MealPal Food Delivery System

Implementation of Particle Swarm Optimization

Name-Kunal Singh Deora Mentor- Dr Kal Bugrara

Problem Statement

- In a real-world scenario, it is a cumbersome task to manage the delivery system efficiently.
- A good transportation system is the one which establishes the least cost, most efficient transportation connection network while honoring all customer's service requirements. Achieving such efficiency in a transportation system is always a problem.
- My business MEALPAL which prepares food for the customers and that food is being delivered by a driver to various customers located at different location. The goal is to find the shortest and fastest path for the driver to deliver the food to the corresponding resulting in maximizing the profit for the organization.

Why PSO ??

- Vehicle routing problem comes under np-Hard (non deterministic polynomial-time hard)
- These kinds of problem does not have best/optimized solution in less amount time
- PSO although does not give best solution but it do gives most optimum solution in less time

My Solution

Initializing Parameter

• Set number of particles in a swarm, number of customers, iteration, maximum customer demand and maximum vehicle capacity

Make Adjacency Matrix to calculate distance • Adjacency matrix is created of size 7*7, randomly generated numbers from 12 to 63 at each ij position of the matrix

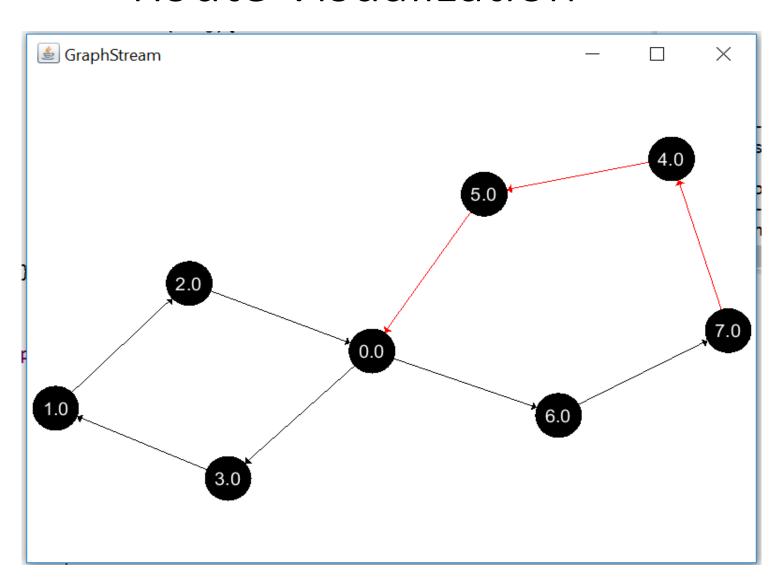
Initializing Swarm

- Shuffled hard coded array to generate particle's f(x) and f(pBest) for the first iteration
- Randomly generated velocities vector and set the fitness value of each particle with maximum value of Integer

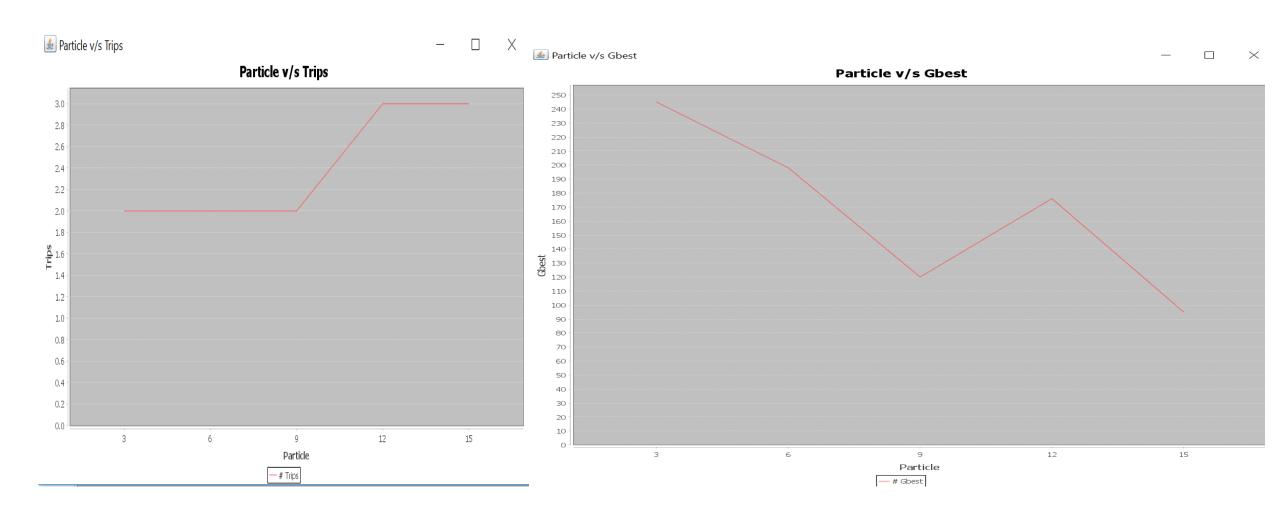
Run PSO

• For number of iteration set, calculate fitness value, updategBestArray, calculate new velocity and then create new solution of the particle(should not be more than the number of Customers)

Route Visualization



Empirical Analysis



Demo

Thank you [©]