Bachelorproject 2019

Rasmus og Roald

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1 Introduction

1.1 Motivation

Neurale netværk er rigtigt seje [1]

1.2 Proteins

1.2.1 What is

1.2.2 Secondary Structures

1.2.3 Solvent accessible surface area

1.3 Neural networks

The common perception is that humans and animals process information, i.e. transform perceptional stimuli and physiological conditions into behaviour, by using their brains. This is imprecise however, as the brain as such is only one functioning part of what is called the *nervous system*, which is in turn responsible for the internal workings of human and animal behaviour.

This nervous system is an abstaction over a number of *neurons* interconnected by synapses. Neurons in turn are so-called electrically exitable cells. In a gross over-simplification, this can be translated into the case that each neuron can have different internal states, depending on the internal states of the neurons it is connected to, thus forming a *neural network*.

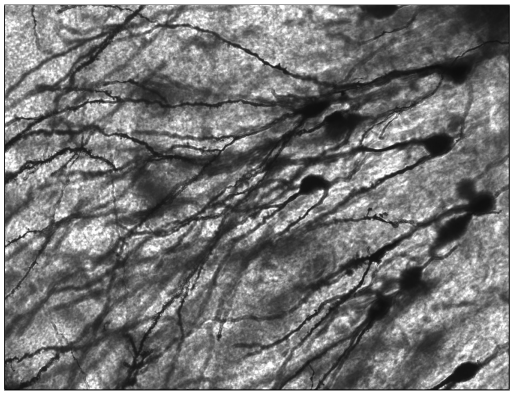
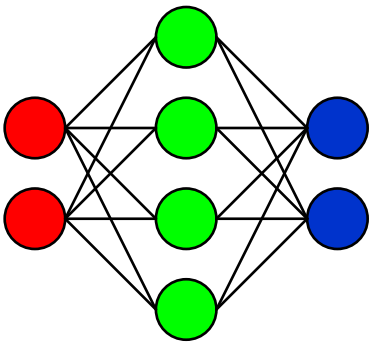


Figure 1: Neurons in the dentate gyrus of an epilepsy patient.

While obviously interesting within the fields of biology or psychology, this structure has shown to be enourmously interesting in the field of computation, as one can in fact model this very thing and use it to make predictions based on prior observations, for example in regards to the aforementioned structures of proteins folding.

Analogously, or rather, digitally, we can use this model to construct an *artificial neural network*.

These set themselves apart from biological neural networks in a couple of ways: most urgently in that while neurons in biological neural networks are connected to each other via synapses, so that each neuron has an either inhibitory or activating effect on whether or not a connected neuron 'fires', in artificial neural networks neurons are connected by *edges*, each with an associated *weight*, allowing the artificial networks to leave the discrete domain and enter the continuous.



1.3.1 Convolutional neural networks

1.3.2 Multitask learning

2 Methods

3 Results

4 Conclusion

5 Appendix

References

[1] C. Bishop, *Pattern Recognition and Machine Learning*. Information Science and Statistics, Springer, 2006.