ADVISOR: ZACK BUTLER

Optimization of vehicle routing problem using artificial bee colony algorithm

Nikhil Keswaney
September 3, 2019

1 DESCRIPTION

Capacitated vehicle routing problem (CVRP) is a known NP-hard problem.
Problem statement: There are n customers and each of them require goods of capacity d_i delivered to them. Also, there is a depot with K trucks such that each truck has a capacity Q_j after serving the customers the truck has to return to the depot. We have to find the most optimal route for each truck such that each customer gets served by a truck only once.

There are various exact approaches that can be used to solve the CVRP problem but the issue with these approaches is the computational time taken for finding the most optimal solution. So instead of an exact approach I am planning to use the artificial bee colony(ABC) algorithm which mimics the intelligent foraging of the bee swarm. This approach won't necessarily give the most optimal solution since it is an approximate algorithm.

2 MILESTONES

1. Finding a dataset and solving the CVRP problem using the exact approach benchmarking it and finding the drawbacks of using the exact approach.
2. Using the Artificial bee colony algorithm to solve the CVRP problem. Also, modifying and improving the Artificial bee colony algorithm to better handle the CVRP problem.
3. Creating the parallel architecture for the improved artificial bee colony algorithm.Compare and contrast the results that were received after all the milestones.