Travelling Salesman Problem

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Problem Description

Given a set of cities with distance between every pair, we have to output the shortest path in order to cover all the given cities.

Solution

The solution for Travelling Salesman Problem in polynomial time is not an easy task. This problem has a solution in factorial order which cannot be a good choice. (For the large inputs, it reaches to the state where it is impossible to have a solution in finite time.) As the time complexity concern, we make the approximate solution for this problem. It does not give a shortest path all the time, but reaches towards the good solution with time.

We have used a technique Simulated Annealing to get the shortest possible path.

Our implementation of Simulated Annealing

1. We are starting with the traditional approach of Simulated annealing (high temperature to low temperature.)
2. After we have cooled down we are again starting from high temperature so as to avoid any local minima after the first minima observed at first lowest temperature.
3. Also, while repeating the annealing we ae starting with the best path of the previous run

Conclusion

The traditional Simulated annealing tends to get stuck at some local minima as when its temperature decreases it won't be changing its path (Because the local minima has the lowest energy and Simulated annealing doesn't change its path at low temperature if energy difference is greater than zero).
Our approach leads it to move out of such local minima.
It can also be said that it is an indirect way of doing stochastic Search(Because at every high temperature our algorithm could jump to a new state).