

Machine Learning

Exercise Sheet 8

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Exercise 19: Decision Trees (4 Points)

What is the decision tree for the following Boolean functions:

1. $A \wedge B$
2. $A \vee B$
3. $A \oplus (B \vee C)$
4. $(A \vee B) \wedge (C \vee D)$

In each decision tree only one variable will be queried. Are the resulting trees unique? Are they linearly separable?

Hint: The symbol \oplus is the XOR function.

Exercise 20: Decision Trees and Rules (3 Points)

In the lecture it was shown that each decision tree can be converted into an equivalent set of rules. Can also each set of rules be converted to an equivalent decision tree? Either give an counterexample or show how the trees can be constructed from the rule sets.

Hint: Think about the evaluation of rule sets.

Exercise 21: Probability Distributions in R (3 Points)

Read Chapter 8 of „An Introduction to R“.

- a) Using the prefix `r` you get a function which allows you to draw random values from a distribution e.g. `rnorm(100)` returns 100 normal distributed random values. Plot three different probability distributions with each 500 random values.
- b) Investigate the Iris data set, especially the variable `Sepal.Length`, using the in 8.2 presented functions `hist`, `stem` and `summary`. What is the result of the function calls?
- c) Name two significance tests that R offers.