Exercises 07: Optimization

Content

Exercise 1: Find Optimal Parameters for Regression with Polynomial Features (scikit-optimize) 1

Exercise 2: Benchmark the Knapsack Problem 1

Exercise 3: Implement and Benchmark the Multiple-Choice Knapsack Problem 1

Exercise 4: Implement a Decision Support System 1

Please note that all results of each exercise should be included in one PDF file. The group name and the names of the members should be visible in the document.

Exercise 1: Find Optimal Parameters for Regression with Polynomial Features (scikit-optimize)

Implement "Exercises 06: Bayesian Optimization: Exercise 1: Find Optimal Parameters for Regression with Polynomial Features" with scikit-optimize (https://scikit-optimize.github.io/stable/index.html). Use "skopt.plots: Plotting functions" (https://scikit-optimize.github.io/stable/modules/classes.html) to visualize results of the algorithm. Compare the "scikit-optimize solution" with your implementation.

Exercise 2: Benchmark the Knapsack Problem

Open "Knapsack.py" and implement a generator for "v" and "w". Increase items and measure the time to solve the problem. Repeat each benchmark (n-times) and calculate mean and variance time. Create a table and a plot to visualize your results.

Exercise 3: Implement and Benchmark the Multiple-Choice Knapsack Problem

Implement the "Multiple-Choice Knapsack Problem" and benchmark the solving of this problem (cf. Exercise 3).

Exercise 4: Implement a Decision Support System

You should implement a decision support system (cf. Figure 1). The system should answer the question which option to use: CPU or Cloud. It is an open exercise. You can combine the concepts you have learned as you wish.

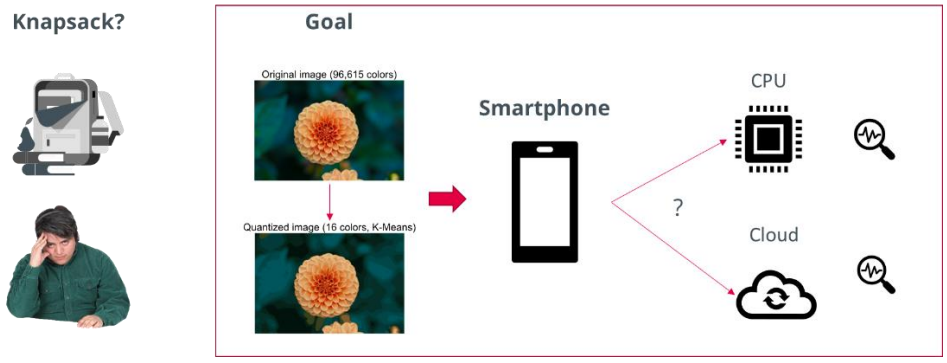

Figure 1: Decision Support System