

Lecture 8: *"Introduction to Artificial Neural Networks with Keras"*

Book Chapter

Please read the *Chapter 10 "Introduction to Artificial Neural Networks with Keras"* till page 307. Answer the following Questions.

Keep in mind: If you answer these questions and write a detailed summary, you won't need to read these chapters again while preparing for the exam

Additional Installation

Please install keras and Tensorflow 2.0 as described on pages 296-297.

Questions

The start of the chapter is left out. The questions begin with the section "The perceptron".

1. Describe the architecture of a Perceptron.
2. How does a Perceptron work?
3. What is a Fully Connected Layer or also called Dense Layer?
4. Which problems are solvable with single Layer Perceptrons?
5. What is a Multilayer Perceptron (Feed Forward Network)?
6. Explain the backpropagation algorithm.
7. Why do we need an activation function with a non-zero derivative?
8. What is the default activation function commonly used?
9. How many output neurons are needed for regression tasks?
10. What type of activation functions should you use for the last layer in a regression task? Describe the different situations and the corresponding activation functions.
11. What type of activation functions should you use for the last layer in a classification task? Describe the different situations and the corresponding activation functions. Note: In Tensorflow does not exist a logistic activation function, use sigmoid instead (see: https://www.tensorflow.org/api_docs/python/tf/keras/activations)
12. How is the loss function defined for classification?

13. Describe why the formula for binary cross entropy works well as a loss function for binary classification. You find a good explanation here:
<https://towardsdatascience.com/cross-entropy-for-classification-d98e7f974451>
14. What steps are required to set up a neural system to the point of evaluation?
15. In a multilayer perceptron the weights are initialized randomly. Why is this important?
16. What are the different settings in a feed-forward neural network in a regression problem compared to a classification problem?

Homework Assignment

Code the exercises in 08-ANN.zip .