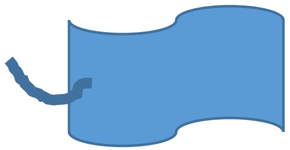
Machine Learning Model Pipeline
Feature Engineering

Feature Engineering

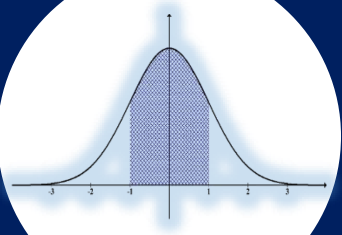
Missing data

Missing values within a variable



Labels

Strings in categorical variables



Distribution

Normal vs skewed

Outliers

Unusual or unexpected values

Missing Data

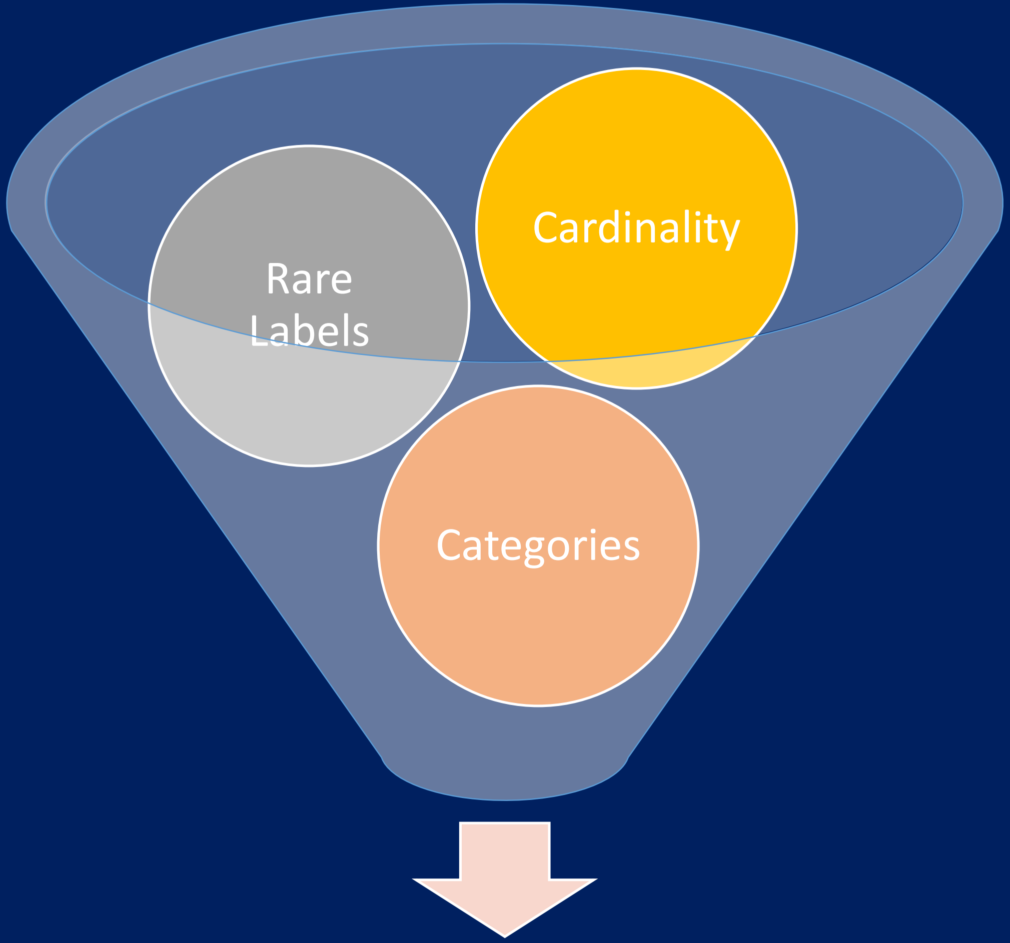
- Missing values for certain observations
- Affects all machine learning models
  - Scikit-learn

Random

Systematic

Labels in categorical variables

- Cardinality: high number of labels
- Rare Labels: infrequent categories
- Categories: strings
  - Scikit-learn

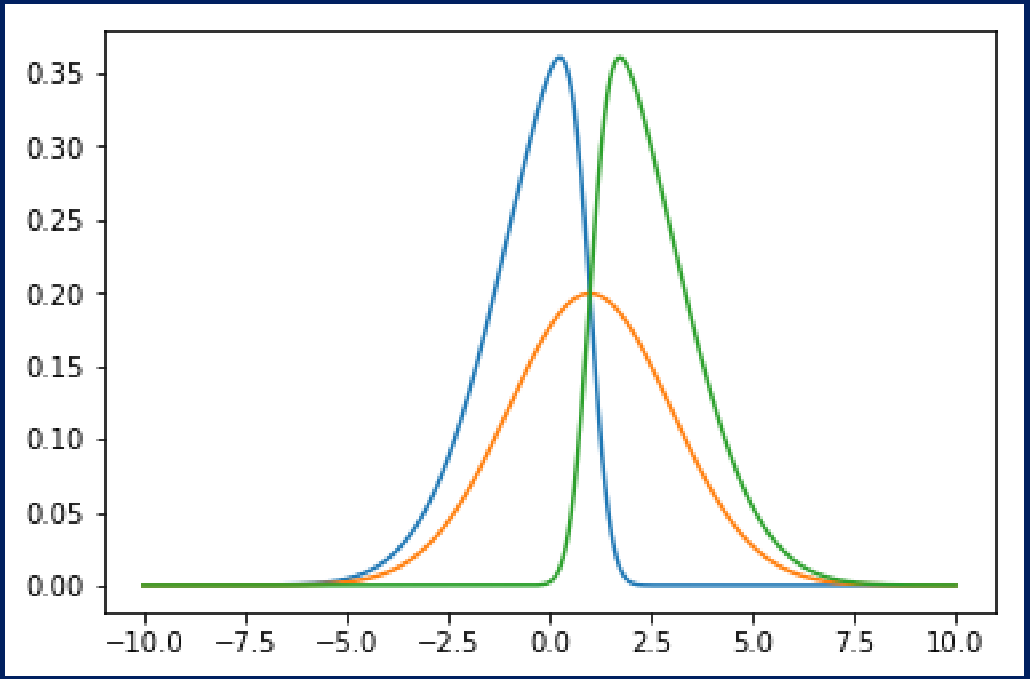


Overfitting in tree based algorithms

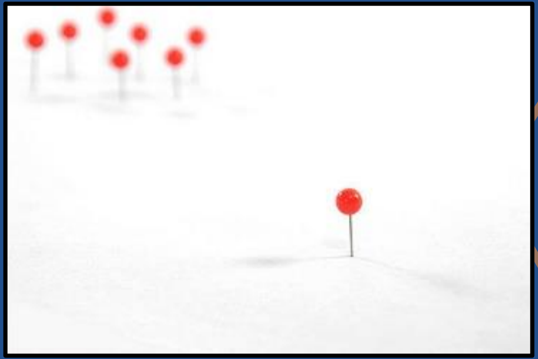
Distributions

- Linear model assumptions:
  - Variables follow a Gaussian distribution
- Other models: no assumption
  - Better spread of values may benefit performance

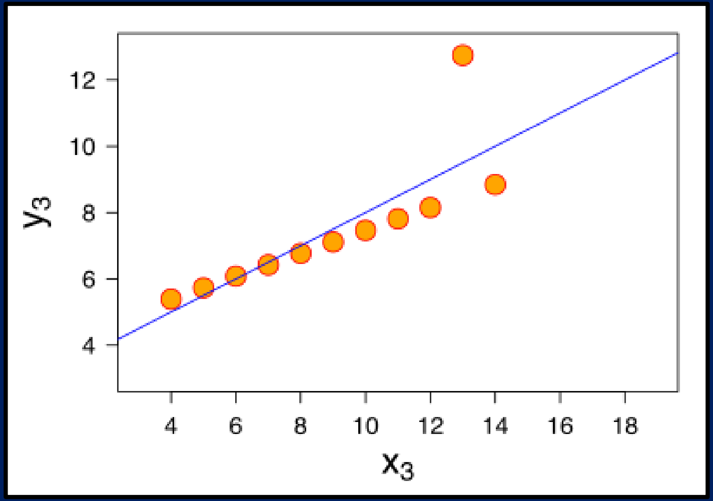
Gaussian vs Skewed



Outliers



Linear models

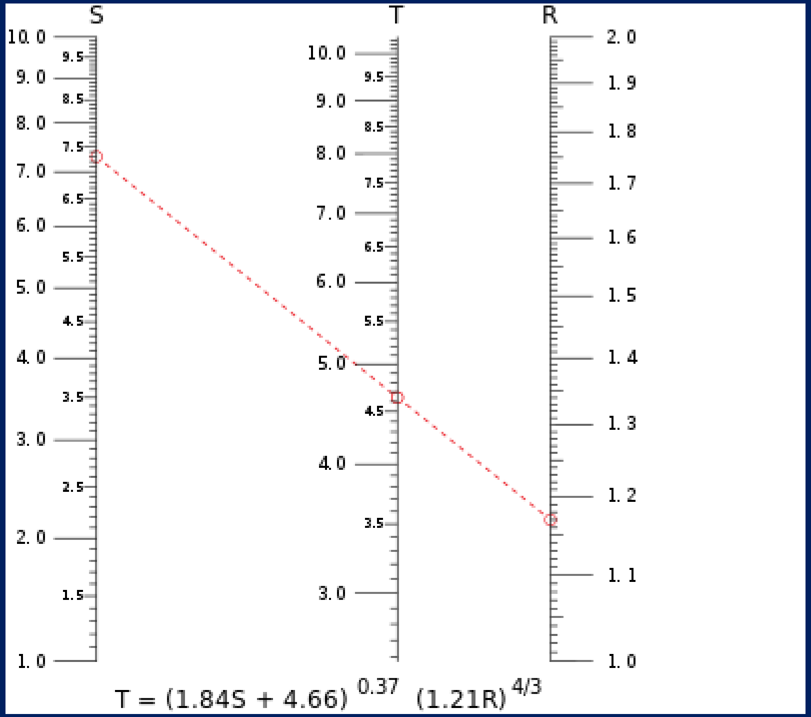


Adaboost

Tremendous weights

Bad generalisation

Feature Magnitude - Scale



Machine learning models sensitive to feature scale:

- Linear and Logistic Regression
- Neural Networks
- Support Vector Machines
- KNN
- K-means clustering
- Linear Discriminant Analysis (LDA)
- Principal Component Analysis (PCA)

Tree based ML models insensitive to feature scale:

- Classification and Regression Trees
- Random Forests
- Gradient Boosted Trees