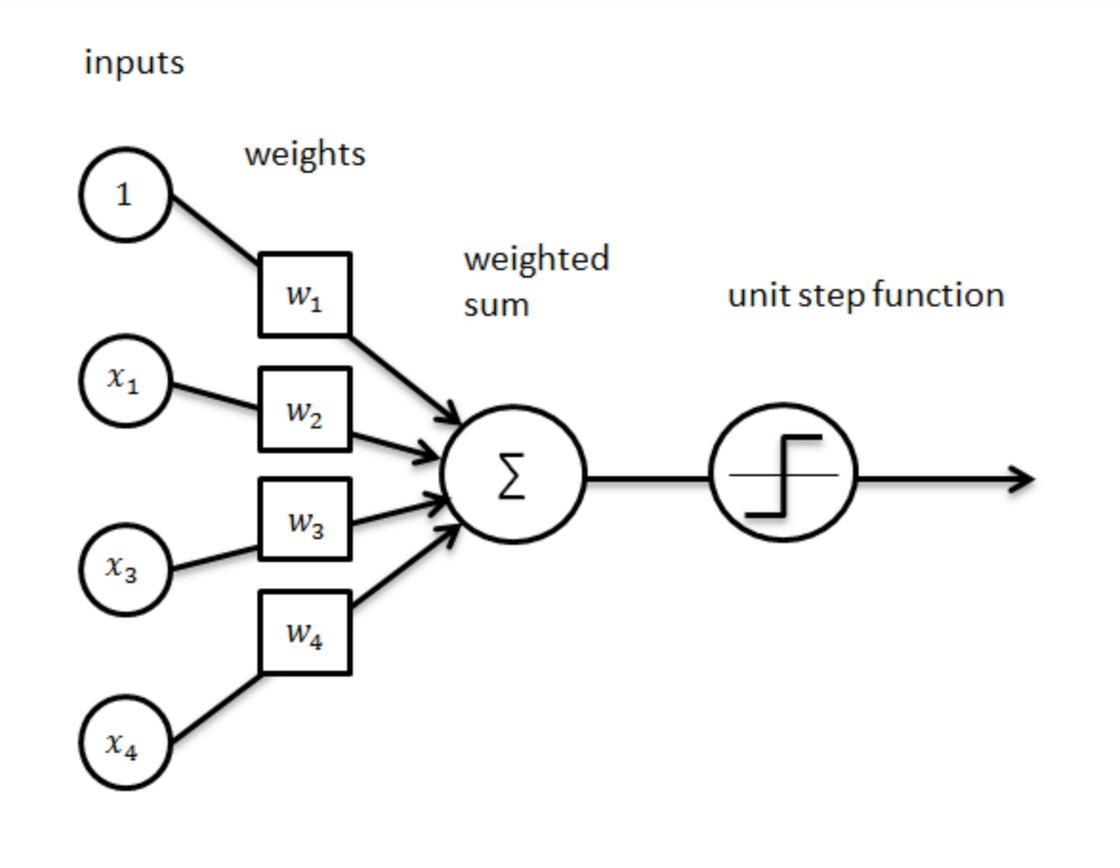
ECE449 Lab 3

October 17th, 2019

Artificial Neural Networks

- New topic: ANN
- 2 Exercises:
  - Classification
- Decide the class of an example
  - Regression
- Capture the pattern in a dataset
- To produce a number given the inputs

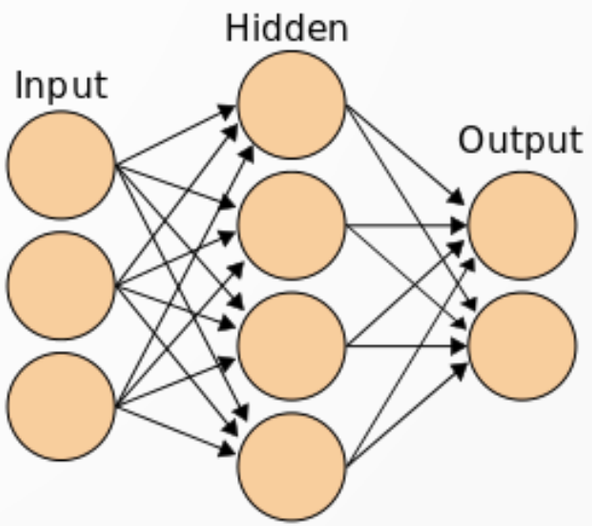
Perceptron



http://ataspinar.com/2016/12/22/the-perceptron/

Multi-layer perceptron

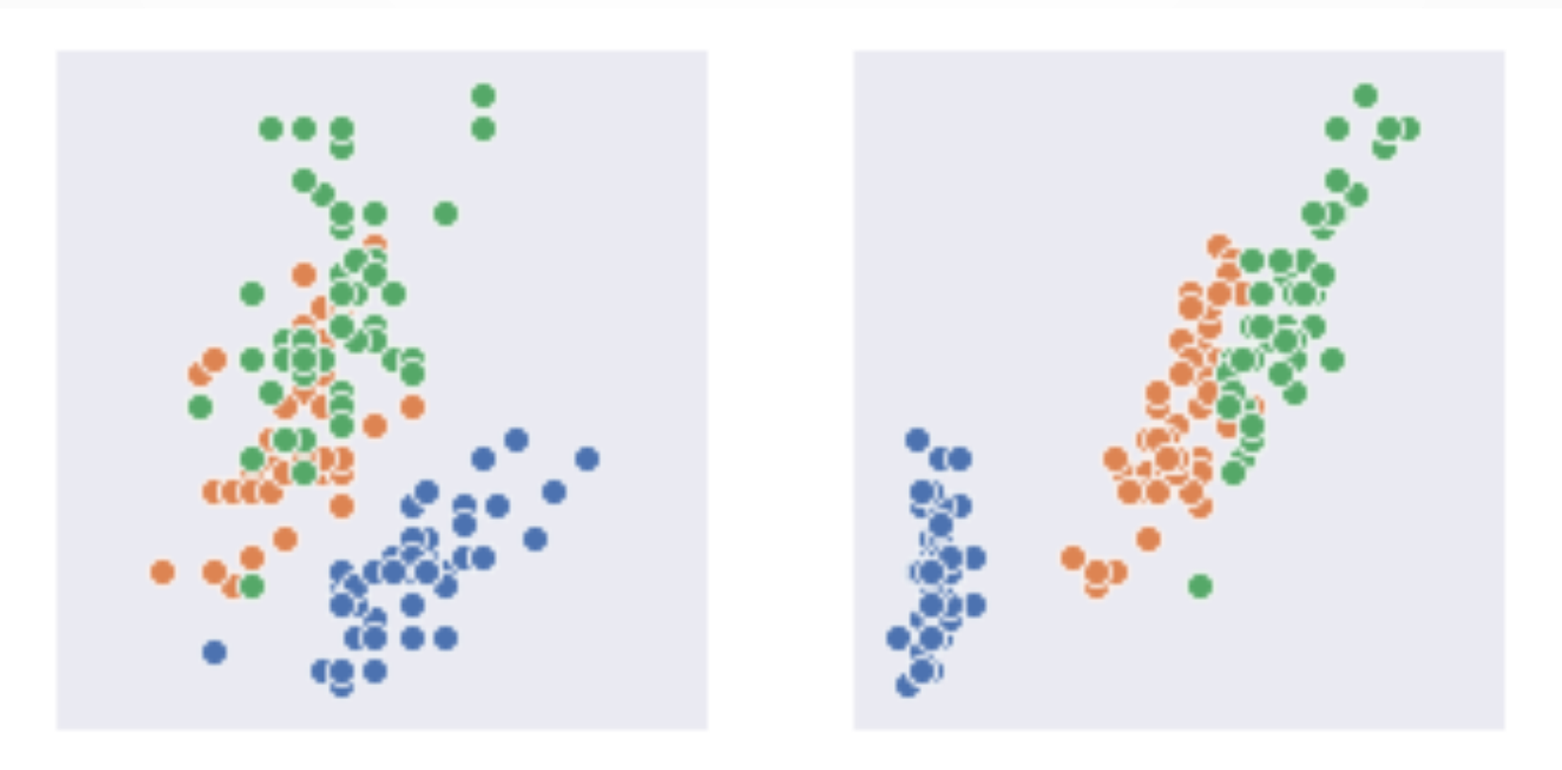
- Multiple perceptrons connected together
- Training using backpropagation
  - Take one training sample
  - Figure out what the error is
  - Update the weights so that the error is smaller
  - Repeat until a stopping condition reached



https://en.wikipedia.org/wiki/Artificial_neural_network#/media/File:Artificial_neural_network.svg

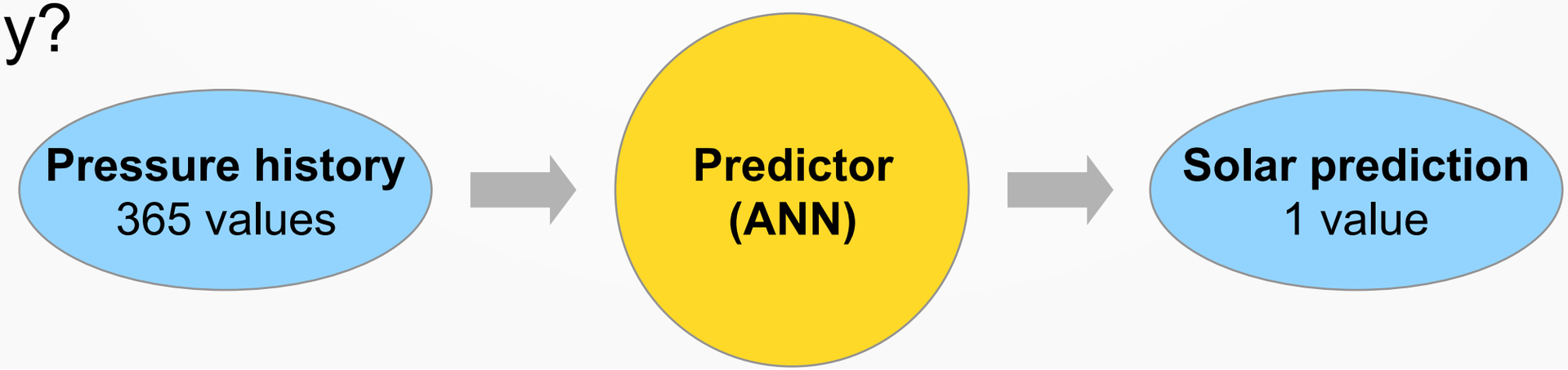
Exercise 1

- Train a Perceptron and a MLP so that it can distinguish classes of inputs



Exercise 2

- Problem:
  - We want to predict the incoming solar irradiance for the next day.
- We have an atmospheric pressure sensor recording the pressure.
  - Can this data be used to predict the solar irradiance next day?



Exercise 2

- The code is prepared and ready to run!
- Your task:
  - Understand the code
  - Evaluate how the parameters affect the performance
- Number of iterations
- Size of the hidden layer
- Activation function