

Machine Learning Pipeline

This lesson will focus on the process of training machine learning models.

WE'LL COVER THE FOLLOWING ^

- Training process
 - Feature engineering
 - Selecting the model
 - Train and test set
 - Training the model
 - Evaluating model performance
 - Model tuning

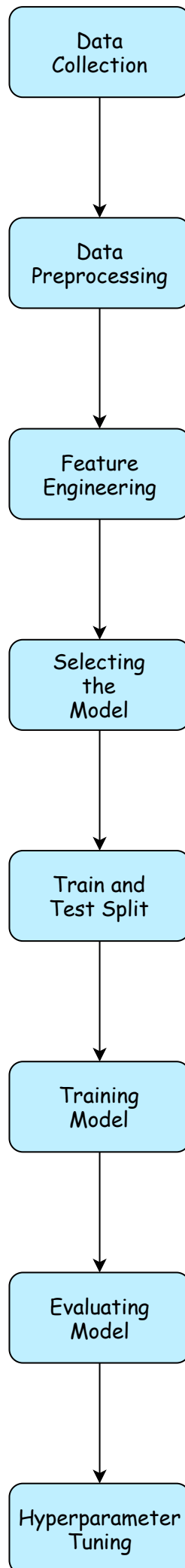
In the last lesson, we talked about why we need machine learning models. This leads us to our first model, which is a *decision tree*. But before we dive into the details of decision trees, we need to look at the training process of these models.

Training process

To use a machine learning model, we go through the following different stages:

- Data collection
- Data preprocessing
- Feature engineering
- Selecting the model
- Splitting the data set into train and test sets
- Use the train set to train the model
- Evaluate performance on the test set

- Tune the model



We are already familiar with the first two steps as we have done these extensively in this course.

Feature engineering

This includes combining and manipulating existing variables, aka *features* in ML, to make new features that might help us capture the relationships better. This also includes transforming the features to a different scale. For instance, normalizing skewed data.

Selecting the model

This is a very important task in the whole process. Choosing which model to use requires looking at the data and deciding which model will work better with the data.

Train and test set

We divide our data into two sets, a *training* set and a *testing* set. We use the training set repeatedly to train the model.

Training the model

The model is given the training set. It learns the hidden patterns and relationships in the data. It is not given anything from the testing set during the training process. Most of the models are trained by algorithms similar to gradient descent optimization. The models update their parameters based on how they perform on the training set, repeating this process several times.

Evaluating model performance

After training, models are evaluated by giving them the testing set as input, and the predictions they make on the testing set are evaluated using different metrics and loss functions.

Model tuning

If the models do not give satisfactory performance, we change the *hyperparameters* of the models. We will look at hyperparameters later in this chapter.

With this, we can now start using our first ML model. We will look at *decision trees* in the next lesson.