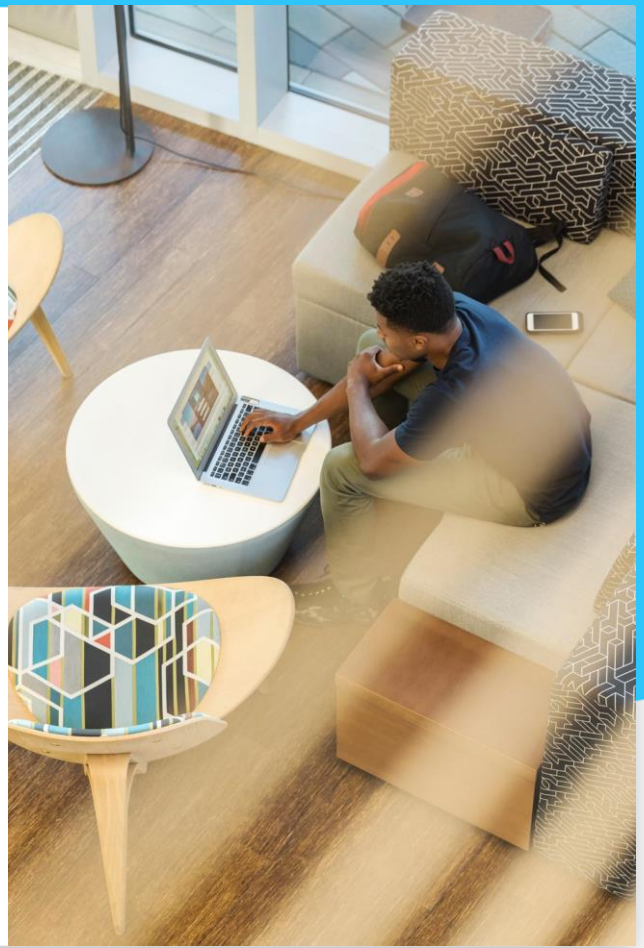
Introduction to Machine Learning

MACHINE LEARNING

Data

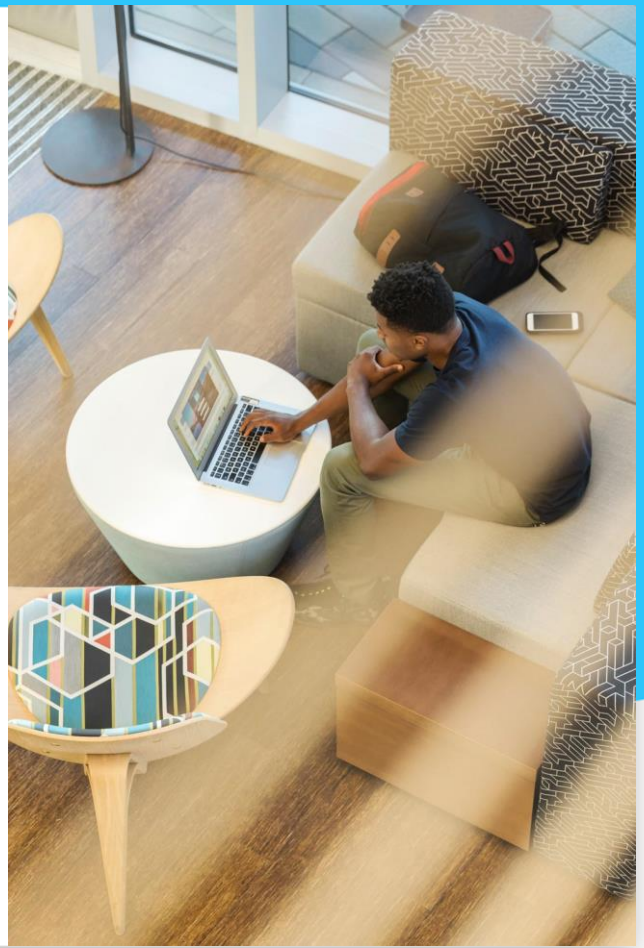
- Continuous process
- Measures
- Targets
- Monitoring



MACHINE LEARNING

Features

- Signal
- Relationships
- Patterns
- Hidden information in our dataset
- Valuable resources to predict our target



MACHINE LEARNING

Learning

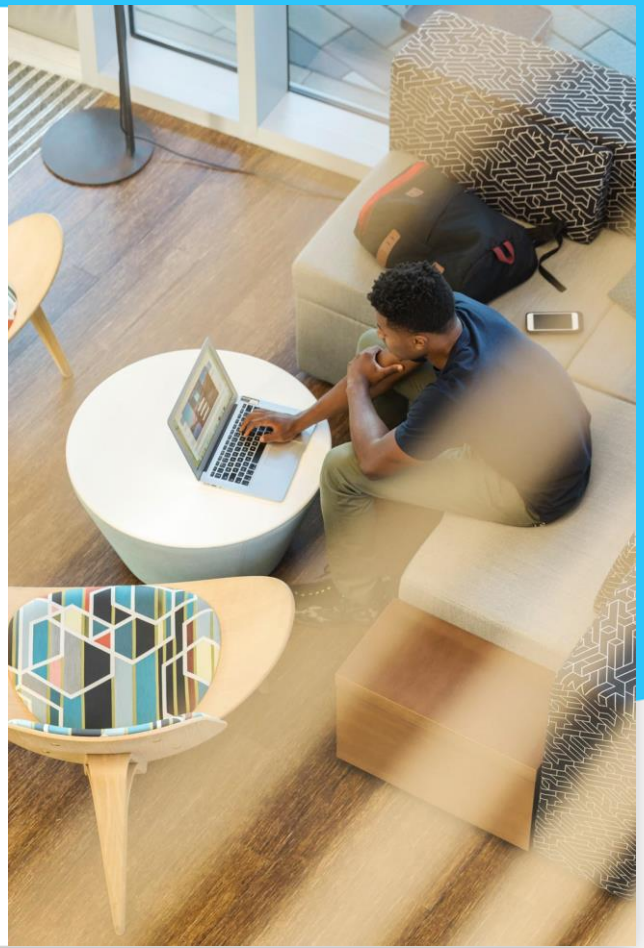
Set of Rules – Human vs Machine

Learn from Data

*.Learn a pattern so that when it sees **similar** data, it will be able to understand it.*

.Take data as input, and output a prediction

Data → Machine Learning → **Output**



MACHINE LEARNING

Techniques

Supervised Learning

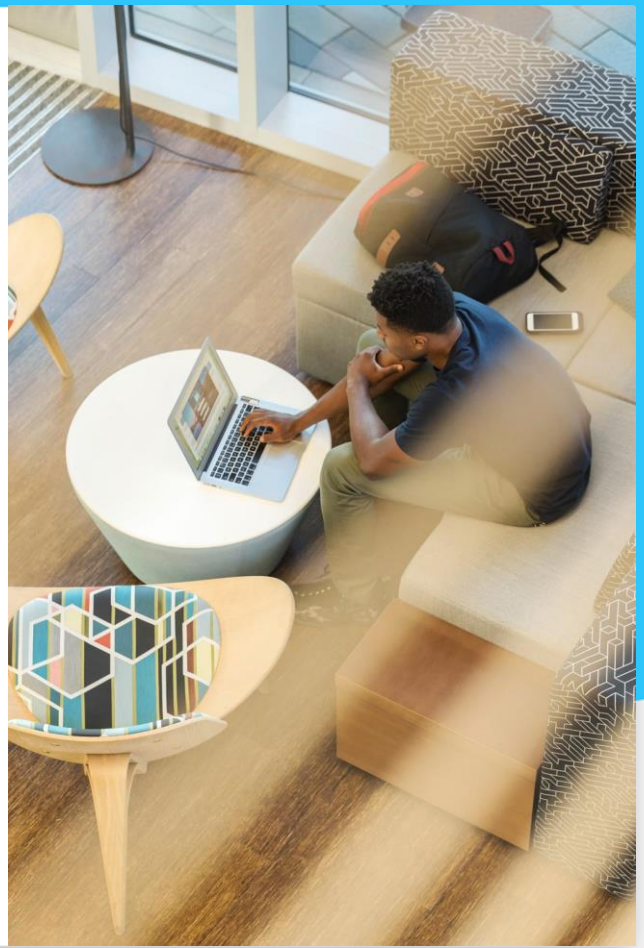
. *Regression*

. *Classification*

Unsupervised Learning

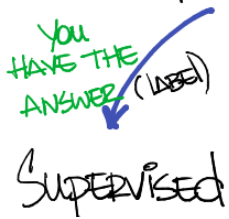
. *Dimensionality Reduction*

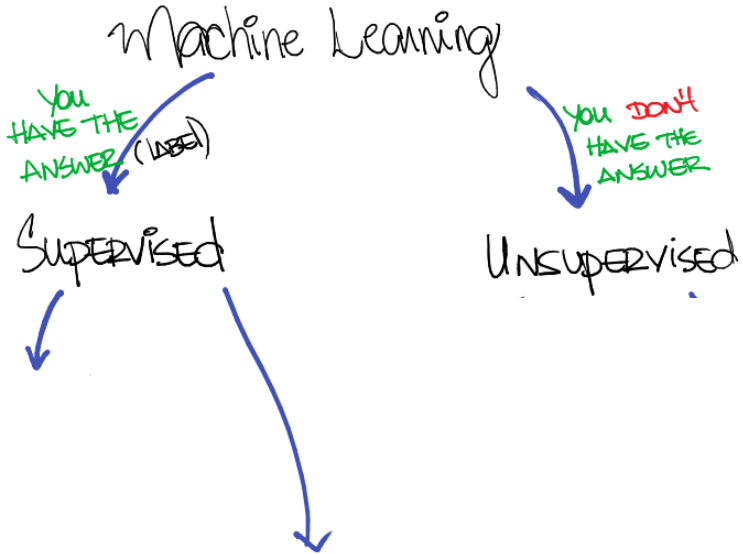
. *Clustering*



Machine Learning

Machine Learning




Machine Learning
You HAVE THE ANSWER (LABEL)
You DON'T HAVE THE ANSWER
Supervised
Unsupervised

Machine Learning

You have the answer (label)

You don't have the answer

Supervised

Unsupervised

Regression

Predict a real number

Machine Learning

You HAVE THE ANSWER (LABEL)

You DON'T HAVE THE ANSWER

Supervised

Regression

Predict a real number

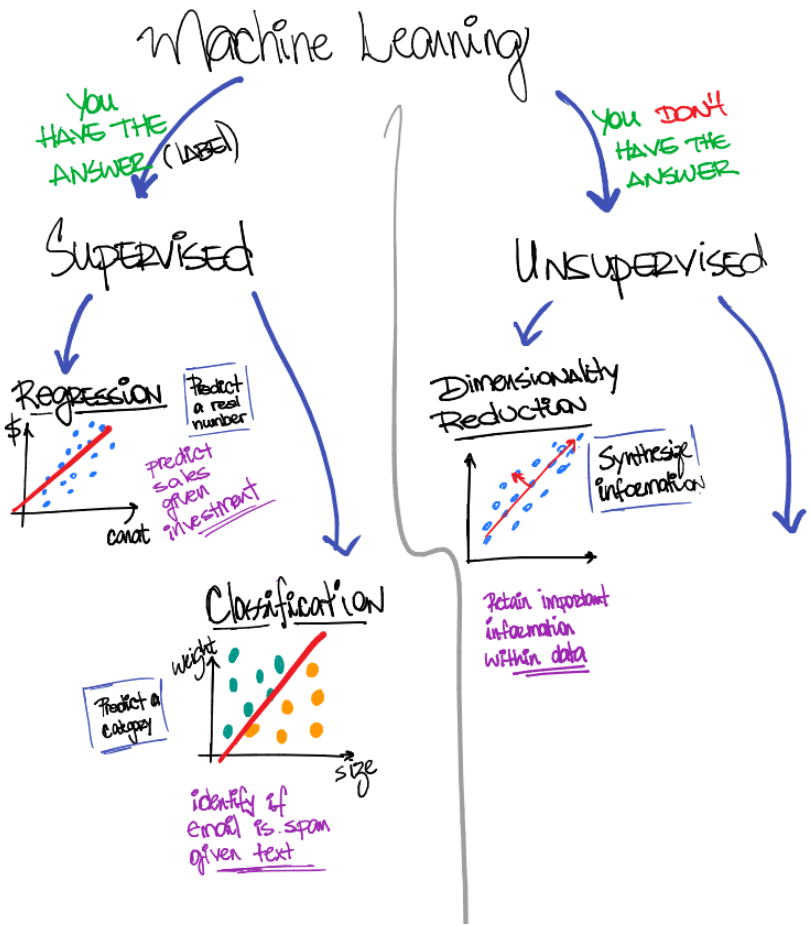
predict sales given investment

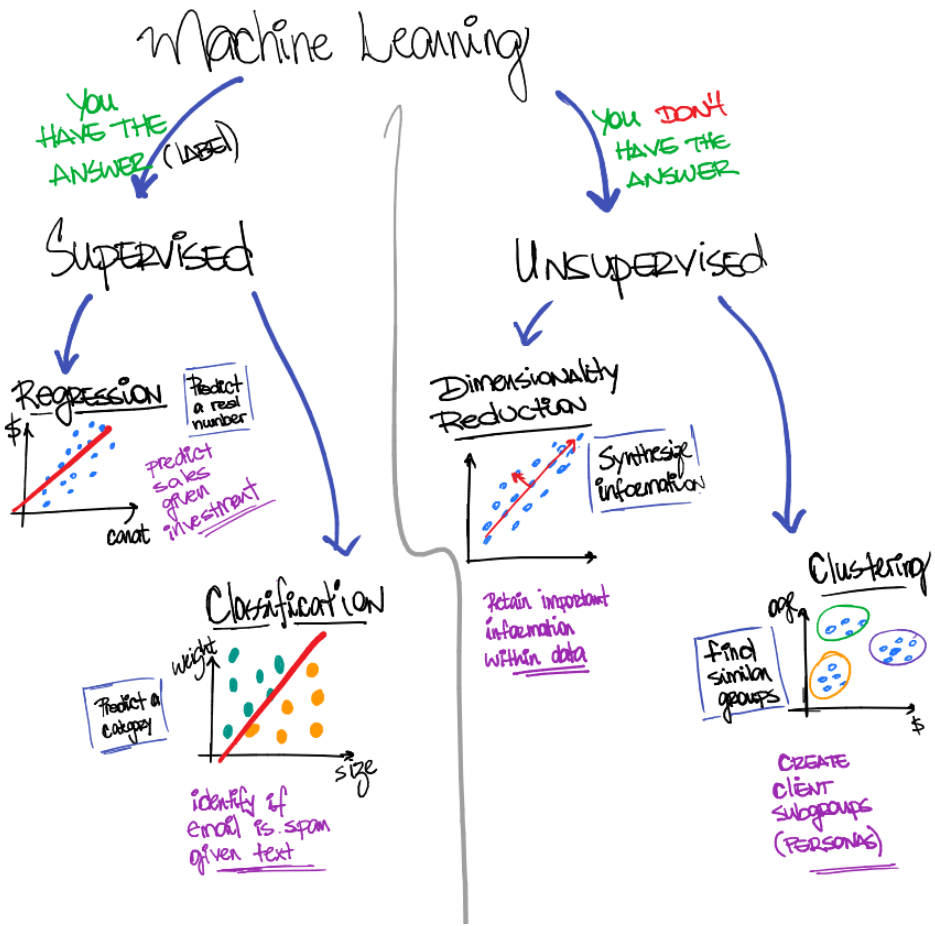
Classification

Predict a category

identify if email is spam given text

Unsupervised


Machine Learning
You HAVE THE ANSWER (LABEL)
You DON'T HAVE THE ANSWER
Supervised
Unsupervised
Regression
Predict a real number
$
cost
predict sales given investment
Classification
Predict a category
weight
size
identify if email is spam given text
Dimensionality Reduction
Synthesize information
Retain important information within data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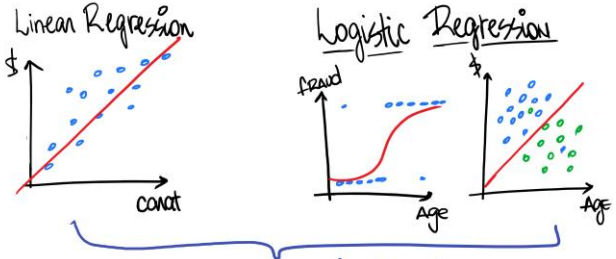
Dimensionality Reduction
Synthesize information
Retain important information within data
Clustering
age
$
find similar groups
CREATE CLIENT SUBGROUPS (PERSONAS)

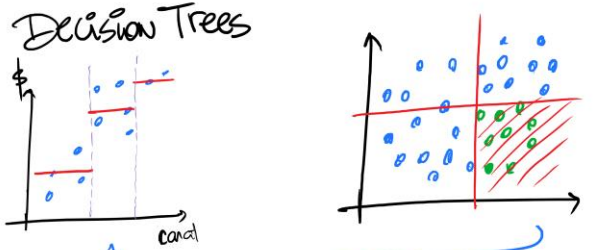
Machine Learning Methods

Regression

Classification

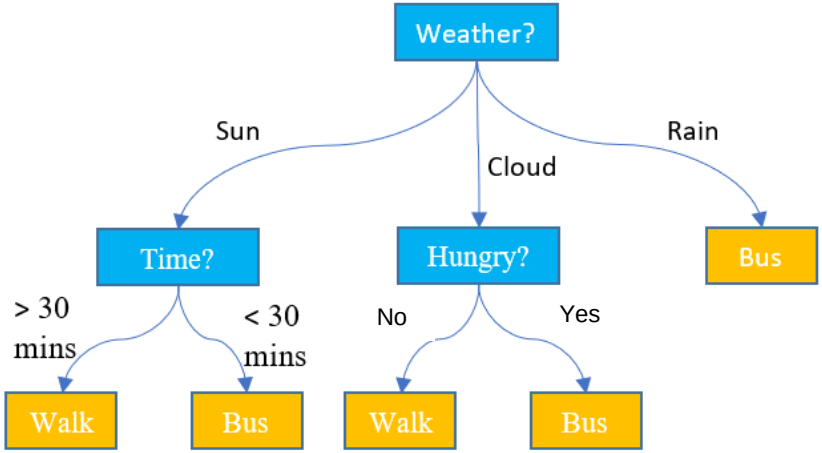


LINEAR METHODS



NON-LINEAR METHODS

Should I go walking or by bus?



Bias and Variance TradeOff

Bias

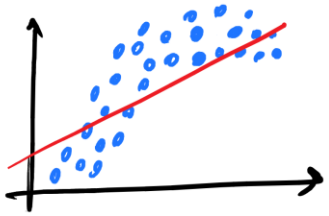
A highly biased model oversimplifies the information given by your data and tends to have high error rate.

Variance

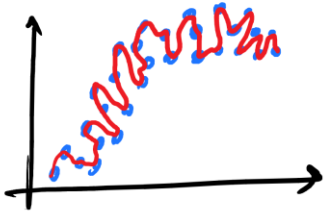
A model with high variance tends to pay so much attention to the data it was given that it fails to generalize for data it hasn’t seen before.

Machine Learning

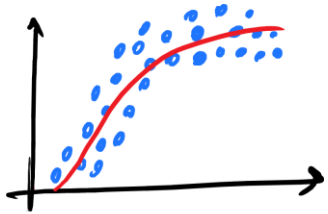
Overfitting : Regression



: under fitting



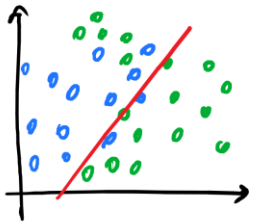
: OVERfitting



: generalization

Machine Learning

Overfitting : classification



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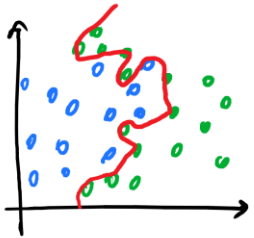
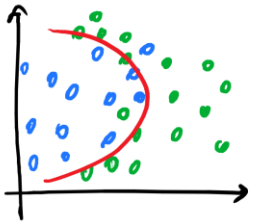
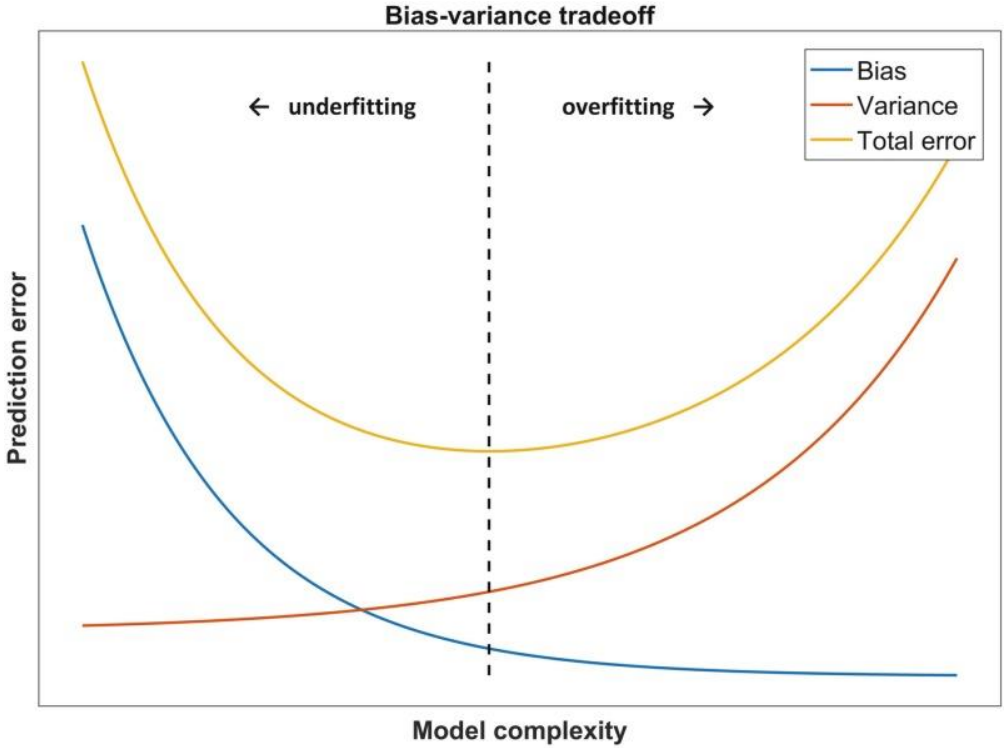


: overfitting

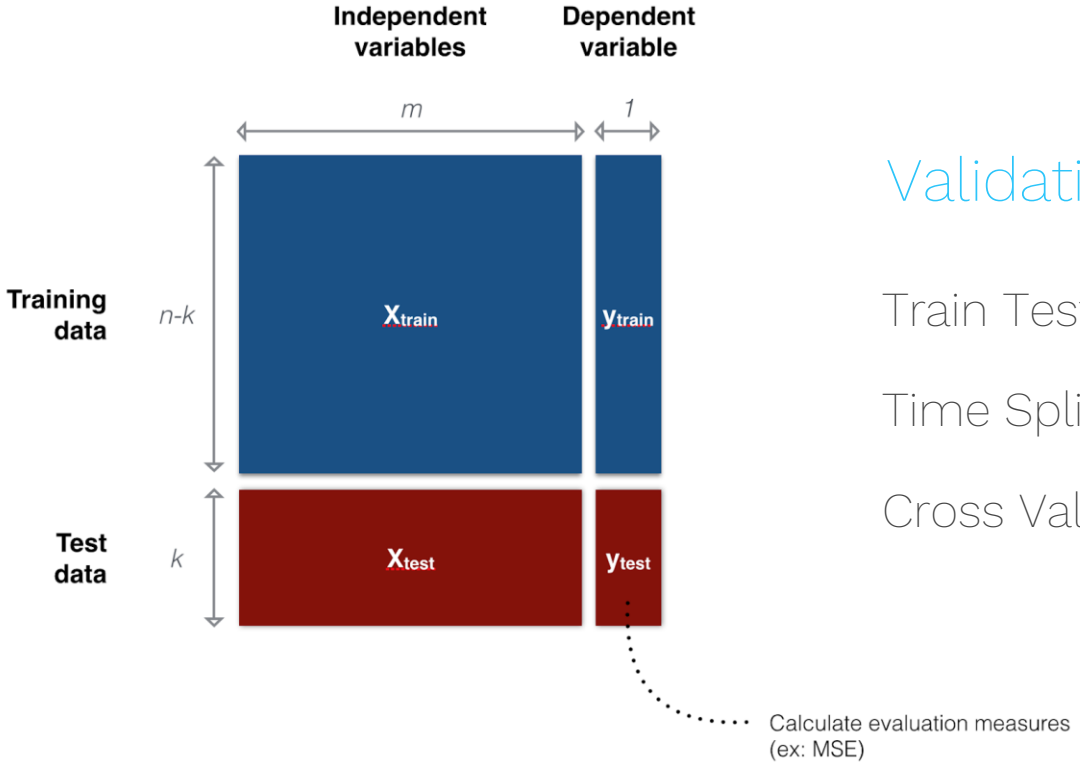


: generalization

Bias and Variance TradeOff



Techniques to prevent overfitting



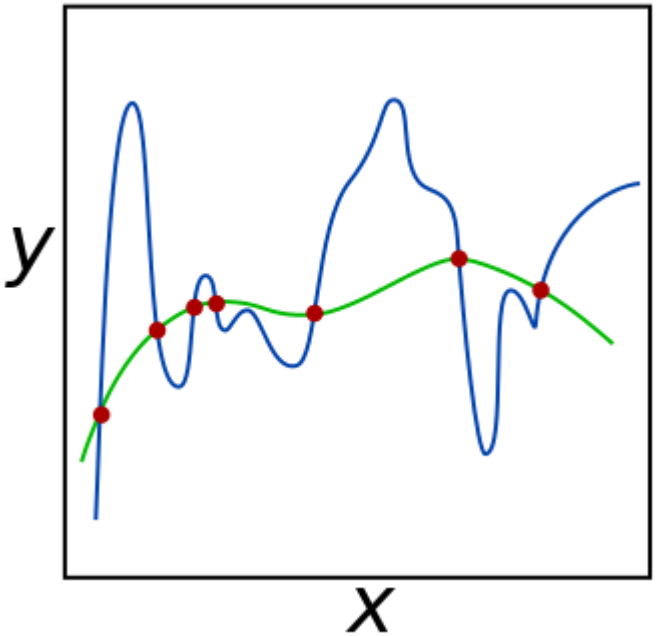
Validation Techniques

Train Test Split

Time Split

Cross Validation

Techniques to prevent overfitting



Reducing Model Complexity

Regularization

Tree Pruning

Ironhack