

A Genetic Algorithm Based Solution Approach for the Time Dependent Vehicle Routing Problem

M. Selçuk Korkmaz

**Marmara University, Engineering Management Program
Istanbul, Turkey**

Serol Bulkan

**Marmara University, Industrial Eng. Dept.
Istanbul, Turkey**

Ekrem Duman

**Ozyegin University, Industrial Eng. Dept.
Istanbul, Turkey**

Abstract

The classical vehicle routing problem (VRP) assumes that distances between locations (in terms of time) are constant. However, in most real life applications of VRP the time between locations depend on the traffic which changes according to the time of the day. In spite of this fact, this problem which has been named as the Time Dependent VRP in literature, has attracted very little interest so far. The apparent reason of this is the complexity of the problem; VRP is already NP-Hard and the TDVRP is even a more complex. In this study, we attack to solve the TDVRP which assumes a slower traffic at certain times (e.g. morning) in some specific parts of the city (e.g. downtown). We assumed varying travel speeds where the travel time can be calculated by taking the integral of the speed function. Our study differs from the few similar studies in literature which assumed step functions for the travel times to reflect the effect of the traffic. We suggested a genetic algorithm based solution method and we obtained very successful results. We demonstrate that our solutions which take care of the traffic generates much better solutions as compared to other solutions which ignores the times dependency aspect of the problem.

Keywords

Vehicle Routing Problem, Genetic Algorithm, Time Dependent Vehicle Routing Problem

Biography

Mehmet Selçuk Korkmaz is participating in PhD program in Industrial Engineering at Özyegin University, Istanbul, Turkey. He earned B.S. in Computer Engineering from Boğaziçi University, Turkey, Masters in Engineering Management from Marmara University, Turkey. His research interests include optimization, heuristics, transportation problems and manufacturing. He published a national symposium paper and studies on several publications.

Serol Bulkan is an Assistant Professor in Industrial Engineering at Marmara University, TURKEY. He earned B.S. in Management Engineering from Istanbul Technical University, TURKEY, Master of Science in Management Engineering from Istanbul Technical University, TURKEY, a second Master of Science in Operations Research from Florida Institute of Technology, Florida, USA, and PhD in Industrial Engineering from Cleveland State University, Ohio, USA. He has published journal and conference papers. His research interests include project management, optimization, production planning, scheduling, and combinatorial optimization.

Ekrem Duman was born in Afyon, Turkey, in 1967. He received the BS degree in electrical and electronics engineering from Bogazici University. He then received his MS and PhD degrees in industrial engineering from the same university. He works as a faculty in the Industrial Engineering Department of Ozyegin University. His areas of interest include industrial applications of operations research, scheduling and data mining.