Advance topics in Algorithms

ASSIGNMENT 7

Team Speed Programmers:
Hafiz Muhammad Abid
Syed Fahad Saeed
Syed Batl

Contents

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

1.1 Problem description

Find Optimal Parameters for Regression with Polynomial Features" with scikit-optimize. We have Used "skopt.plots: Plotting functions" to visualize results of the algorithm.

1.2 Results

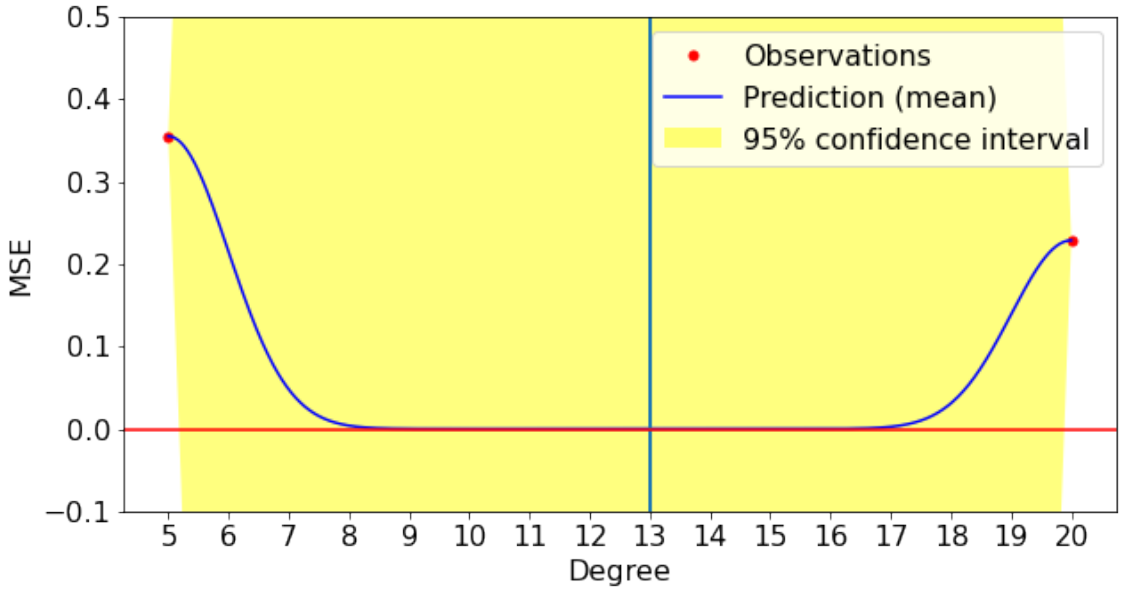

Figure 1: After bayesian optimization

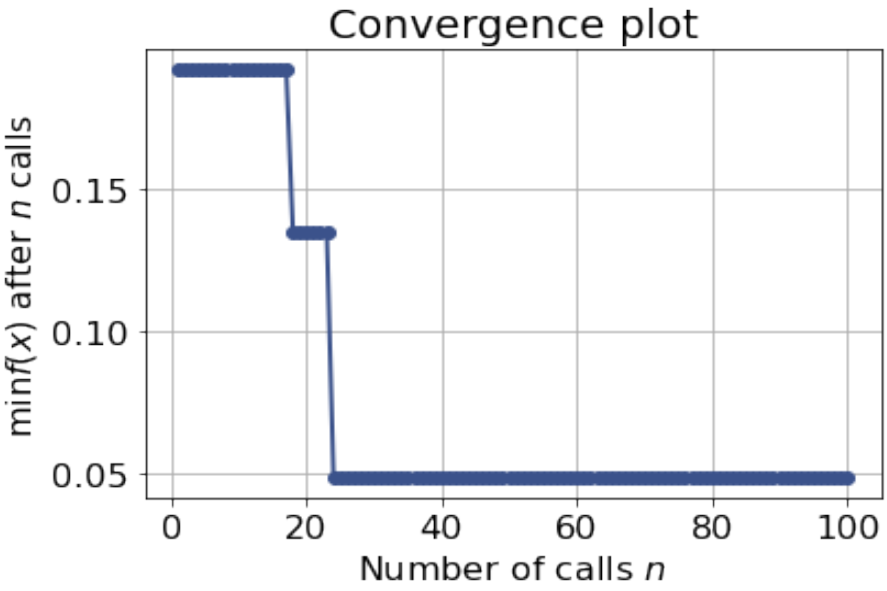

Figure 2: Using Scikit-optimize

2 Exercise 2: : Benchmark the Knapsack Problem

2.1 Problem description

Repeat each benchmark (n-times) and calculate mean and variance time. Also the the time usage with increasing of the time of benchmark.

2.2 Mean & Variance

Mean	Variance
0.055610790252685546	0.0001049154918909153

2.3 Results

We have repeated 50 times the benchmark and calculate the time. After calculating the time, we have visualized the relationship between time usage of each benchmark with the number of times it runs.

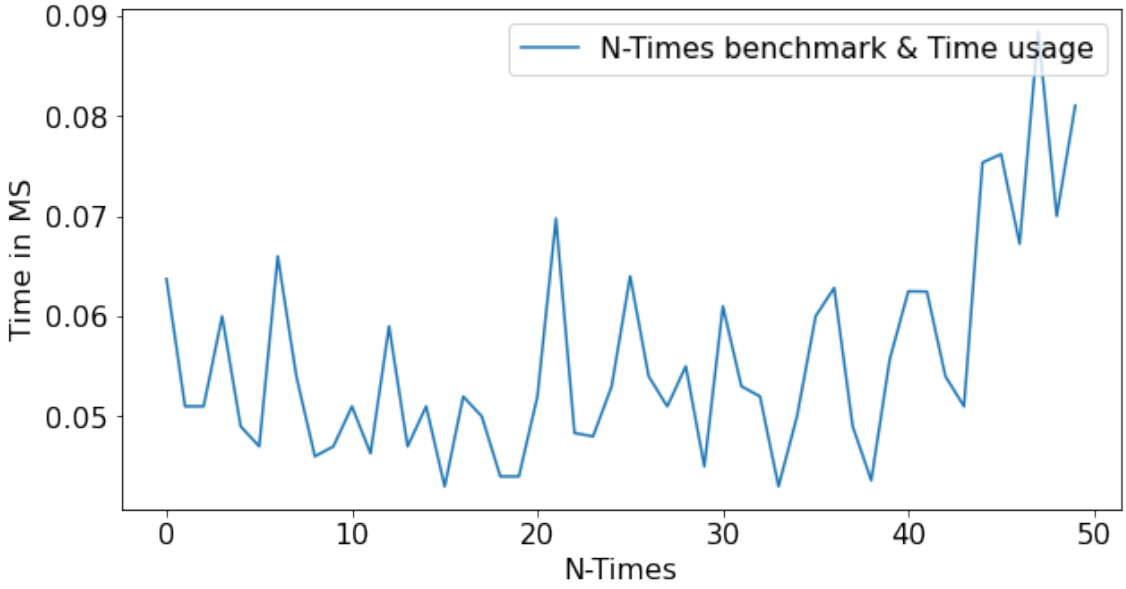

Figure 3: Benchmark the Knapsack Problem

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

3.1 Problem description

We start with a collection of items of varying weights and values. The problem is to pack a subset of the items into different bins, each of which has a maximum capacity of 100, so that the total packed value is a maximum.The graph below shows the number of bins increasing and the impact on the time.

3.2 Results

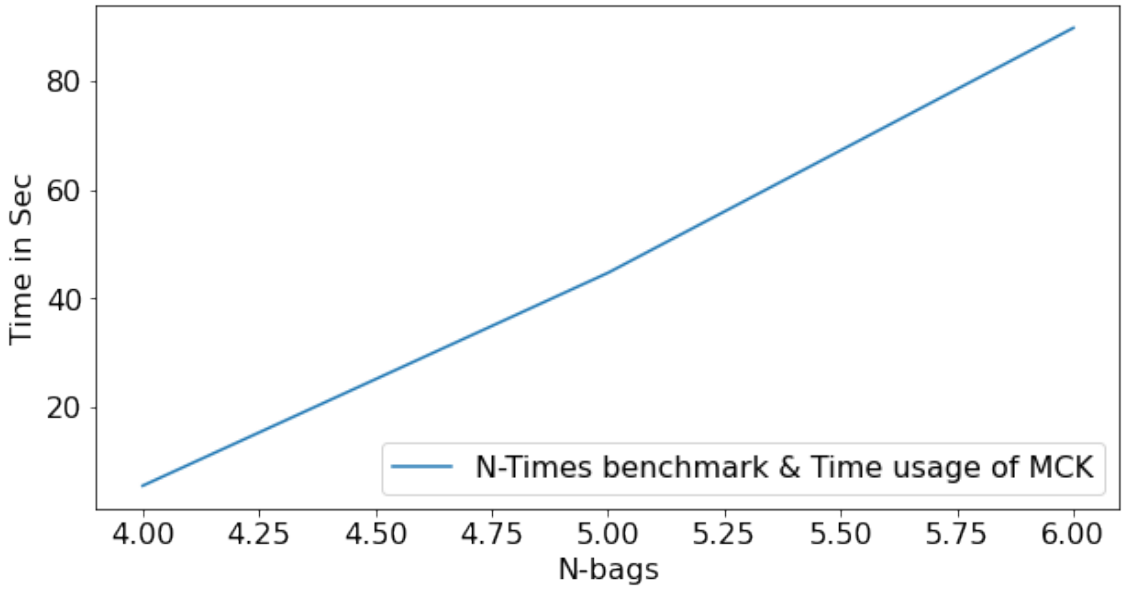

Figure 4: Benchmark the Multiple-Choice Knapsack