UNIVERSITI TEKNOLOGI MARA

TECHNICAL REPORT

GENETIC ALGORITHM FOR SOLVING CAPACITATED VEHICLE ROUTING PROBLEM

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ABSTRACT

The capacitated vehicle routing problem (CVRP) is one of the most important problems in the optimization of distribution networks. The main objective for Capacitated Vehicle Routing Problem (CVRP) is to deliver goods to a set of customer with known demands through minimum vehicle distance routes, starting and ending with the same depot and carrying limited capacity of the goods. Since it is difficult to solve this problem directly, we used Genetic Algorithm for Capacitated Vehicle Routing Problem (CVRP) as to get the optimized route with minimum distance travel without exceeding capacity constraint. The outcomes of GA achieve better result. There are several step in methodology which input data by using operator selection and randomly choose two routes. From the data, we conduct iteration process which consist of crossover, selection and mutation process. Based on the study, we believe that minimum distance for P is 396.66 and the selected order routes is 1-14-2-4-5-8-7-6-16-19-1-12-11-15-3-13-9-17-18-10-1. The capacity carried for route 1 is 150 and route 2 is 160. While minimum distance for Q is 397.47 and the selected order routes is 1-2-5-3-4-15-7-8-9-19-1-11-12-13-14-6-16-17-18-10-1. The capacity carried for route 1 and 2 are 159 and 151. Both capacity were valid since it does not exceed our capacity decision which the vehicle cannot carry more than 160. The result that are encoded in Matlab, we found that the best order of the route is 1-5-13-17-4-18-9-12-11-15-1-19-8-3-14-10-6-16-7-2-1 which distance travel is 294.52 and the capacity for route 1 and 2 are 151 and 159 From the result, It can be conclude that GA method can be apply to large city routes.

Keywords : Genetic Algorithm, Capacitated Vehicle Routing Problem (CVRP), Matlab.

1 INTRODUCTION

The Capacitated Vehicle Routing Problem (CVRP) is a basic issue in combinatorial improvement with boundless applications. It frames the center of co-ordinations arranging and has been broadly examined by the operations explore group. Capacitated Vehicle Routing Problem (CVRP) can be characterized as carrying products to an arrangement of client with known client requests through least vehicle path, beginning and end with a similar stop and have to carry limited merchandise that must be deliver so that the recognized requests of all nodes are completely involved.

Capacitated Vehicle Routing Problem (CVRP) should determine the optimum path for delivering without excessing capacity to a set (n) total customers which known as nod. Moreover, there is a cost segment connected with moving a vehicle starting with one hub then onto the next. These costs more often than not speak to separation, voyaging time, number of vehicles utilized or a blend of these variables. Accordingly, in this research, Capacitated Vehicle Routing Problem (CVRP) will be tackled by utilizing Genetic Algorithm technique.

Genetic Algorithm (GA) is a search heuristics that similarly to the process of natural selection. By comparing various algorithm, Genetic Algorithm (GA) it gives the nearest optimal solution. Genetic Algorithm can be apply to a certain administrators to a populace as arrangements of the issues, in a manner that the new populace is enhanced contrasted and the past one as per a pre-determined foundation work. All in all, the arrangements of the issue are coded and the administrators are connected to the coded forms of the arrangements. The way the arrangements are coded assumes an imperative part in the execution of a genetic calculation. Arrangements can be arrange by utilizing different program, for example, C++ program, MatLab and Java.