

Solving p -*Hub* problem with a Steady State Genetic Algorithm

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1 Introduction

In this work I develop an algorithm aiming to solve the single hub location problem. Due to the nature of the hub location problem, the use of meta-heuristics can simplify the process of finding an optimal solution.

In this work the optimal solution for the dataset provided in the original paper[1] is found.

There is, also, a study of hyperparameters selection to achieve the solution in the least resource intensive way.

The code used in this work can be found here https://github.com/sorny92/genetic_algorithm.

2 *p-Hub* problem

3 Method

The implementation of this solution is based on the code developed by E. Alba here <https://neo.lcc.uma.es/software/ssga/index.php>. This software is based on Java but the implementation used in this work is reimplemented in C++ to know more in deep how to develop this kind of systems.

4 Results

5 Conclusion

A complex version can be done where the allocation is not done to the closest but also be learnt changing the genome to a two pair set up and removing the nearest allocation mechanism. [2]

parameters inspiration got from here: [3]

References

- [1] Morton E. O'Kelly. A quadratic integer program for the location of interacting hub facilities. *European Journal of Operational Research*, 32(3):393–404, 1987.
- [2] Zorica Stanimirović. Solving the capacitated single allocation hub location problem using genetic algorithm. 11 2007.
- [3] YiYe Zhou, DengKai Yao, QianRui Sun, and QiKe Wu. Application of genetic algorithm in p-hub airline network design problem. In *Proceedings of the 2nd International Conference on Electronics, Network and Computer Engineering (ICENCE 2016)*, pages 298–303. Atlantis Press, 2016/09.