

Vehicle route optimization for student transportation in a GIS and programming environment: Case study of mawo secondary school, Minna, Niger State, Nigeria

Odumosu, J. O.¹, O. O Morenikeji² and E. A. Adesina¹

¹Department of Surveying and Geoinformatics, School of Environmental Technology, Federal University of Technology, Minna, Nigeria. ²Department of Urban and Regional Planning, School of Environmental Technology, Federal University of Technology, Minna, Nigeria

Abstract

Route optimization in Vehicle Routing Problem (VRP) is an age long field of research that has attracted interest amidst most professionals in the built environment because of its many variants and types. It often becomes confusing as to which solution approach is best suited for certain VRP at hand. This paper has presented a brief theoretical description aimed at enhancing easy discrimination of the difference between the major variants of the Capacitated VRP (CVRP) and their solution algorithms using the conventional dikjstra's algorithm for the Chinese Postman's Problem (CPP) and the generic algorithm for the Travelling Salesman's Problem (TSP) in ArcView and MATLAB respectively. Analysis of the results obtained within the study area show that the CPP (with a realistic path distance of 38.772Km) is better suited for CVRP in existing road networks than the TSP (with an unrealistic path distance of 19.165Km).

Keywords: Route Optimization, Vehicle Routing Problem (VRP), Chinese Postman's Problem (CPP), travelling salesman's Problem (TSP), Dijkstra's algorithm, Generic Algorithm

Email: oluwole@futminna.edu.ng; joseph.odumosu@futminna.edu.ng

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