
Homework for Artificial Intelligence for Robotics - Assignment 7

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1 PRACTICAL PART

1.1 TASK

The task was to implement an algorithm to solve the travelling salesman problem using random-restart hill climbing.

754 cities and their coordinates were given in a txt file.

1.2 APPROACH

1.2.1 FIRST

In my first approach I used no optimizations up front. I create a random path visiting every city exactly once and compute its length. I then compute all possible next configurations when switching exactly two cities within the path. I only store the one configuration with the least path length. If the configuration does not change any more with respect to the previous step, I consider this configuration a local minimum and stop.

1.2.2 SECOND

In my second approach I tried clustering the nodes first using k-means. I then apply my first approach on each cluster and on the cluster-means themselves. I obtain paths for every cluster and I obtain the visiting sequence of the clusters, which I then can put together to one path.

1.3 RESULT

In my first approach I observed very long computing time for each step. This is because of the high number of cities and the possible states to consider.

In my second approach I expect to have a much shorter computation time due to the reduced number of cities for each cluster. Sadly I made some mistakes and was not able to fix them in time.