

Machine Learning

▼ Class	02_titanic
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1) Project Introduction

This week we will use data on titanic passengers. We will try to use data about the passengers to predict whether they survived or not.

1.1) Data

`train.csv` : The training data for this weeks project.

`test.csv` : The test data for this weeks project. The dataset on which we do the final evaluation of our model quality.

`penguins_simple.csv` : Practice / Lecture Dataset. We will use the penguins data in the lectures to explain concepts.

All of the datasets are already on GitHub under `week_02/data`

1.2) Goals

- Understand the concept of Machine Learning
- Understand the machine learning models Logistic Regression, Decision Trees and Random Forests
- Learn which Feature Engineering techniques exist and how to apply them to our data
- Learn how to evaluate a model
- Build the best model possible in terms of "score"/"accuracy"

- Ok but fairly easy: 0.76
- Good: > 0.77
- Very Good: > 0.78
- Awesome: > 0.8
- (Submit our results to kaggle)

2) Machine Learning

2.1) What is it?

- You give data to the computer and ask the computer to learn about the computer using certain method and tools.
- Model training itself; the more data you put in, the better the model gets
- Providing data, model learns from experience, model improves over time, model makes predictions

2.2) Machine Learning Applications

- Search Engines - Rather unsupervised learning
- Social Media Feed, eg. Youtube suggestions - Recommender Systems
- Brain - All concepts
- Spam Filters - Supervised Learning - Classification

2.3) Types of Machine Learning

2.3.1) Supervised Learning

- Know the right answer (at least for a sample of the data)
- Existence of an output variable that we want to predict: **y**
- We use input features **X** to predict **y**

2.3.1.1) Regression

- y is a numeric value

2.3.1.2) Classification

- y is a class - Survived or Dead
- y can be binary as in our Titanic case or you can have multiple classes

2.3.2) Unsupervised Learning

- There is no y
- Unsupervised learning algorithms are finding patterns in the data: X

2.3.2.1) Clustering

- Eg. we have customer data from a supermarket in we want to cluster customers into different categories

2.3.2.2) Dimensionality Reduction

2.3.3) Reinforcement Learning

Self-learning systems