

Evaluating Employee Attrition

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The High Cost of Employee Turnover



26.3%

Annual overall turnover rate
U.S. in 2017
Bureau of Labor Statistics



660k-
2.6m

\$660,000 to \$2.6m / year
100-person organization
\$50,000 average salary

What is the data-driven answer to attrition?

**Train people well enough so they
can leave, **treat them well**
enough so they don't want to.**

-Richard Branson

www.linkedin.com

**Employees Don't
Quit Their Job; They
Quit Their Boss!**

**People don't leave jobs.
They leave toxic work cultures.**

Dr. Amina Aitsi-Selmi



- Uses HR data from 1470 individuals
- 35 columns

Data Cleaning



Maintain

Age
MonthlyIncome
JobInvolvement
JobLevel
NumCompaniesWorked
PercentSalaryHike
StockOptionLevel
TotalWorkingYears
TrainingTimesLastYear



Dummy

BusinessTravel
Education
Gender
MaritalStatus
WorkLifeBalance
JobRole
OverTime



Drop: Highly Correlated

Pay variables

- _HourlyRate
- DailyRate
- MonthlyRate

Age variables

- Over18
- YearsAtCompany
- YearsInCurrentRole
- YearsSinceLastPromotion
- YearsWithCurrManager



Drop: Irrelevant

EmployeeCount
EmployeeNumber
StandardHours
EducationField
PerformanceRating
JobSatisfaction
EnvironmentSatisfaction
DistanceFromHome
RelationshipSatisfaction
Department

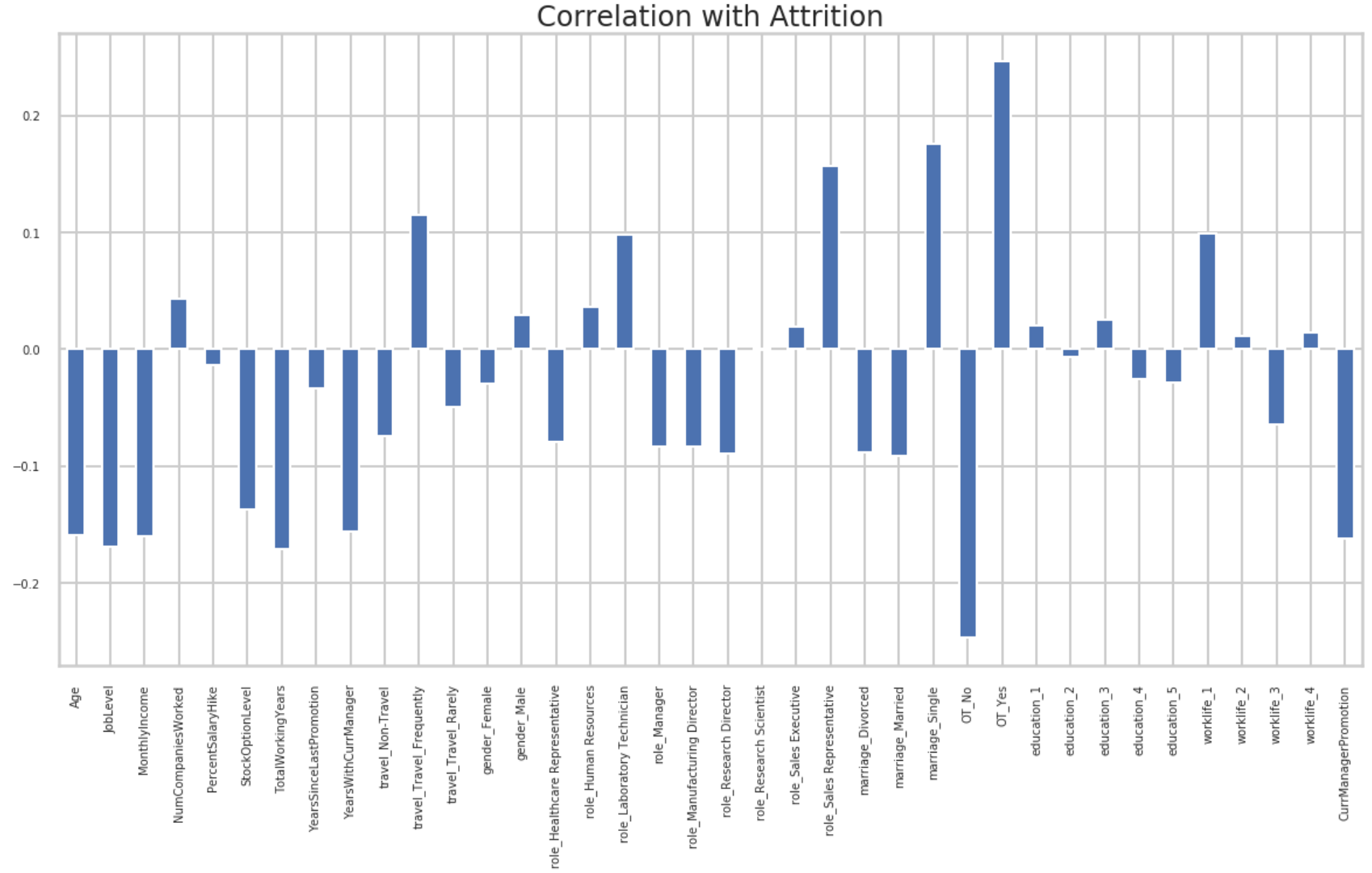
Low Turnover

(High) Age
Job level
Monthly Income
Stock Options
Total Working Years

High Turnover

Travel frequently
Sales rep
Single

Loyalty: Has your current manager ever given you a raise?



XGBoost

Hyperparameters:
Upscaling for Attrition,
value count 1233 (No)
and 237 (Yes)

Accuracy: .83

F1: .43

Random Forest

Hyperparameters:
test_size=0.1

Accuracy: .85

F1: .51

KNN

Hyperparameters:
standard

Accuracy: .79

F1: .33

Recommendations



HIRE A DIVERSE AGE RANGE OF EMPLOYEES. MARRIED AND OLDER EMPLOYEES HAVE LOWER ATTRITION.



CONDUCT COMPREHENSIVE SURVEYS. THEN, EITHER DITCH OR IMPROVE EMPLOYEE TRAINING PROGRAMS.



OFFER OVERTIME OR OTHER FINANCIAL REWARD INCENTIVES BEYOND SALARY.

Future Exploration



Data

Redo this exercise with
Gallup data

Try emailing them
directly for access while a
student



Analysis

Is Overtime an indicator
of a lower monthly wage,
rather than a highly
influential variable?

What are other features
that can be engineered to
assess attrition?

More granular information
on attrition identifiers



Model

Continue fine tuning the
hyperparameters

Thank you

