

Machine Learning Workflow

≔ Day	Monday
≡ Tasks	Familiarize yourself with <u>Kaggle</u> ; explore the dataset; run a dummy model

What is Machine Learning?

Q: What examples of machine learning use cases did you encounter this weekend or this morning so far?

A:

- · Shopping on amazon: recommendations
- · Alexa / Siri / virtual assistants
- Voice recognition
- Cancer detection / computer vision / deep learning



"Field of study that gives computers the ability to learn **without being explicitly programmed**."

Arthur

Samuel (1959)

Q: What does it mean for a machine to learn?

A: Use *past data* to detect *patterns*, to predict *future outcomes*, improve from *experience*.

Types of Machine Learning

Supervised Learning

- We have prior knowledge on the output values for our dataset labels, y (cats / dogs, survived / did not survive, price of a house, bike sharing demand)
- Two types of problems:
 - Classification predicting a *class* for data point: cat / dog / mouse / horse, survived / did not survive; week 2
 - Regression predicting a (continuous) value for a data point: price of a house, bike sharing demand; week 3
- Data is divided *training / validation / test* datasets. We do this to make sure the model is generalizable.

Unsupervised Learning

- Data is without labels.
- Models look for inherent structure (clusters, dimensionality reduction).
- More difficult to evaluate than supervised learning models.
- → whiteboard: draw the supervised ML model ←

Your Project for the Week

Goals:

- Based on passenger information data, build a model that predicts whether a person had survived the Titanic disaster or not.
- Submit your predictions to <u>Kaggle</u>.

Data:

train.csv: Your dataset for this weeks project. This is the dataset you are training and evaluating your model on.

test.csv: The dataset Kaggle uses to evaluate your model. It does not have labels.

Note: The naming of datasets this week is **confusing**.

- The train.csv file is your **full** dataset for this week. You will need to split this dataset into training and test sets training set to build your model on, and test set to evaluate how your model is doing. In real life (non-Kaggle competition life) this would just be called something like data.csv.
- The test.csv is not the "real" test set in that it doesn't give you labels. This is just a dataset Kaggle uses to evaluate your model. In real-life/job you won't be submitting your ML models to competitions and so you won't have an equivalent of this (but you will still do train/test split on your whole dataset as explained in the previous bullet point). You can think of this as kaggle_submission.csv.

Evaluation:

- Don't pay attention to all the perfect scores on Kaggle they are all cheaters!
- These are the scores you can expect from the model you build:

• EASY: 70%

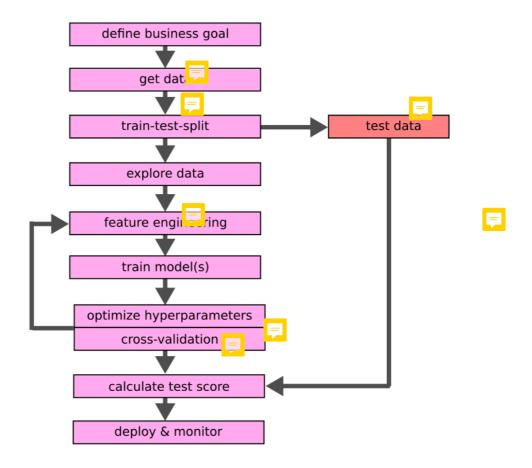
• MEDIUM: 75%

• MEDIUM-HARD: 77.5%

• HARD: 79%

VERY HARD: over 80%

Machine Learning Workflow



- 1. Define business goal ✓
 - Create a model that predicts if a person survived the Titanic disaster or not; optimize for accuracy.
- 2. Get data 🗸
 - From Kaggle, or from week_02/data folder.
- 3. Train-test-split: √
 - Use scikit-learn library in Python
 - Use train.csv for this step
 - If you want to keep your labels together with your data while doing EDA, you can use the code example on the bottom, then separate your X and y later.

```
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.20, random_state =42)
```

```
from sklearn.model_selection import train_test_split
df_train, df_test = train_test_split(df, test_size=0.20, random_state=42)
```

- 4. Explore data 🗸
 - Plot all the things!
- 5. Feature engineering \checkmark
 - Tomorrow
- 6. Train model \checkmark
 - Figure out how to run the dummy model from scikit-learn on your data
 - This afternoon you'll learn how to run logistic regression

7-...

· Later this week

→ notebook: ML workflow ←

Your Tasks

- Download and explore the data (do Exploratory Data Analysis challenge in 2.1.
 What is Machine Learning)
- Familiarize yourself with Kaggle.
- Run the scikit-learn dummy model on your data (or logistic regression after the afternoon encounter).