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TITLE OF THESIS :DEVELOPMENT OF KNOWLEDGE BASE MANAGEMENT SYSTEM USING FUZZY LOGIC ON GENETIC LEARNING ALGORITHM

ABSTRACT

Development is essential activity of the data. To develop the KBMS must be chosen, the type of Knowledge Base (KB) firstly and then study the facilities to develop it. The aim of this study have proposed a new system which is based on mixing two techniques Fuzzy Logic and Genetic Algorithms by designing, implementing the KB and manage the data that are stored on it. The Fuzzy Vehicle Routing Problem (FVRP) is the base data that selecting to calculate the content of KB (fuzzy-due time), applying genetic algorithm component with different operators on the membership function. The method that is used is implemented by using minimum number of vehicles behavior with a small population and in relatively few generations.

Instead of using normal parameters related with the problem, apply Fuzzy Logic to input parameters by using triangular membership function to calculate fuzzy-due time for each node. This parameter concerned with the customer's preference which consist of two kinds. Firstly , tolerable interval time consist of $[e_i, l_i]$, e_i is the earliest time and the other value is the latest. While secondly is the desirable service time u_i . Then stored in the chromosome with another parameters related with the problem and perform GAs operators to search the optimal solution which is low time costly.

The system is composed of two main algorithms for solving the problem. In the first, depending on the distance between the nodes while the other, used average fuzzy-due time related with each chromosome in the population to calculate the fitness and objective values that is essential to apply the genetic operators after initialize the chromosome randomly.

For both states, the system contains the fuzzification phase which consist of three main stages, compute the customer demand, apply fuzzy operation on the data, and deduce the other data related with the problem which is stored in the initially chromosome, generate population, by applying arithmetic crossover for the service time & single point crossover for vehicle's number, order changing mutation for customer's demand, vehicle's number & service time. And Roulette wheel selection for evaluate the fitness value in the second stage to reach the optimal solution. Finally, analysis all the parameters value used in the system.

After implement and design the proposed system, it tests with various value of the probability for crossover, probability for mutation to evaluate this parameters and study the affectivity on the optimal solution the deduce that the probability for crossover could be greater than probability for mutation. Also, the cut-off between these values must be large in order to effect best on the search space.

Moreover, GAs waste time to produce the solution but when mixed with Fuzzy Logic, this lead to minimize the time needs to search as an optimal solution.

The method which depends on the fuzzy-due time could be noticeable more an efficient, accurate and best because it was exploring the search space in one generation with low value of Fuzzy parameter compared with the first method. The first method consuming more time because it was working in many generation with various values of distance then be added more procedures to choose the best optimal solution.

And, when it was performing two algorithms to search the optimal solution, used a variant value of population size The best when used the large size of population for both methods because it was extending the search space and is more flexible to choose the best optimal solution with low time costly.

The proposed system was designed by using Visual C⁺⁺ version 6.