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Susanne Thon: The Mathematical Background of Artificial Neural Networks and their Application in the Medical Technology Project NIVA^B

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Sammanfattning

One of the most important features of the human brain is its ability to learn. The way in which the synapses between the brain's neurons are adapted in new situations is unique and the total capacity of biological neural networks has not been able to be simulated. Yet artificial neural networks are a powerful tool in pattern recognition and calculation as they are able to approximate any continuous multidimensional function. The proof of this property goes back to Kolmogorov and will be one of the main results which we will present in this thesis.

After giving the mathematical background of neural networks, we will turn to an application in medical technology. In the project NIVA^B (non-invasive determination of blood glucose level) neural networks are used for the calculation of blood glucose. On the basis of this project we will in the second part of this thesis demonstrate how neural networks can be realised with Matlab.