Imagine you’re a CEO or VP of People Operations...

TURN

PREDICTING EMPLOYEE CHURN

How much should you invest in people?

So many factors makes it tough to decide...

- Salary
- Healthcare
- Training
- Perks
- And many more

Machine learning can help you save cost

Replacement costs (~$30k+)*

- Recruitment
- Training
- Lost opportunity
- Lost morale

Engagement costs

- Training
- Bonus
- Flexible work
- Perks

*Source

Disengaged employees are expensive

Source

Two part solution: analysis and engagement

Part 1: Classification algorithm

- Classify who will churn
- Understand correlations & drivers

Part 2: Prediction app

- See exactly who needs more engagement
- Extend offer to top performers

Early alpha used available simulated public data

Alpha dataset

- Online anonymous dataset of employee churn
- 15k employee records
- 10 features including time at company, salary, # projects and more
- 23% overall churn

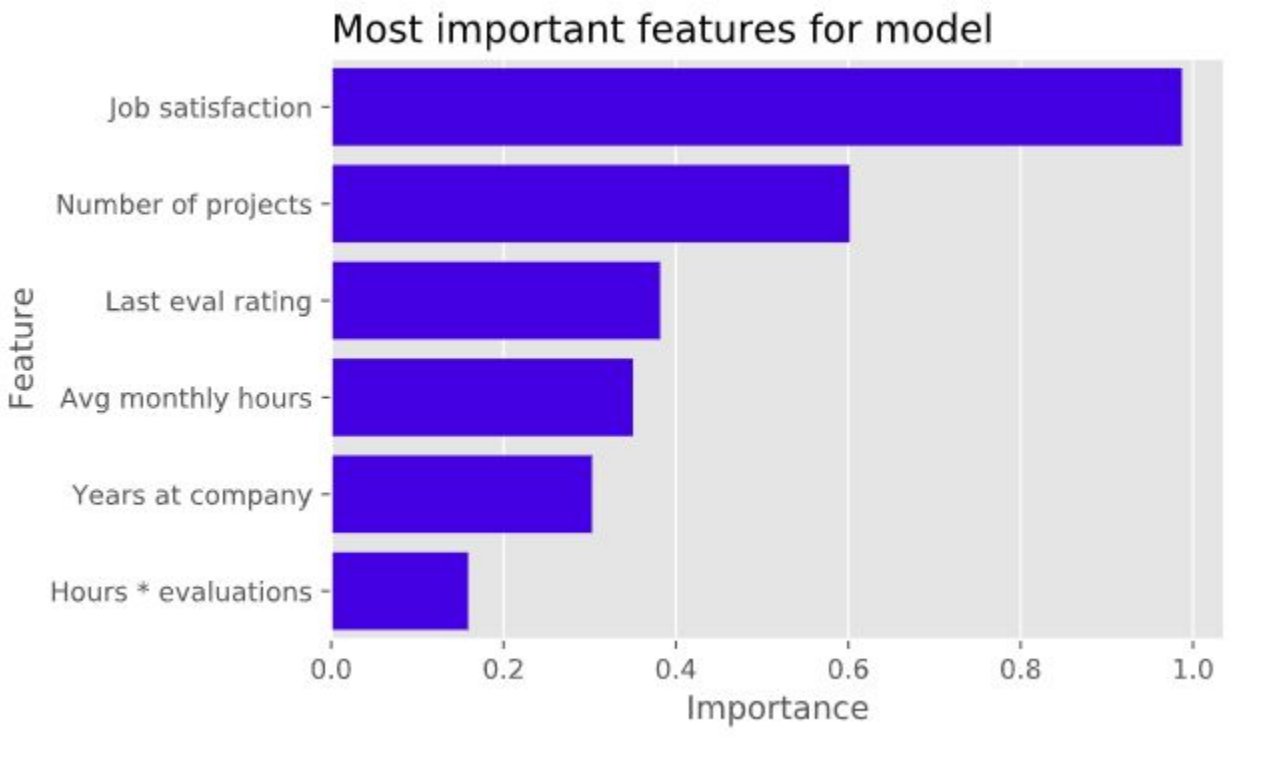
Created a robust & reusable ML pipeline

1) Clean & split data
2) Optimized analysis in three ways:
   - Tested 7 algorithms
   - Best ones: Random Forest, XGBoost, KNN
   - Class imbalance
   - Feature engineering
   - Hyperparameter tuning

3) Scored on recall

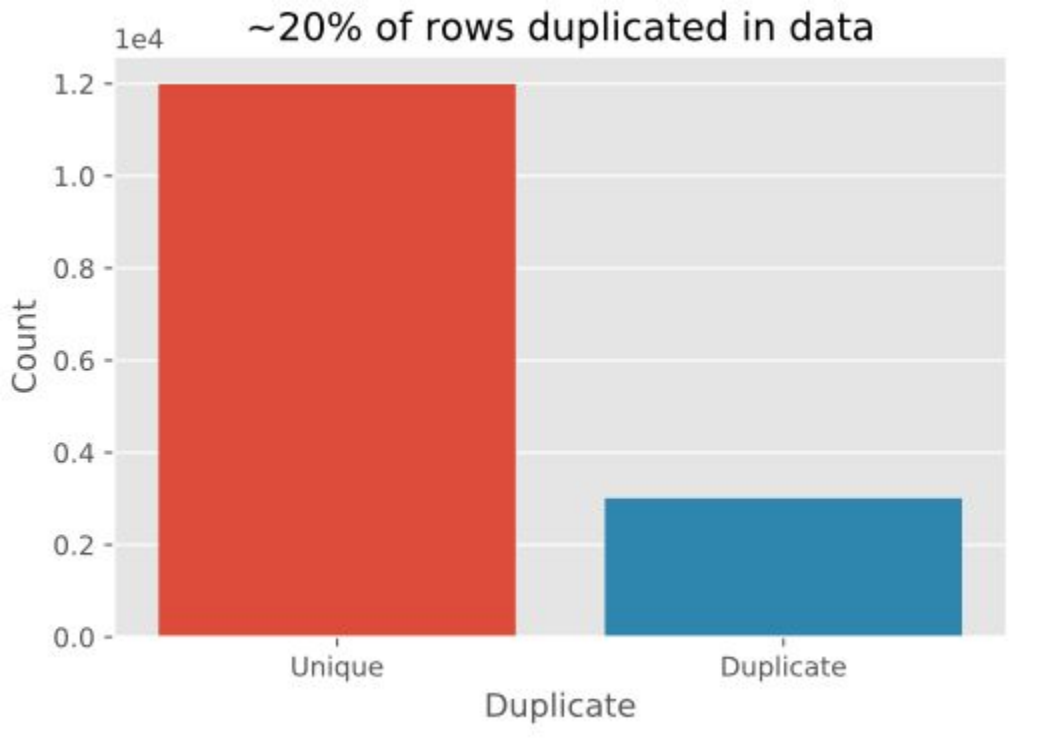
Tools Used

Six features drove prediction performance



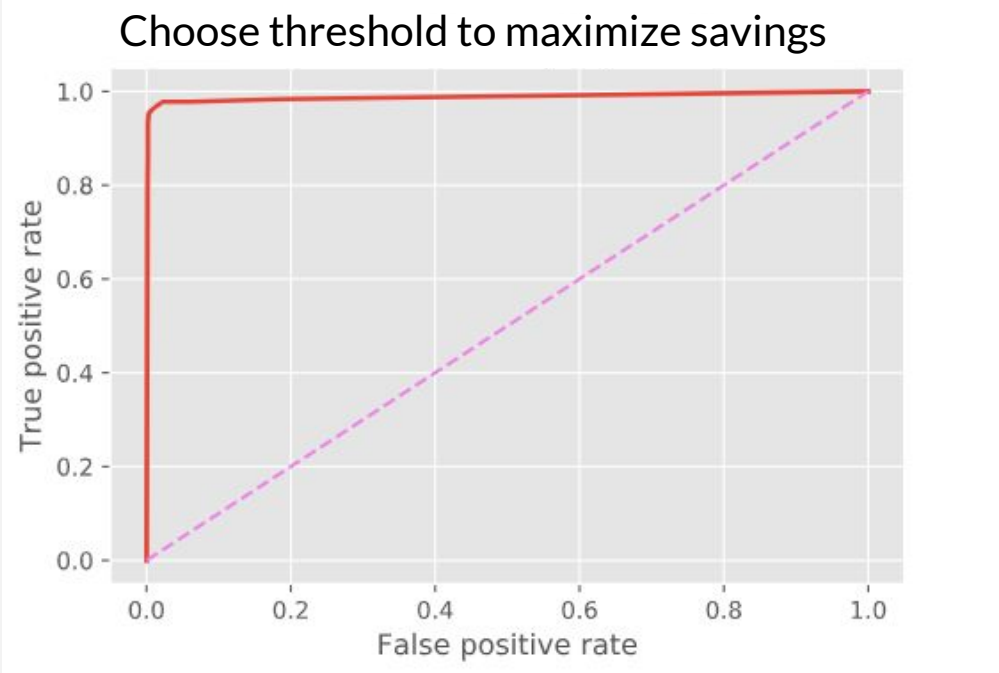
Random Forest Feature importance Library

Alpha dataset: Surprising “slingshot” employees

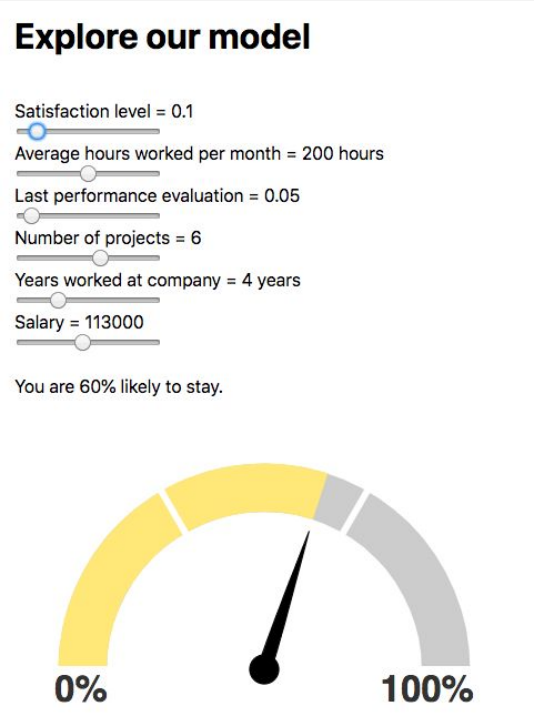


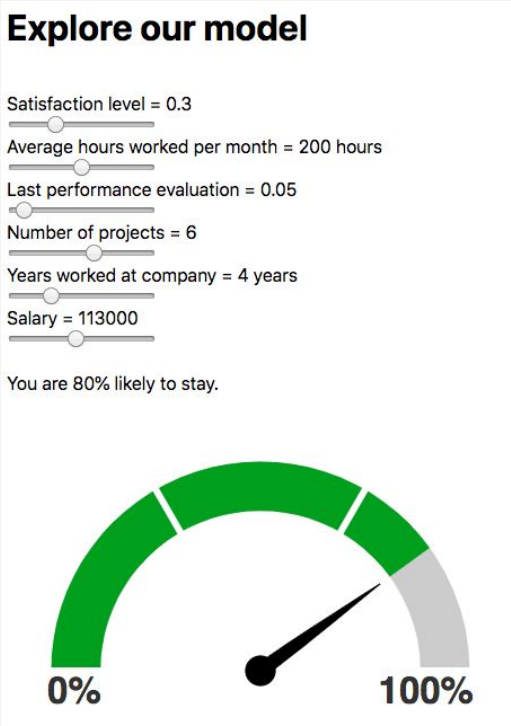
Optimized Random Forest for best result

	Recall	Change
Baseline	94.73%	-
Dupes in train	98.28%	3.75%
Feature engineering	**98.58%**	**4.06%**



Less satisfied? Less likely to stay





[Explore online]

Get up to 20 free employee predictions

- Limited time discount for first 10 employers to signup

Product roadmap

- Gather more data from diverse partners
- Continuous algorithm improvement
- Extend modeling out to predicting employee satisfaction

Thanks!

Appendix

Turn quantifies the number of employees at risk

Hypothetical scenario:

- 30 employees; $2.6 million in salary
- Replacement = $400k-$1 mil

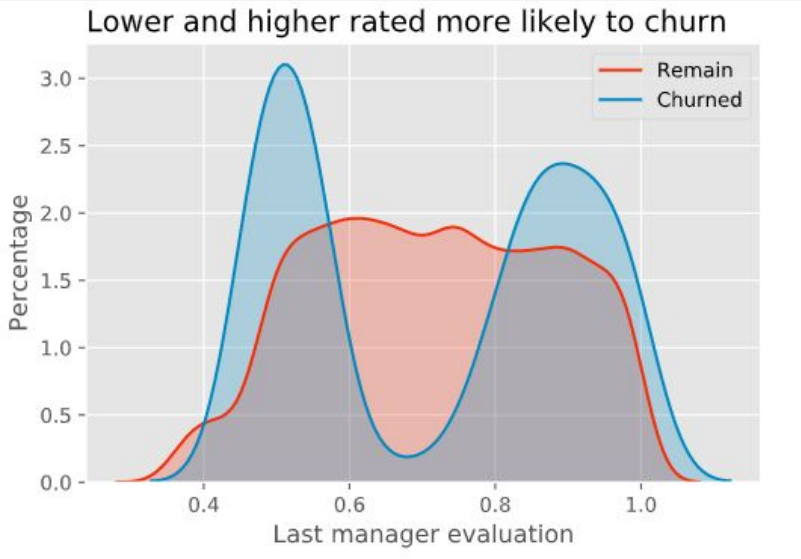
Enter Turn:

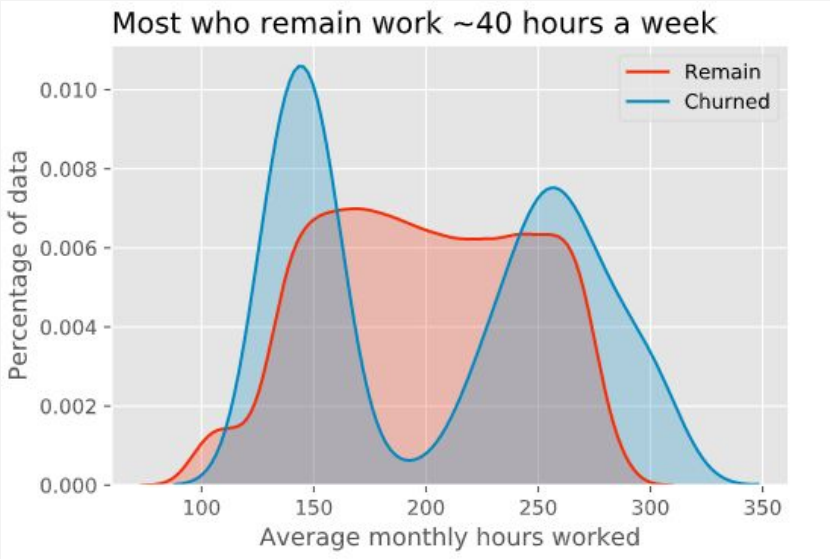
- Exact employee identification
- Rengagement 20-40% of the cost

Tested 7 models to predict churn

	Recall
Logistic Regression	33.25%
KNN	92.45%
Gaussian NB	81.99%
SVM	91.29%
Decision Tree	86.72%
Random Forest	98.58%
XGBoost	94.73%

Alpha dataset: Outliers most likely to churn





Baseline models show RF best to optimize

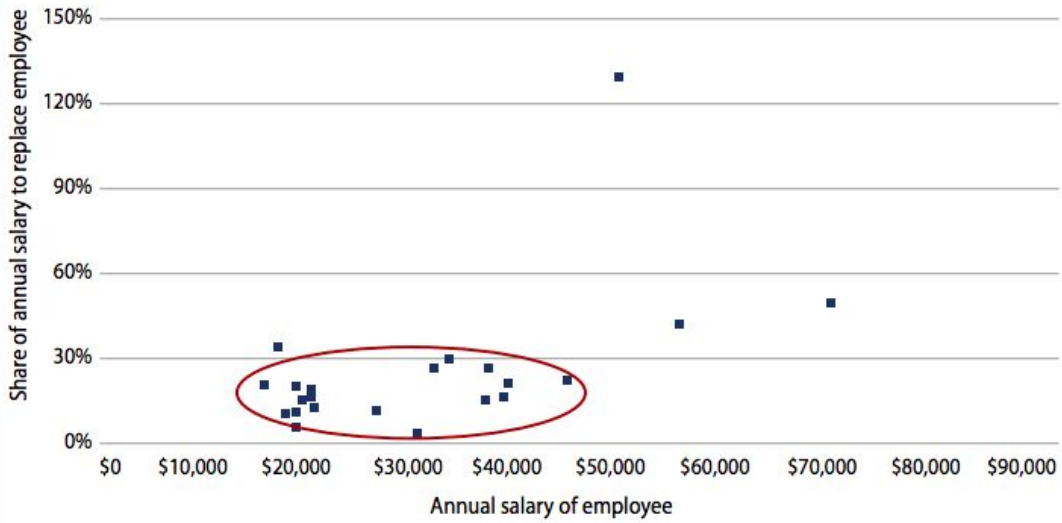
	Recall
Logistic Regression	33.25%
KNN	92.45%
Gaussian NB	81.99%
SVM	91.29%
Random Forest	94.73%

Replacing one employee ~$15k to 213% of salary

FIGURE 2

Across jobs, the cost of replacing an employee is clustered between 10 percent and 30 percent of an employee's annual salary

Range of estimates of the cost of turnover from 30 case studies spanning 1992 to 2007

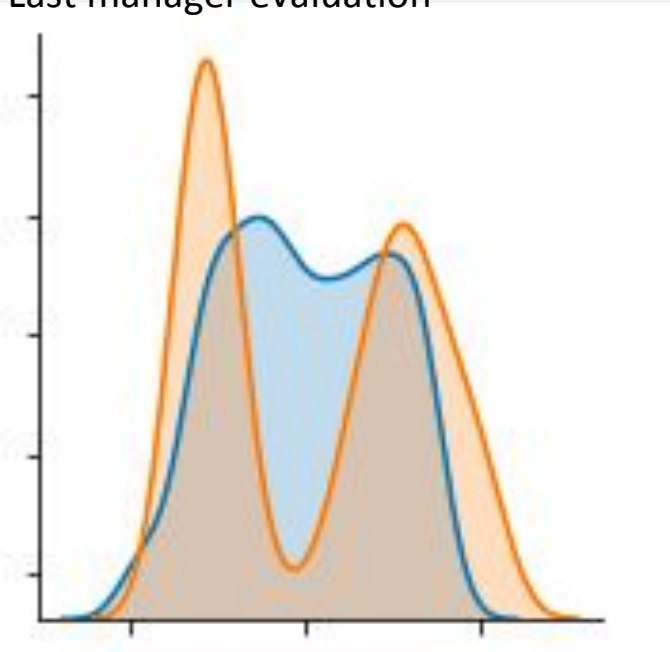


Source: Author's analysis of 30 case studies on the cost of turnover from 1992 through 2007.

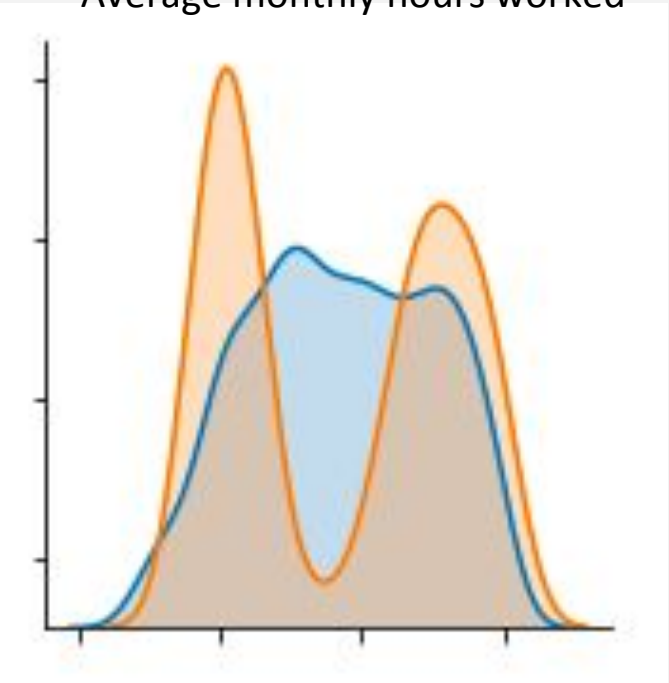
Source

Slingshot have similar distributions to non-dupes

Last manager evaluation

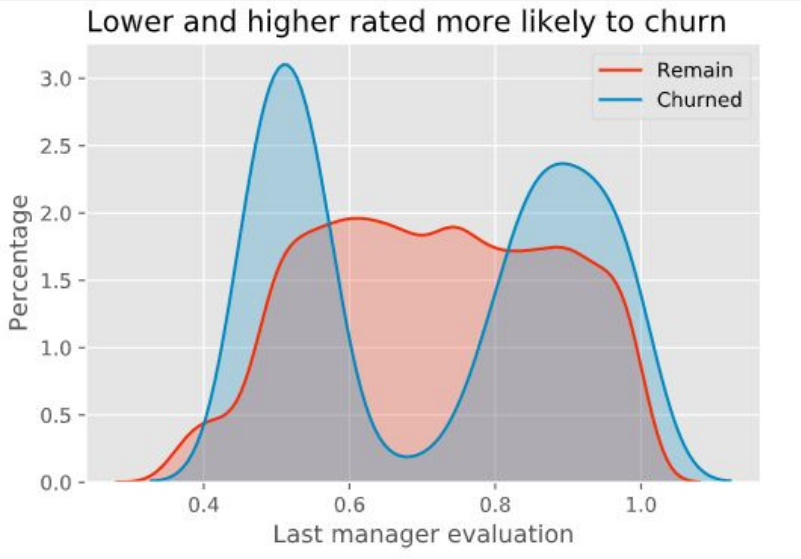


Average monthly hours worked



Alpha dataset: Outliers most likely to churn

Last manager evaluation



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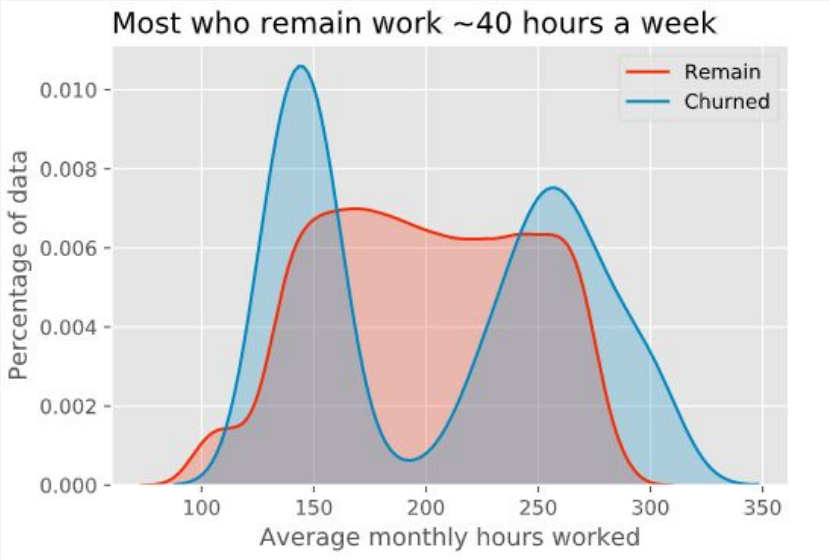

Predicting employee churn

How to help us all get more out of our 80,000 hours we spend at work

Nathan Maton
2/13/19