The best performing model utilized multiple linear regression (MLR) on the top three predictors previously mentioned
- Root mean squared deviation (RSME) is less than $1k
- Better than MLR with all features used as predictors

Predictions Provided

- Using our best performing models, we labeled the non-labeled datasets provided by Frito Lay.
- Labeled prediction datasets in “prediction” folder deliverable

Conclusion

- We hope Frito Lay finds our models useful in their ongoing operations for employee attrition and salary prediction efforts

- Final Models used:
  - Attrition: naive Bayes
  - Monthly Income (salary): Multiple Linear Regression