PnS 2018

Deep Learing with Raspberry Pi

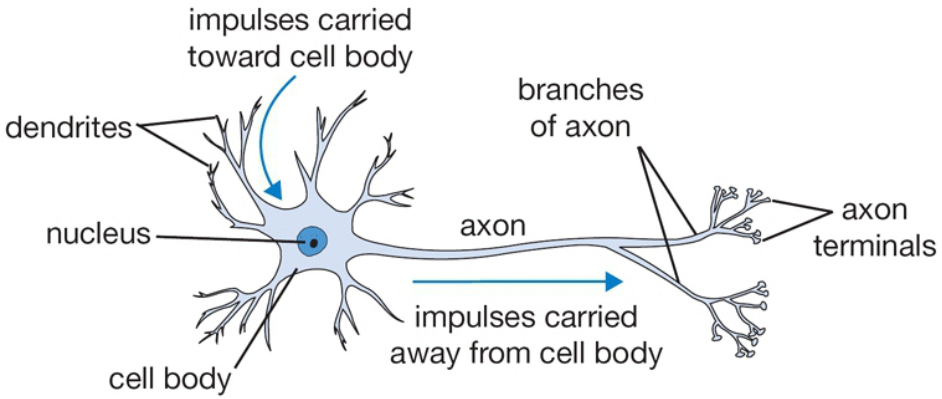
Session 3

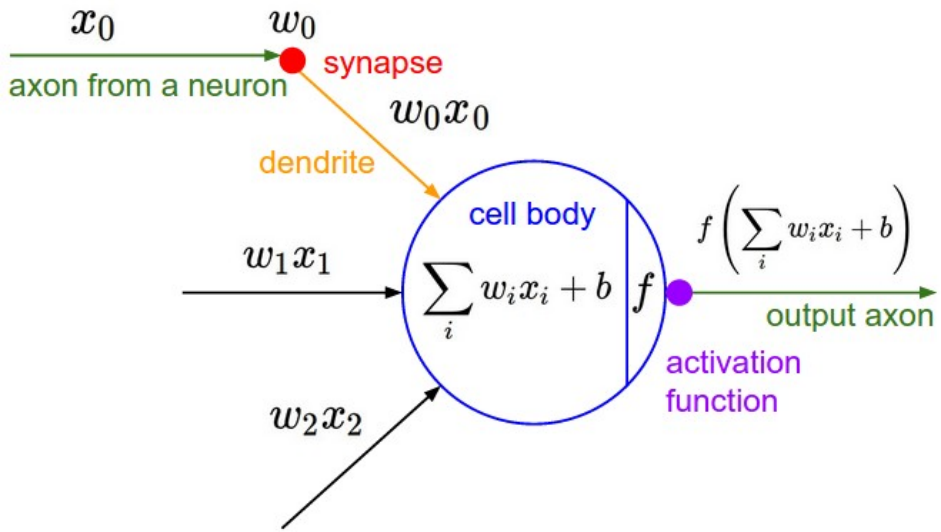
PnS 2018 Team

Institute of Neuroinformatics
University of Zürich and ETH Zürich

Outline

Artifical Neuron: Overview

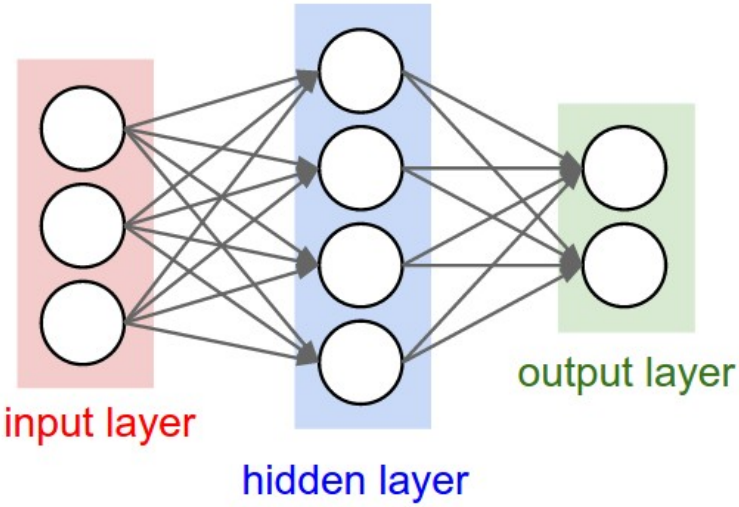


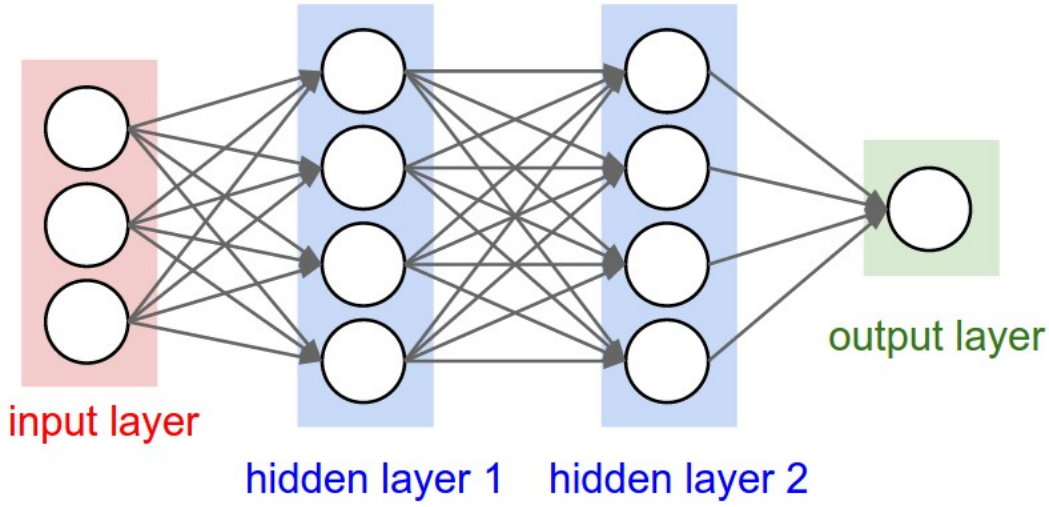


- A basic computational model of the biological model
- Single neuron as linear/logistic regression

http://cs231n.github.io/neural-networks-1/

Multi-Layer Perceptron

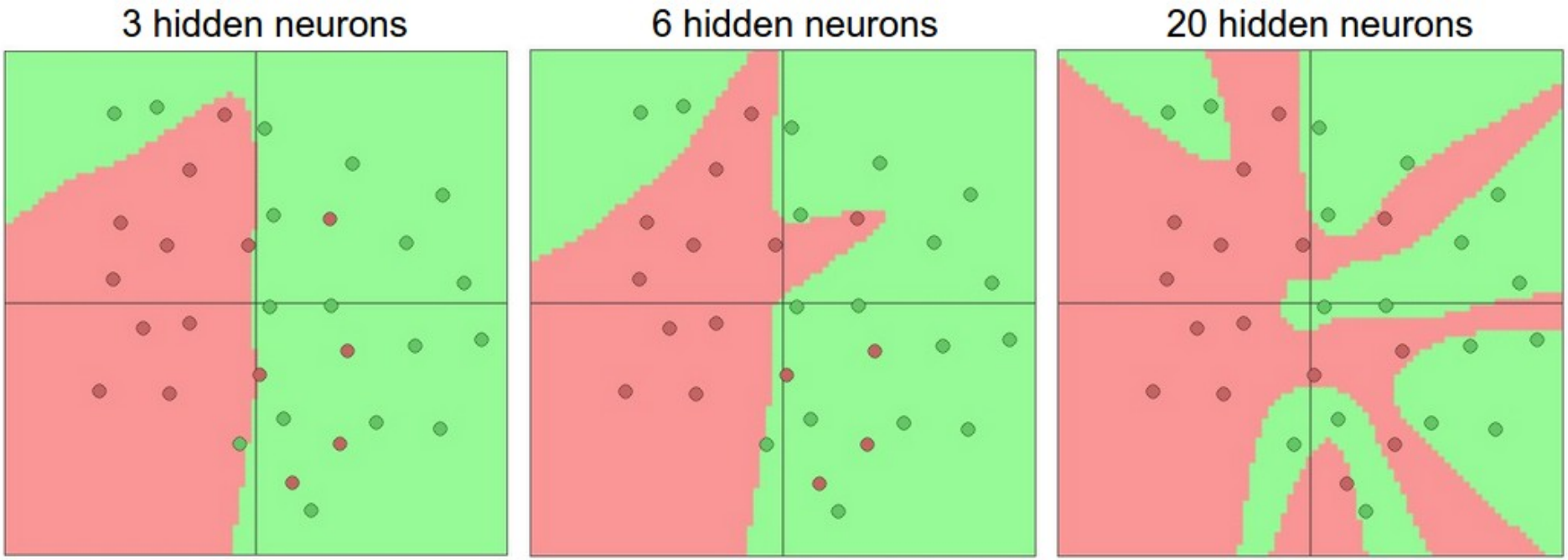




- Neurons in an acyclic feed-forward graph
- Fully connected layers
- Each fully connected layer computation is a matrix multiplication, matrix addition and an activation function

http://cs231n.github.io/neural-networks-1/

What can an MLP learn?



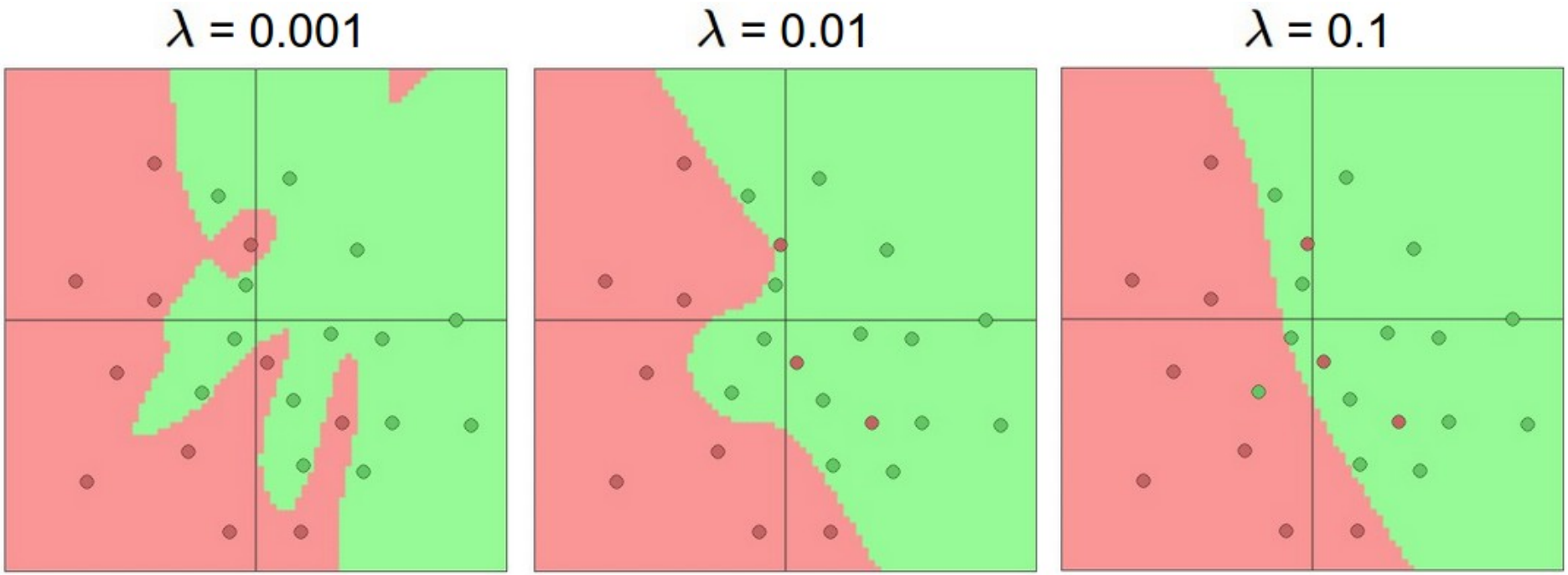
- Neural Networks with at least one hidden layer are universal approximators[1]
- More neurons are expected to approximate better

[1] Approximation by superpositions of a sigmoidal function, by Cybenko G.
http://cs231n.github.io/neural-networks-1/

Regularization

- Overfitting more probable with larger models
- Could be prevented by using a regularization term in the loss function

Regularization



- Use bigger networks but take measures to prevent overfitting

http://cs231n.github.io/neural-networks-1/

Working with images

- MLPs do not work well with images
- Hierarchy of local spatial features
- Extract these local spatial features through filters