Discussion Session w. 39

- Topics for discussion session w. 39:
  Artificial neural networks and support vector machines

Literature:

- Chapter 16.5 on neural networks in (Murphy, 2012).
- Chapter 16.3 in Johansson, R.: *System Modeling and Identification*. Englewood Cliffs, NJ: Prentice Hall, 1993.
- Lewis, F. L., Yesildirek, A., & Liu, K.: "Multilayer neural-net robot controller with guaranteed tracking performance". *IEEE Trans. Neural Networks*, Vol. 7, No. 2, 388–399, 1996.
- Chapter 14.5 on support vector machines in (Murphy, 2012).
- Suykens, J. A., Vandewalle, J., & De Moor, B.: "Optimal control by least squares support vector machines". *Neural Networks*, Vol. 14, No. 1, 23–35, 2001.
- See also the lecture slides by Thomas Schön at `http://user.it.uu.se/~thosc112/ML/lectures.html`

Discussion Session w. 39 (cont'd)

Simulation tasks:

- Implement the backpropagation algorithm for training of neural networks. Then train a neural network using this algorithm for approximation of a nonlinear function of your choice. Discuss the characteristics of the backpropagation algorithm and their implications for learning.
- Consider the Iris data set available at `http://archive.ics.uci.edu/ml/datasets/Iris`[1]. Implement a support vector machine classifier for this data set. Divide the data into one training set and one validation set, and test the trained classifier on the validation data.

[1] Also available in MATLAB with the command `load fisheriris`.

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