# GENETIC ALGORITHM FOR VEHICLE ROUTING PROBLEM

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## 4. Enhanced Research Title and Objectives

(if any)

Original Title as Proposed:

Genetic Algorithm for Vehicle Routing Problem – A Case Study

Improved/Enhanced Title:

Genetic Algorithm for Vehicle Routing Problem

Original Objectives as Proposed:

To construct a Genetic Algorithm procedure to find the optimal routes and to investigate the effect of changing the parameter in Genetic Algorithm to obtain a better solution.

Improved/Enhanced Objectives:

To construct a Genetic Algorithm procedure to find the optimal routes for vehicle routing problem.

# 5. Report

## 5.1 Proposed Executive Summary

The company involved in this study was a supplier company which operated by receiving oil palm bunches from the estates and then delivering the oil palm bunches to the mills around Johor to be processed. The oil palm bunches were supplied from a company depot by a delivery vehicle operated by the company.

A large proportion of oil palm bunches deliveries were delivered by the company's vehicles. However, the difficulty arises due to a large proportion of oil palm bunches to be sent to too many mills. The depot manager faces the task of designing routes for the delivery vehicles in determining the sequence of mills to deliver the oil palm bunches that will result in minimizing the total distance taken.

Data collection:

**Customers (mills)**

-customers location

-customers demand (quantity of oil palm bunches)

**Supplier (company)**

-number of vehicle

-capacity of each vehicle on the oil palm bunches carried.

## 5.2 Enhanced Executive Summary

The vehicle routing problem (VRP) is the m-Travelling Salesman Problem, where a demand is associated with each city or customer and each vehicle has a certain capacity. Morever,in VRP also the number of vehicles, m, is often considered as a minimization criterion in addition to total travel distance. The objective of this research is to present a heuristic method, called Genetic Algorithm (GA), to solve the VRP.

Genetic Algorithms (GA) were developed initially by Holland and his associates at the University of Michigan in the 1960s and 1970s, and the first full, systematic (and mainly theoretical) treatment was contained in Holland's book Adaptation in Natural and Artificial Systems published in 1975. Goldberg gives an interesting survey of some of the practical work carried out in this era. Among these early applications of GA were those developed by Bagley for a game-playing program, by Rosenberg in simulating biological processes, and by Cavicchio for solving pattern-recognition problems.

In brief, GA is a system developing methods that use the natural principle of a genetic population and involved three main processes that is crossover, mutation and inversion. The GA are adaptive learning heuristic and they are generally referred to in plural, because several versions exist that are adjustments to different problems. They are also robust and effective algorithms that are computationally simple and easy to implement.