Can companies reduce losses by predicting employee turnover?

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Employee Turnover

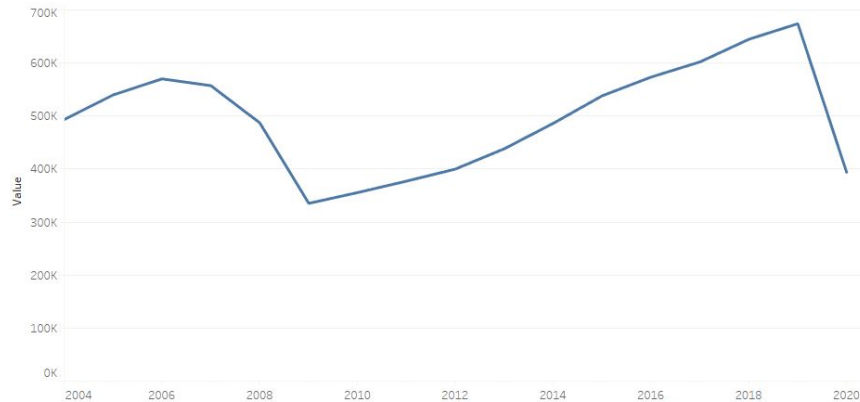Bureau of Labor Statistics: Job Openings and Labor Turnover **Survey** (JOLTS)

- Sample: aprox 16.000 U.S. business establishments
- Public and private
- 50 States
- Raw data

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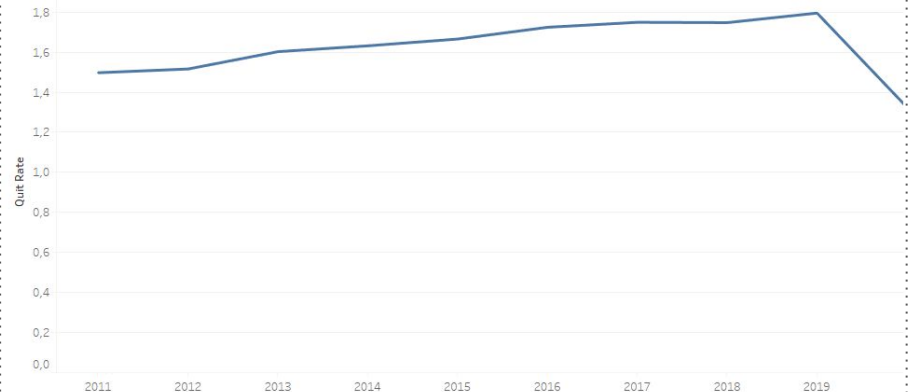**Number of people who quit** (JOLTS Survey)

Employee Turnover

Bureau of Labor Statistics: Job Openings and Labor Turnover **Survey** (JOLTS)

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Number of people who quit (JOLTS Survey)

Quit rate over time

High staff turnover = High expenditures

Voluntary turnover:

$ 1 trillion a year

Replacing an employee:

1.5x to 2x annual salary

Direct exit costs

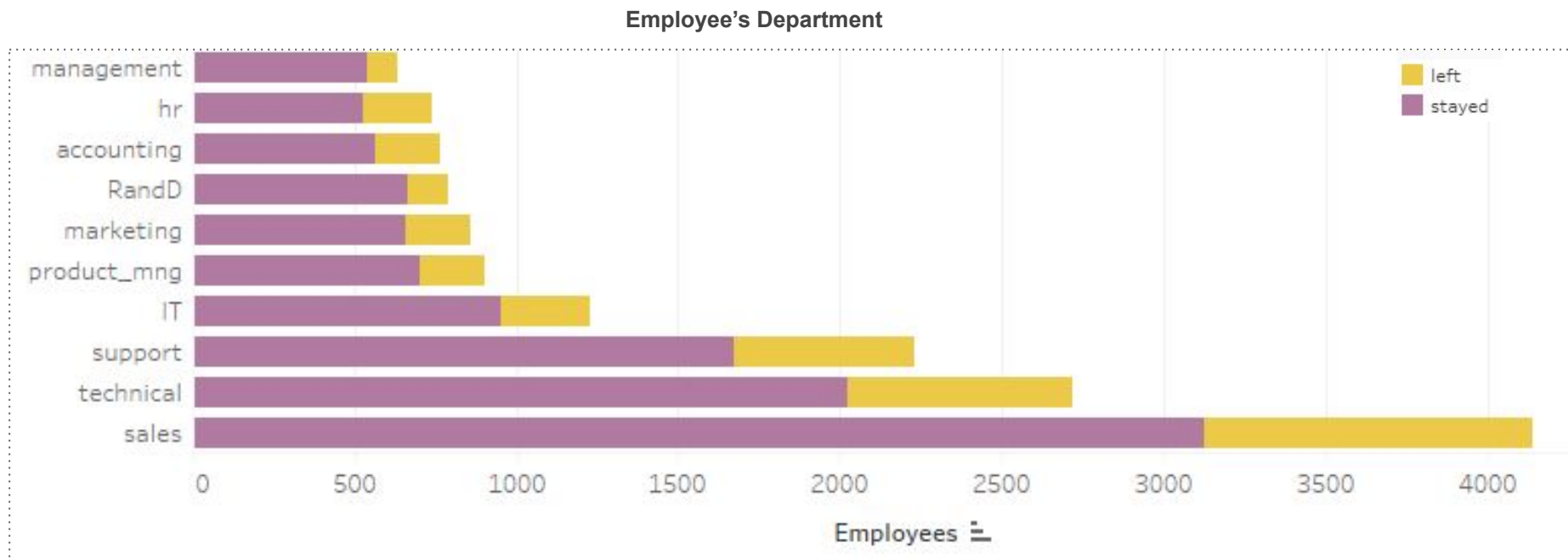**Recruit new hire**

Train new hire
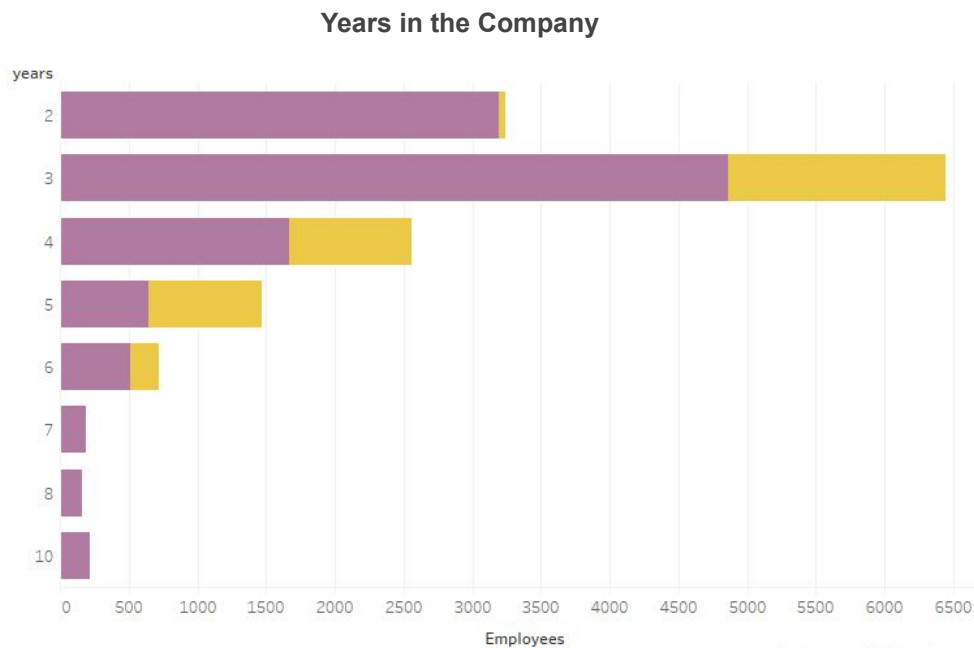
Decrease productivity
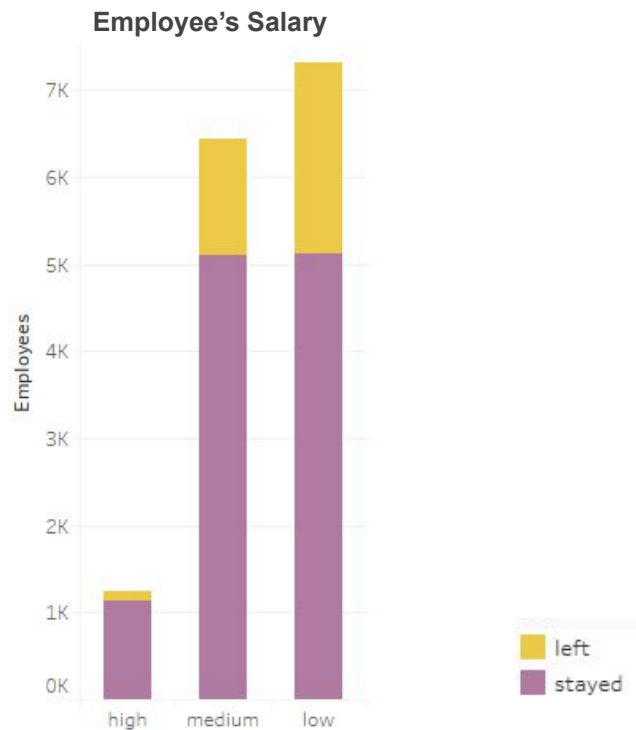
Sales: client losses?

Can companies prevent it?

Company data

Employee's Department

Company data

Employee's Salary

left
stayed

Years in the Company

Variables used for prediction

Department

Categ. var.

Time in the company

Years

Avg monthly hours

Hours

Work accident

Y/N

Promotion last 5 years?

Y/N

Salary

Low/Medium/High

Last evaluation

Grade 0 to 1

Satisfaction level

Grade 0 to 1

Quit

Y/N

ML model

Raw data

Data cleaning
Categ. Var transforming
Correl between var.
Scaling

train   test

Random Forest

Parameters and
model optimization

Final predictor:
Accuracy 0.99
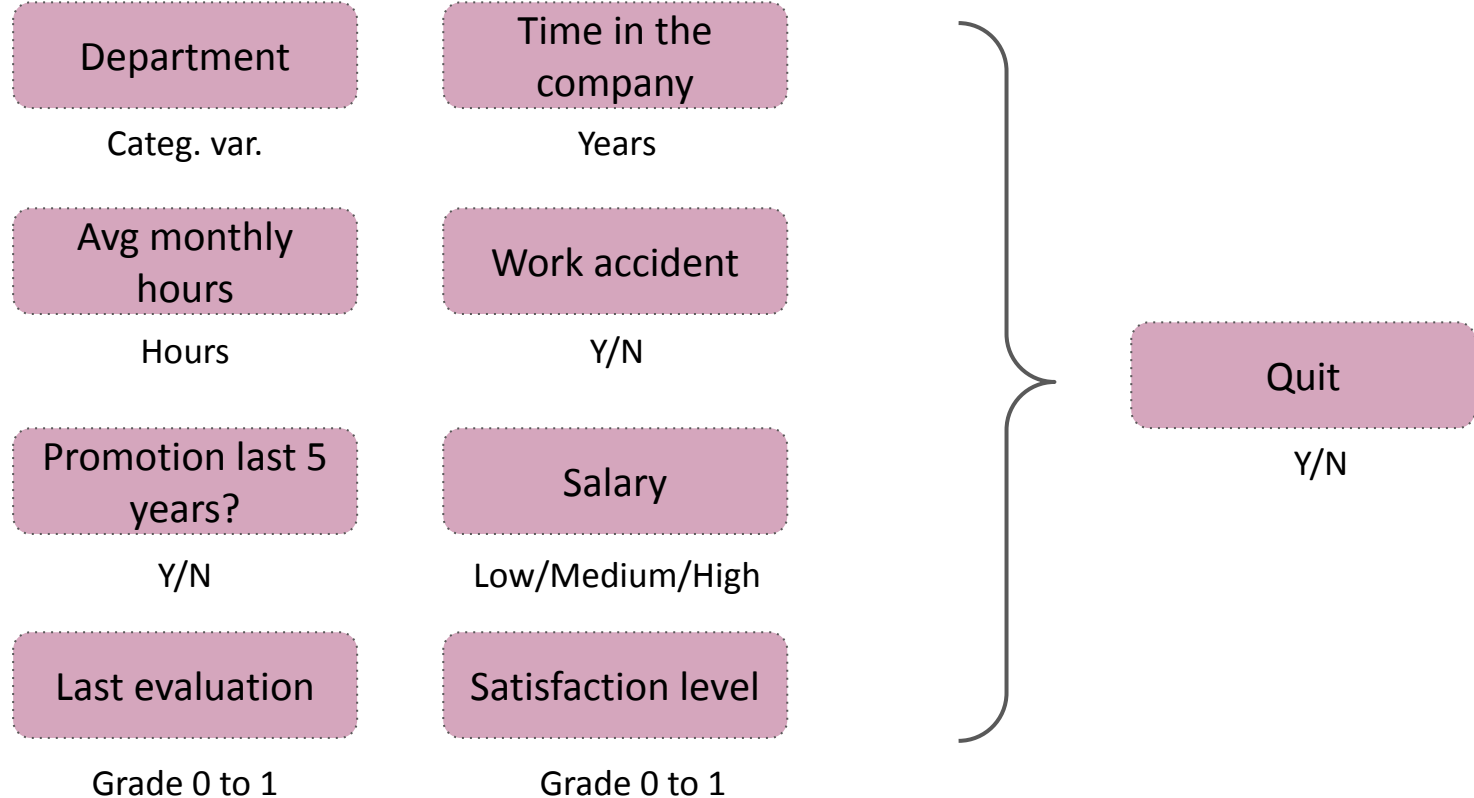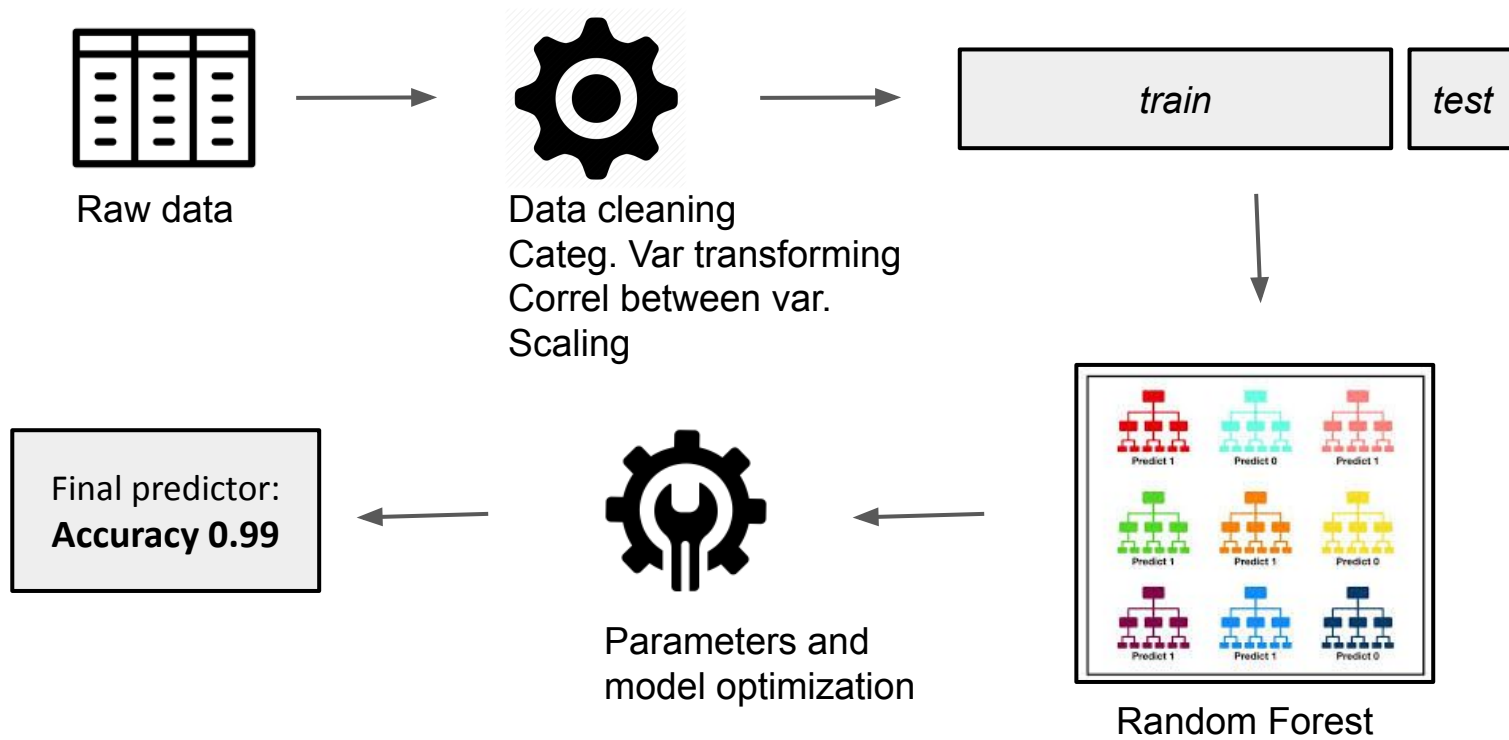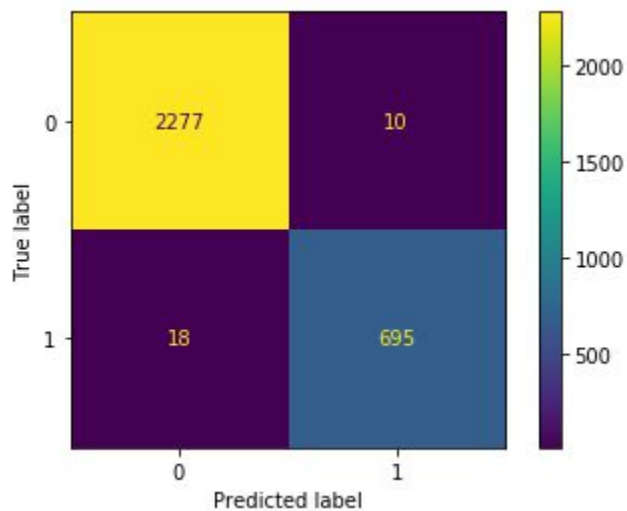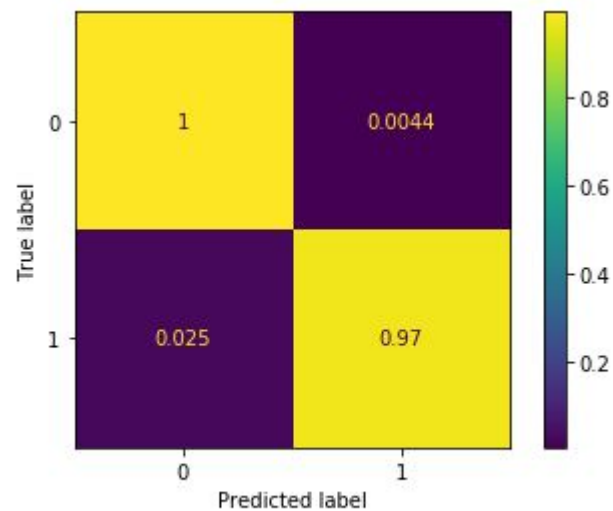
ML model

Confusion Matrix

Confusion Matrix Normalized

What if companies don't have all this information?

Last evaluation

Grade 0 to 1

Satisfaction level

Grade 0 to 1

Correlation with "quit"

Satisfaction Level	- 0.3883
Last Evaluation	0.0065
Number Projects	0.0237
AVG Monthly Hours	0.0712
Time in Company	0.1448
Work Accident	- 0.1546
Promotion Last 5 years	- 0.0617
Salary- High	- 0.1209
Salary- Low	0.1347
Salary- Medium	- 0.0688

Simplifying

Department

Categ. var.

Years in the company

Avg monthly hours

Work accident

Y/N

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Final predictor:
Accuracy 0.97

Can companies reduce losses by predicting employee turnover?

Based on the analyzed data...

Yes

Relevant considerations:

- It is not possible to affirm that the accuracy of the model will always be this high, it will vary from company to company
- Companies probably have specific factors that affect voluntary turnover, the model portrayed here can be considered a baseline

Thank you