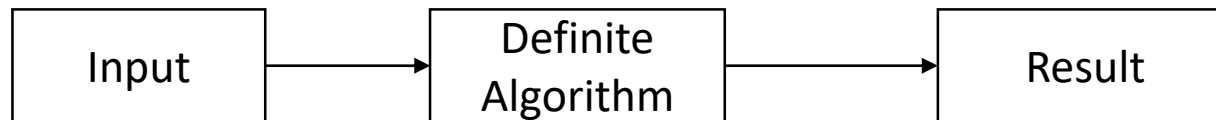# Tensorflow Tutorial

Lesson 1

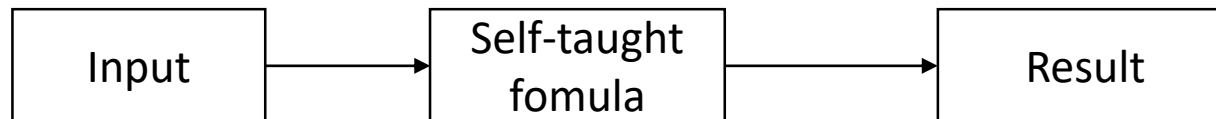- Ground concepts of machine learning

Machine learning

- Usually a program resolves around an easy to describe problem like
  - „What is the area of a circle" or „How many taxes do I have to pay this year?"
  - All these questions can be written down in an easy code
- However, there might be examples where the algorithm cannot be described easily. However, the task can be described easily, e.g.:
  - Classification of an object or animal („What do you see?")
  - Detection and classification of an object („What do you see where?")
  - An example from economics:
    - Estimate the value of an investment -like a immobilie - based on its location and its area.

What's the price of the flat?

- Thanks to data from the past one knows how high the cost for the flat was (Ground truth) in relation to the location and the area

- A machine learning algorithm finds the optimal function by learning which output is expected in relation to the input

- After the learning process, the AI should be able to produce a good result

```
┌─────────┐      ┌─────────────┐      ┌─────────┐
│  Input  │ ───▶ │  Definite   │ ───▶ │ Result  │
│         │      │  Algorithm  │      │         │
└─────────┘      └─────────────┘      └─────────┘
```

„normal" programing

```
┌─────────┐      ┌─────────────┐      ┌─────────┐
│  Input  │ ───▶ │ Self-taught │ ───▶ │ Result  │
│         │      │   fomula    │      │         │
└─────────┘      └─────────────┘      └─────────┘
```

Machine learning

Machine learning

- Key – technologies over the last decades:

  - Decision trees
  - Nearest-Neighbor
  - Linear Regression
  - Neuronal Networks
  - Convolutional Neural Networks