Tourist Trip Route Problem

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Abstract

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1. Data Collection Process

The process of collecting data was pretty rudimentary. Simply, I just select thirty different places in Tenerife from the web TripAdvisor and, after that I just calculated the distance between each place with the Google Maps Tool. Due to the fact that this work is only for educational purpose, I assume that the distance between to places A and B where the same, so, the distance from A to B is the same that the distance from B to A. And, with this, I am able to store the distances into a unidimensional array doing the compute process easier.

2. Initial Solution Generation

All the implemented algorithms must start from any initial feasible solution, so, for this work I have considered two ways of create that initial solution.
On the one hand, I have developed a Greedy algorithm which creates an initial solution considering only the stars of every place.
On the other hand, a random solution was created considering a weighing equation an applying the Opposite-Based Learning technique.

2.1. Opposition-Based Learning

Opposition-based Learning (OBL) [4, 3, 1, 2] is a computing concept which has demostrated great efectivity at the time of improve several optimization algorithms. When we are evaluating a solution X, which belongs to the set of feasibles solutions S, simultaneously, we calculate the opposite solution $\overline{X}$, in order to achieve a better exploration of the search space Ω looking for the global optima [4].

Being $x \in \Re$ a real number defined within a certain range $x \in [a, b]$. The opposite number of X, denoted as $\overline{x}$ is defined as follows [4]:

$$\overline{x} = a + b - x \tag{1}$$

Taking into acount that, in this problem we are not working with real numbers but places, the way we calculate the opposite place of any X place is the same but, in this case, the range $[a, b]$ is the number of possible places we can select in the problem.

Finally, the place inserted in the initial solution is the one which has better rate when aplying the following equation:

$$\frac{0{,}3 * X_{duration} + 0{,}7 * X_{stars}}{X_{stars}^2} \tag{2}$$

3. Algorithms and Results

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4. Encountered Problems

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5. Bibliography

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