SOFT COMPUTING AND REGRESSION MODELLING APPROACHES FOR LINK-CAPACITY FUNCTIONS

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Abstract: Link-capacity functions are the relationships between the fundamental traffic variables like travel time and the flow rate. These relationships are important inputs to the capacity-restrained traffic assignment models. This study investigates the prediction of travel time as a function of several variables V/C (flow rate/capacity), retail activity, parking, number of bus stops and link type. For this purpose, the necessary data collected in Izmir, Turkey are employed by Artificial Neural Networks (ANNs) and Regression-based models of multiple linear regression (MLR) and multiple non-linear regression (MNLR). In ANNs modelling, 70% of the whole dataset is randomly selected for the training, whereas the rest is utilized in testing the model. Similarly, the same training dataset is employed in obtaining the optimal values of the coefficients of the regression-based models. Although all of the variables are used in the input vector of the models to predict the travel time, the most significant independent variables are found to be V/C and retail activity. By considering these two significant input variables, ANNs predicted the travel time with the correlation coefficient $R = 0.87$ while this value was almost 0.60 for the regression-based models.

Key words: *artificial neural networks, link-capacity functions, regression analysis, travel time, flow rate, capacity*

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1. Introduction

The link-capacity could be basically described as the maximum number of vehicles that can reasonably be expected to traverse a specified location on a link within a time period [15, 18]. The capacity is an important parameter indicating performance of a link and it is utilized in link-capacity functions. The link-capacity functions are the relationships between travel time and flow rate. The

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