Machine Learning

- Exercise 1, 29.04.2015
- Introduction

Lecture: Prof. Dr. Volker Tresp
Exercise: Gregor Jossé, Johannes Niedermayer
Tutor: Markus Rohm

Roadmap

- Organisational matters
- Hints
- Motivation
- Exercise

Organisational matters

Organisational Matters

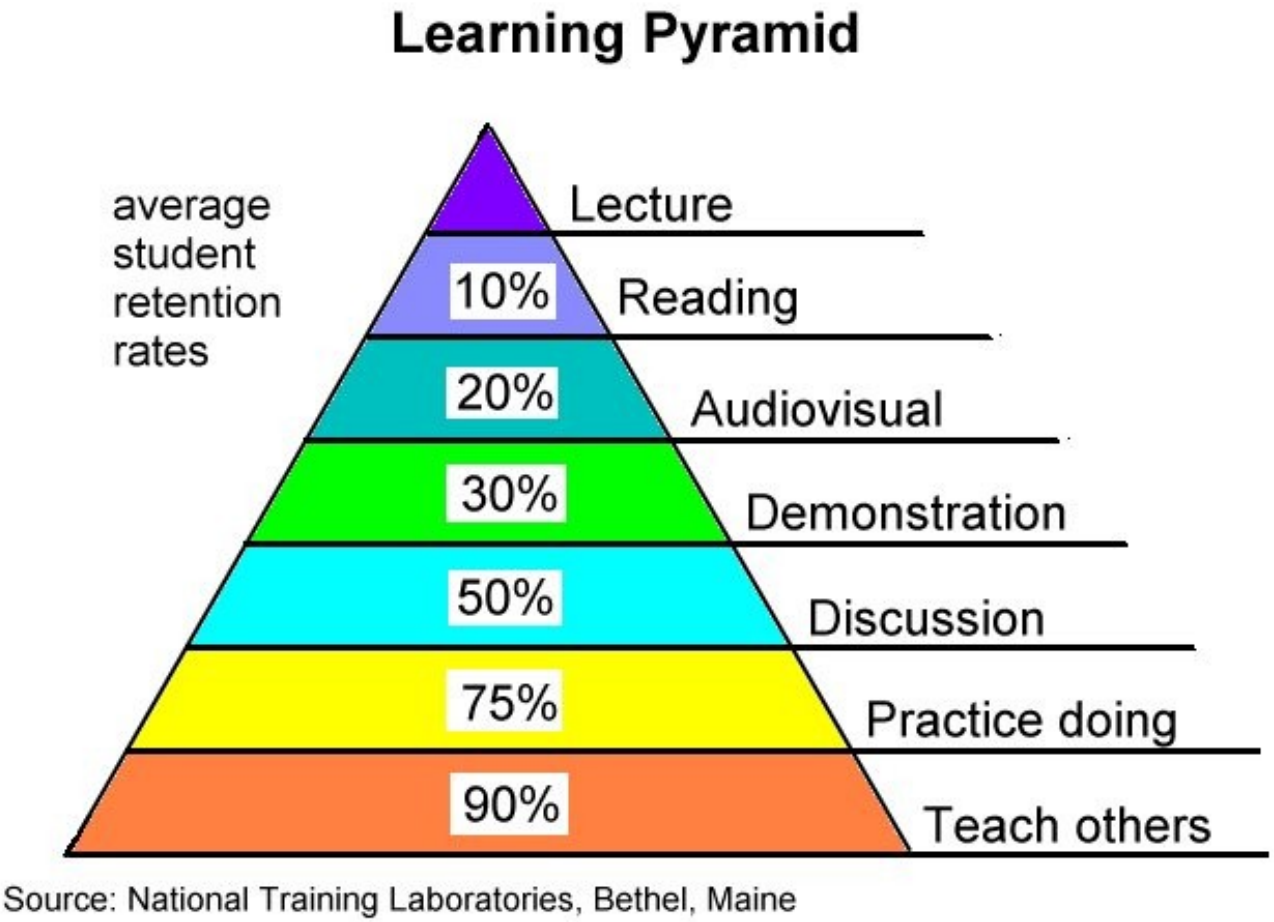
- First exercise (14:00 – 16:00) in **english**
- Second exercise (16:00 – 18:00) in **german**

Hints

Learning in general

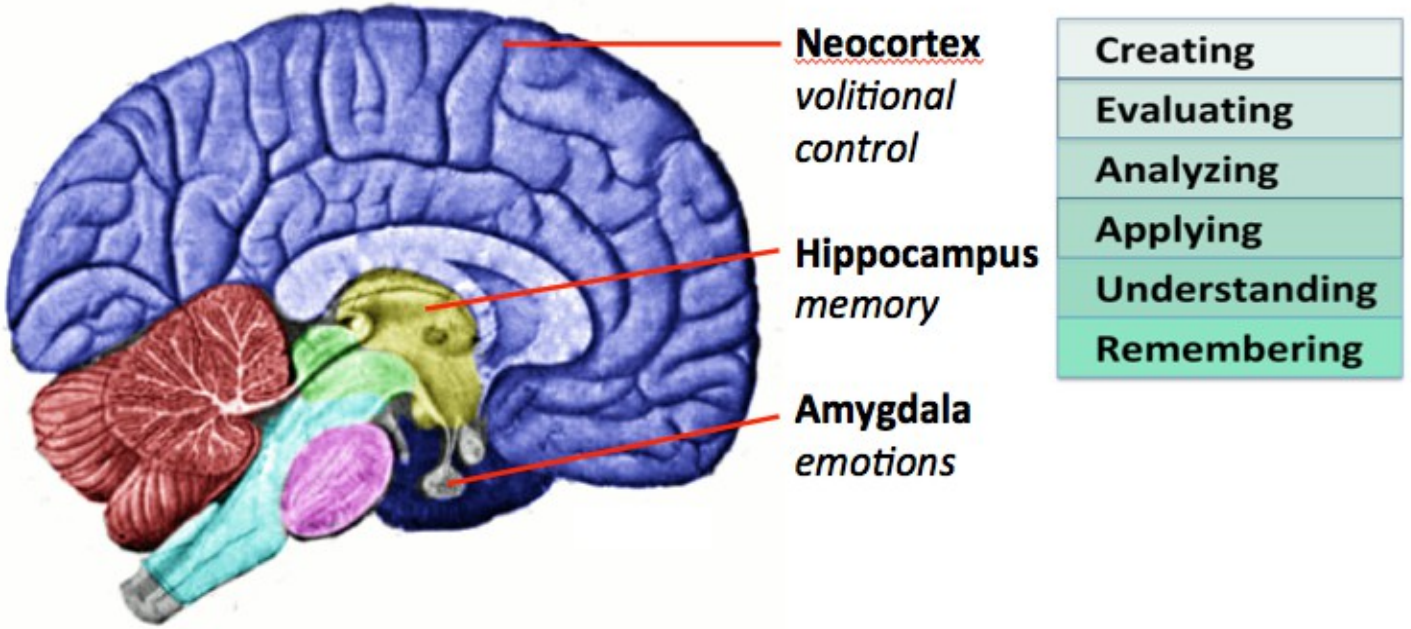
Hints

- Background: Train the trainer



Hints

- **Higher Elaboration = Higher Benefit = Less long time effort**



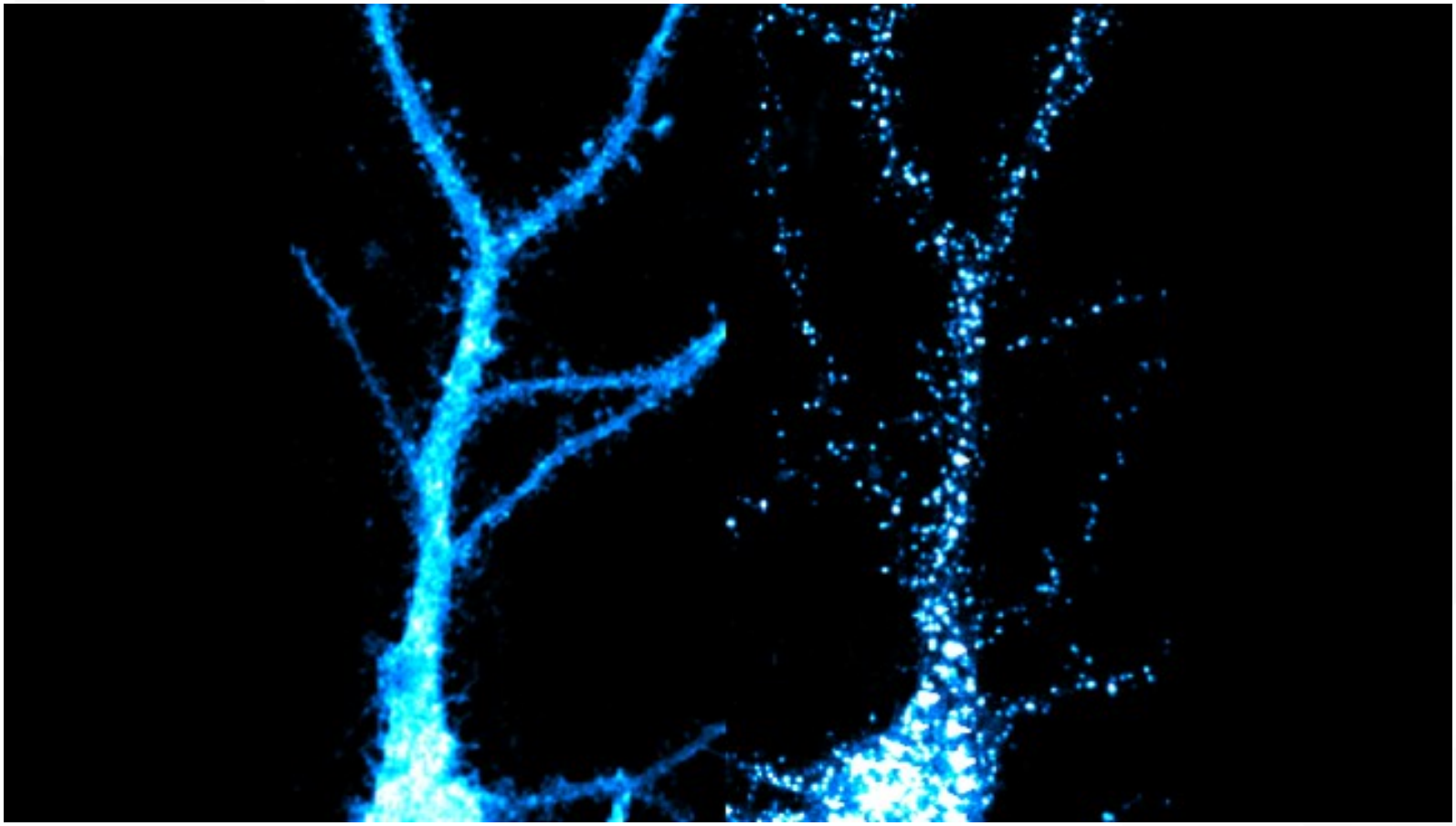
Bloom's taxonomy, which describes cognitive tasks in ascending orders of complexity, appears to be supported by neuroscience research. Recruiting volitional control, memory, and emotions through active learning techniques increases performance.

Brain image by Looie496 [Public domain], via Wikimedia Commons.
Verbs from Bloom's Revised Taxonomy of Learning Objectives in the Cognitive Domain, in Anderson, L. W. and David R. Krathwohl, D. R., et al. eds. *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston: Allyn & Bacon, 2001.

Source: http://gsi.berkeley.edu/gsi-guide-contents/learning-theory-research/neuroscience/

Motivation

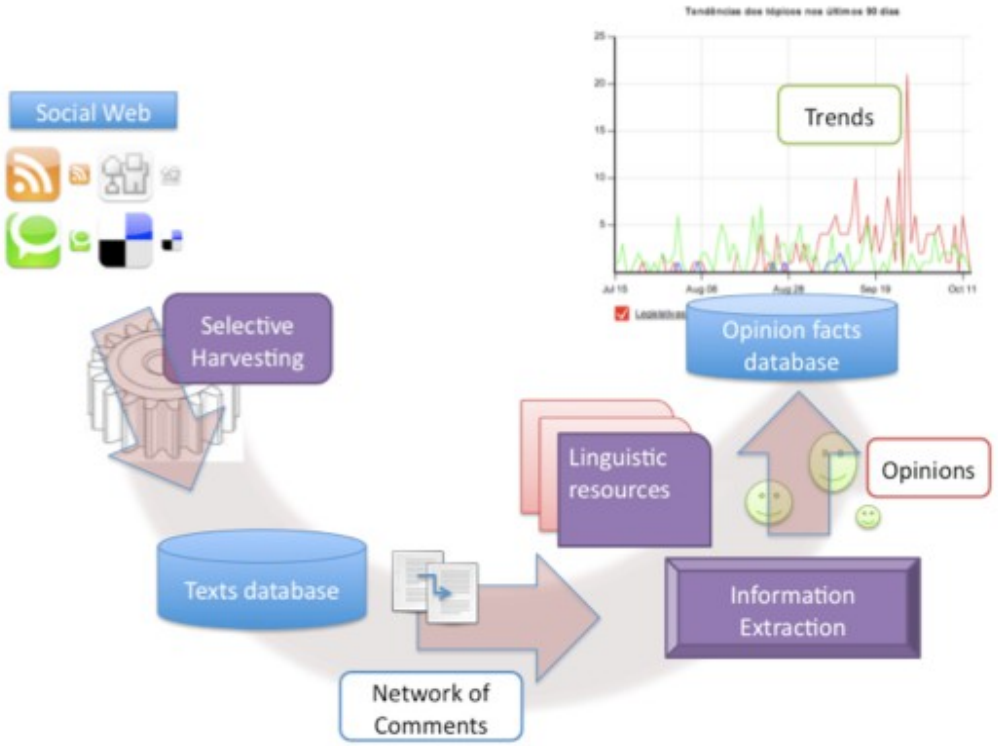
- Learning in your **brain**



Source: Scudder, et al. The Journal of Neuroscience, 2014.

Motivation

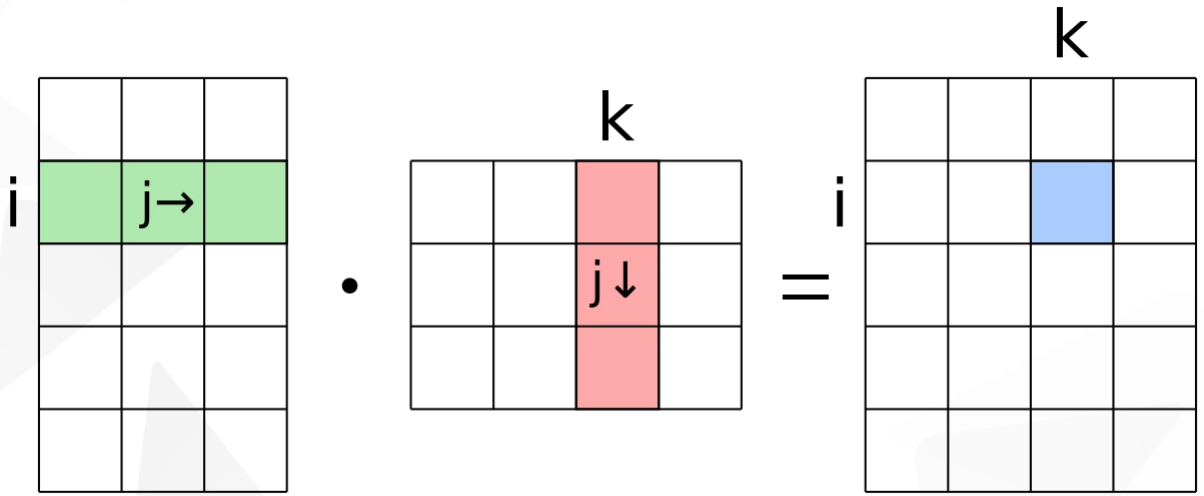
- Applications:
  - Opinion Mining: Max Zimmermann (PhD): Understanding and Monitoring Attitudes of Product Properties over Time



Source: http://dmir.inesc-id.pt/project/POPSTAR

Exercises

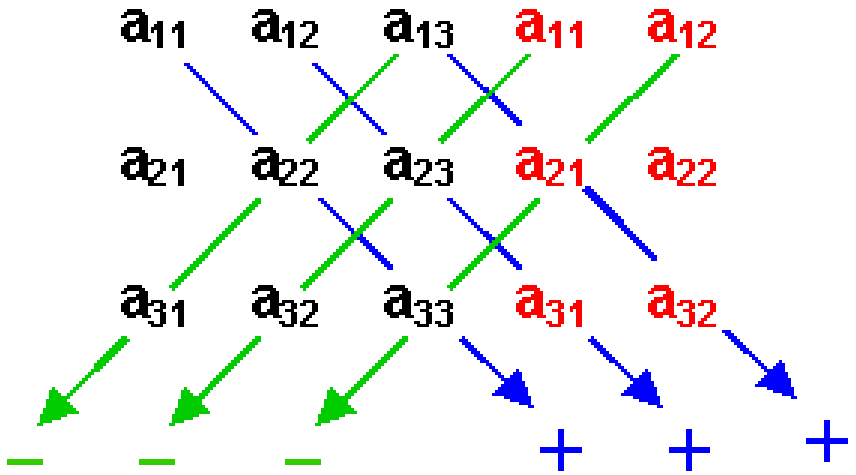
- Exercise 1-1 **Linear Algebra**
  - Matrix multiplication



Source: http://de.wikipedia.org/wiki/Matrizenmultiplikation

Exercises

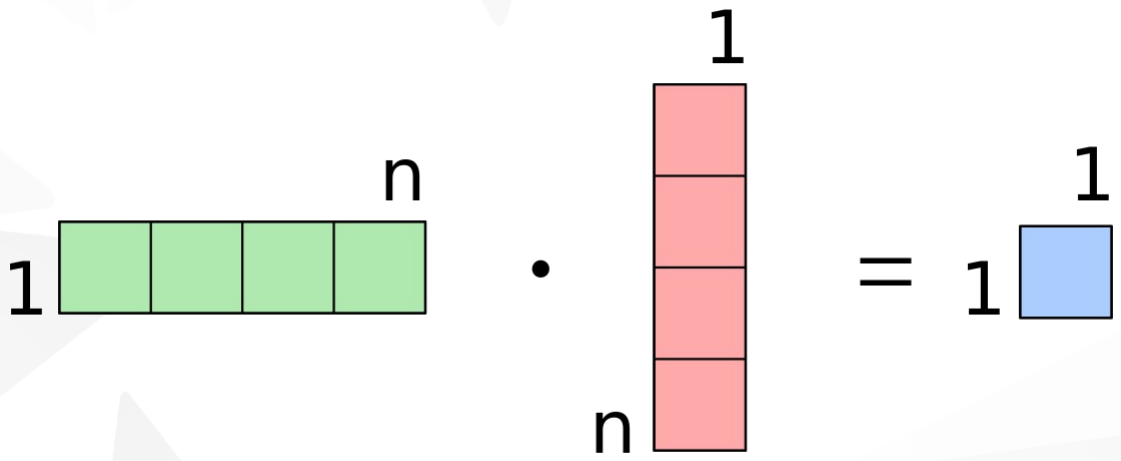
- Exercise 1-1 **Linear Algebra**
  - Matrix determinant



Source: http://www.tf.uni-kiel.de/matwis/amat/def_en/kap_7/basics/b7_3_1.html

Exercises

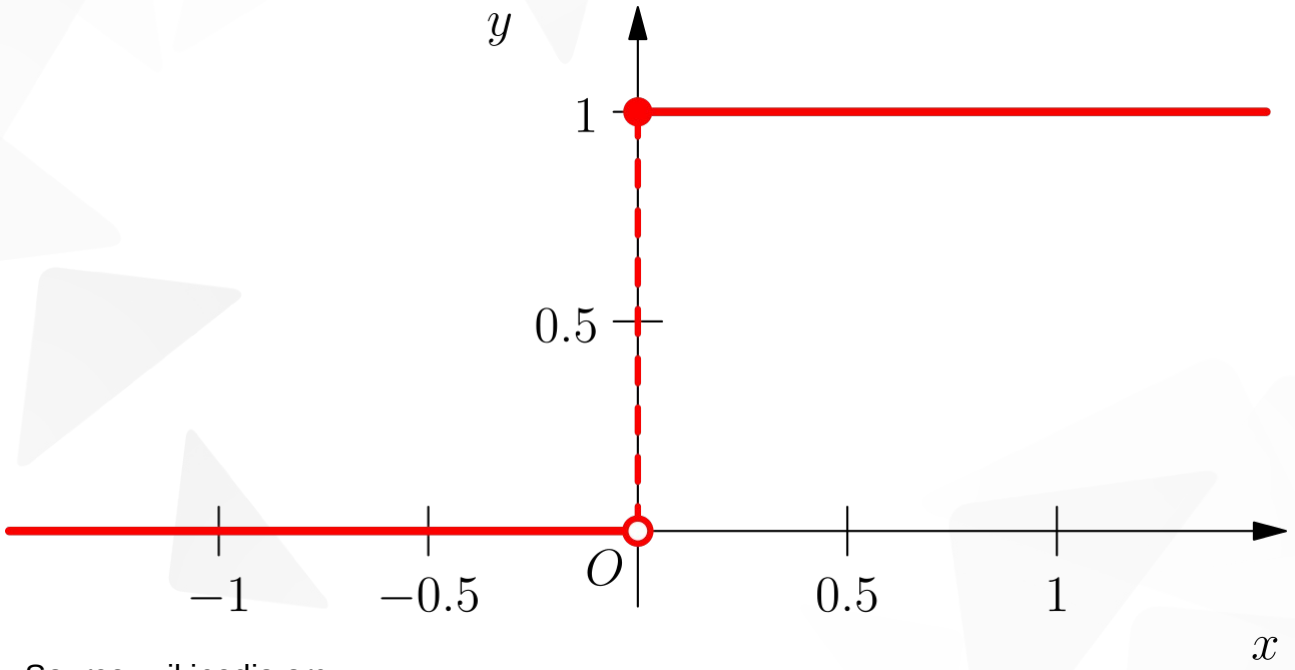
- Exercise 1-2 **Vector Calculus**
  - Standard scalar product



Source: wikipedia.org

Exercises

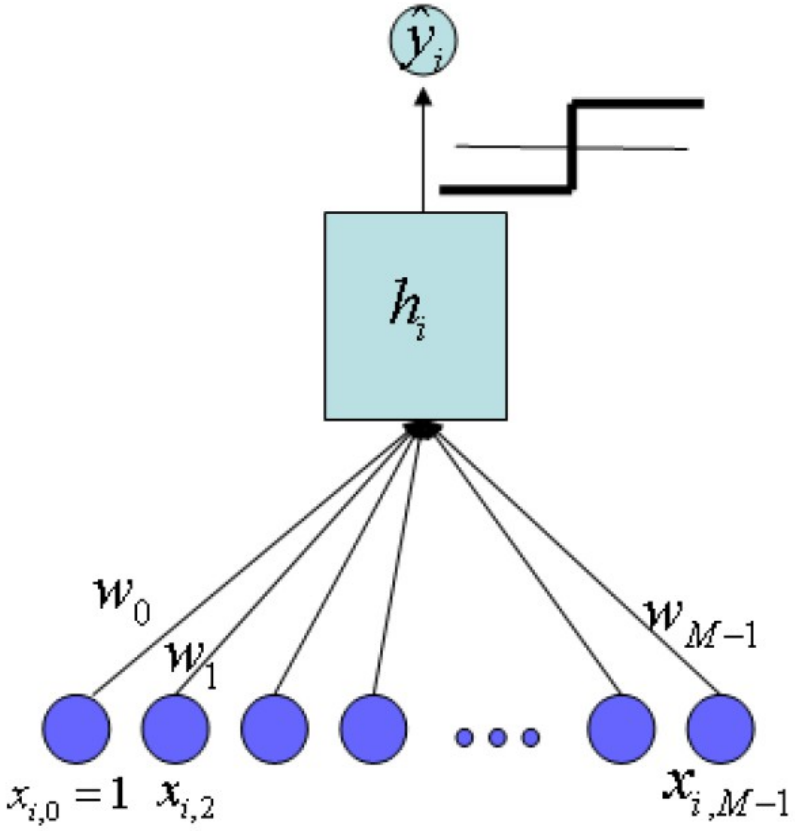
- Exercise 1-3 **Perceptron**
  - Heaviside function



Source: wikipedia.org

Exercises

- Exercise 1-3 **Perceptron**
  - Activation function



Source: lecture

Thank you …