A Quantity Estimated Method to Measure Flow of Nodes in a Freight Transport Network

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Abstract

This study focuses on estimating flows of nodes in a courier transportation network. Literature has quantified the exiting flow of nodes by analysing real data for quantities transported and travel time. Due to difficulties in accessing real data, a method for estimating data especially on the quantity transported among nodes is required. The purpose of this study is to develop a quantity estimated method for measuring the exiting flows of nodes in a freight transport network. The level of significance of each node in the network is estimated through a proposed 'criticality factor'. Nodes are equally categorized as high, medium, and low based on the descending order of the criticality factor. A weighting scale is developed for these three categories and Google maps are used to derive the travel time. The exiting flow of nodes is derived as the ratio between the quantity exited and time taken. This method is applied to peak, off peak, highway, and expressway operations. The study recommends using a proper amount of equipment at nodes, consolidation of vehicles, and relocation of warehouses. This study contributes to the domain of cost reduction in freight network by estimating the exiting flows of all the nodes in a freight network.

Keywords: *Exiting flow, Freight network flow, Criticality factor, Maximum vehicle capacity*