

Splitting the data

HR ANALYTICS: PREDICTING EMPLOYEE CHURN IN PYTHON



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Target and features

- target = churn
- features = everything else

Train/test split

- train - the component used to develop the model
- test - the component used to validate the model

```
from sklearn.model_selection import train_test_split

target_train, target_test, features_train, features_test =
    train_test_split(target, features, test_size=0.25)
```

Overfitting

an error that occurs when model works well enough for the dataset it was developed on (train) but is not useful outside of it (test)

Let's practice!

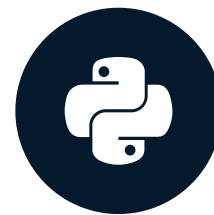
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Introduction to Decision Tree classification

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Classification in Python

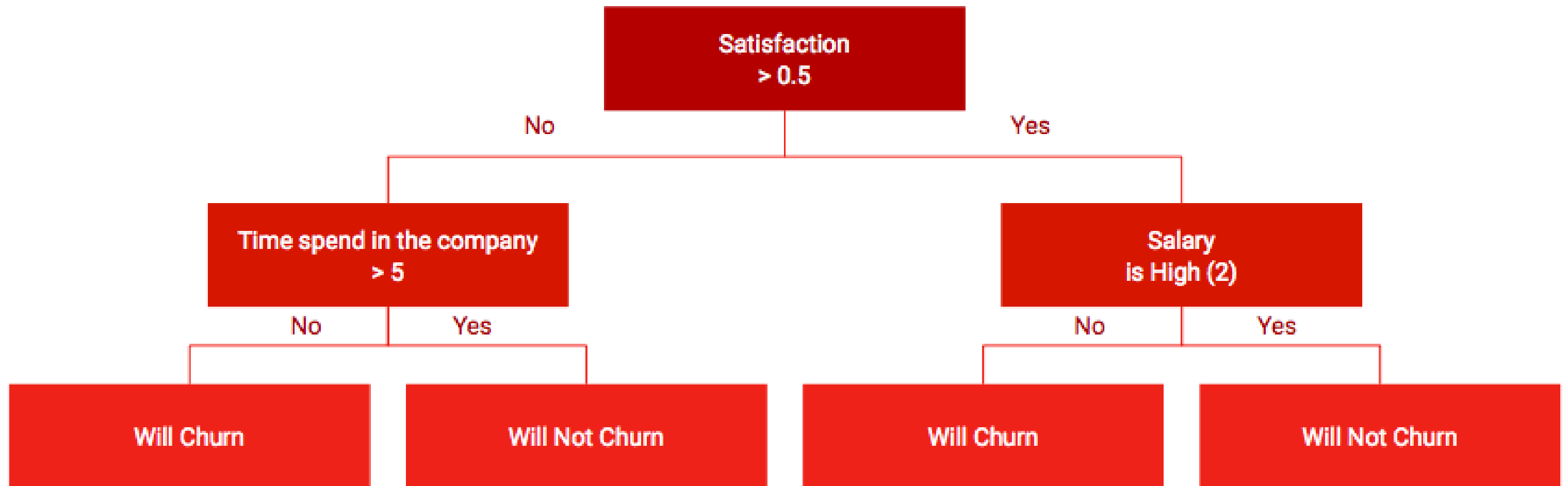
Classification algorithms

- Logistic regression
- Support Vector Machines
- Neural Networks
- Other algorithms

Algorithm we will use

- Decision Tree

Decision Tree Classification



Splitting rule

Splitting rules:

- Gini: $2*p*(1-p)$
- Entropy: $-p*\log(p) - (1-p)*\log(1-p)$

Decision Tree splitting: hypothetical example

Total set: 100 observations, 40 left, 60 stayed

- Gini: $2 * 0.4 * 0.6 = 0.48$

Splitting rule: satisfaction > 0.8

- Left branch (YES) - 50 people: all stayed
- Gini: $2 * 1 * 0 = 0$
- Right branch (NO) - 50 people: 40 left, 10 stayed
- Gini: $2 * 0.4 * 0.1 = 0.08$

Let's practice!

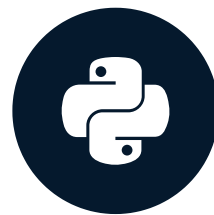
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Predicting employee churn using decision trees

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Decision Tree in Python

```
from sklearn.tree import DecisionTreeClassifier
model = DecisionTreeClassifier(random_state=42)
model.fit(features_train, target_train)
model.score(features_test, target_test)*100
```

Let's practice!

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Interpretation of the decision tree

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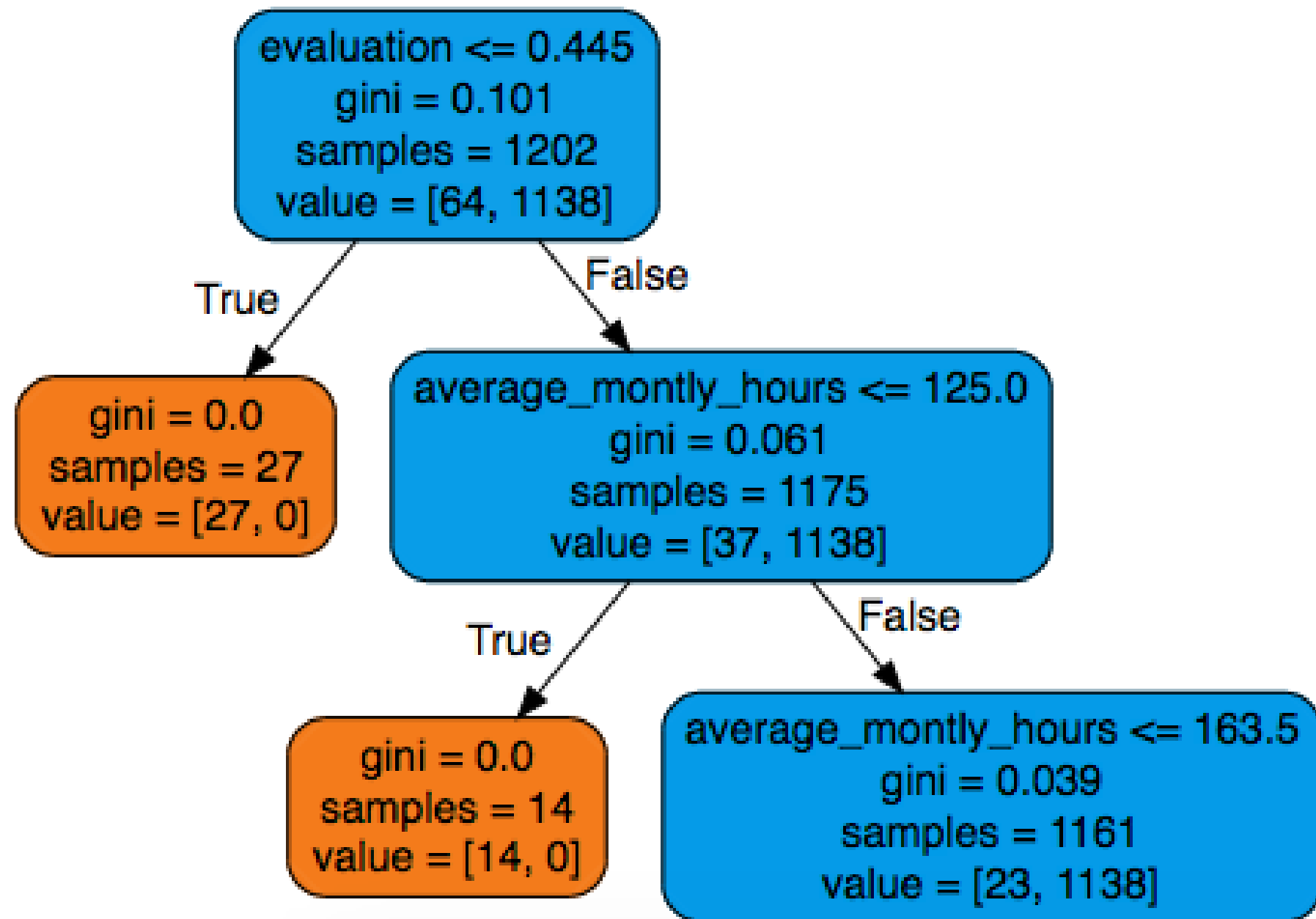
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Visualization

1. Export
2. Copy content
3. Paste it in www.webgraphviz.com

Interpretation



Let's practice!

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