ESTIMATING TRAVEL TIME FOR UN-SIGNALIZED TWO LANE HIGHWAYS IN SRI LANKA

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Thesis submitted in partial fulfilment of the requirements for the degree Master of Science in Civil Engineering

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Declaration

I declare that this is my own work and this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any other university or institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text.

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The above candidate has carried out research for the Master's thesis under my supervision.

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Abstract

Estimating Travel Time for Un-signalized Two Lane Highways in Sri Lanka

Reliable travel time estimation of a given route is important in transport planning. Travel time estimation is an important parameter in effective transport planning, quality maintenance, and traffic management. Even though several models are available worldwide for travel time estimation from simple road network to a complex transport network, local availability of such methods are lacking mainly due to the inadequacy of research, data and resources. Travel time along a particular route is associated with several factors including land use type, geography, weather, road condition, traffic flow, road geometry. One or a combination of these factors can cause variation in travel time and the effect from each parameter can change with the land use activities in the area.

The objective of this research is to develop a relationship to estimate the travel time for road links to monitor the travel time and of two lane highways without signalized intersections in Sri Lankan context, by assessing the correlation between land use type and the travel time along the road.

Two lane road sections of three national highways in Sri Lanka; Peliyagoda-Puttalam road (A03), Colombo-Kandy road (A01), Ambepussa-Trincomalee road (A06) were considered for this study to associate the different land use types, different vertical and horizontal alignments and its correlation with vehicle travel times. Continuous travel time data along the roads was collected during daytime using GPS (Global Positioning System) data loggers. Road was sectioned according to the land use type. Multivariate stepwise regression was used to develop the relationship between the land use type and the travel time. Land use data showed significant positive correlation with the travel time data. One travel time estimation model for three leg un-signalized intersections and four models for travel time estimation for different four land use types, commercial, residential present on both side, residential present on one side and cultivation for the stretch of the road were successfully developed with model fit more than 69% and Mean Absolute Percentage Error (MAPE) of more than 38%.

Key words: *Two Lane Highways, Travel Time Estimation, Land Use Type, Transport Planning*

Dedication

To my loving parents and my husband

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List of Abbreviation

Abbreviation	Description
AI	Artificial Intelligence
ANN	Artificial Neural Network
AVI	Automatic Vehicle Identification
AVL	Automatic Vehicle Location
C	Cultivation Length
CEP	Circular Error Probable
CL	Commercial Length
DMI	Distance Measuring Instrument
DW	Durban Watson
GPS	Global Positioning System
H	No of Houses
I	Number of Important Places
LOS	Level of Service
MAPE	Mean Absolute Percentage Error
RMSQ	Root Mean Squared Error
SMV	Support Vector Machine
TD	Travel Distance