ESTIMATE AND MODIFY O-D FLOWS AND EVALUATE TRAVEL TIME USING MINIMAL NUMBER OF LINK FLOW COUNTS

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Department of Civil Engineering

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DECLARATION

ñI 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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ABSTRACT

Estimate and Modify O-D Flows and Evaluate Travel Time using Minimal Number of Link Flow Counts

Accurate real-time information provision and short-term predictions of traffic parameters such as volumes, travel speeds and occupancies, is a research topic that has attracted considerable interest in the literature. This is, at least in part, a result of the increasing penetration of Intelligent Transportation Systems (ITS) technologies in everyday life. ITS technologies, with Advanced Traveller Information Systems (ATIS) and Advanced Traffic Management Systems (ATMS) as examples, attempt to deal with the traffic congestion and travel time problems facing commuters in many urban areas worldwide by better synchronizing traffic signals and by assisting drivers on selecting routes based on accurate real-time information on traffic conditions.

Objective of this research is to estimate and modify the Origin-Destination flows with latest traffic volume data obtained from minimal number of link flow counts within the network. Methodology in satisfying the research objective has been developed by a Dynamic Program (Dynamic Travel Time Discoverer ï DTTD) in an analytical software platform widely used around the world. Developed methodology allows estimating the link flows and calculating the travel time while giving an opportunity to simultaneously modify the Origin Destination (O-D) flows according to the latest field information. During the program runs, Seed O-D Flow and Distance matrices are read by the program and calculate the total link volumes according to the seed matrices and stores in arrays. Secondly, Akçelik Speed-Flow model is used to convert total flow values into Travel Time values. A case study was carried out to validate this model to Sri Lankan conditions. This model produces significantly improved traffic assignment run times and provides more accurate speed estimates and reasonably accurate travel times to assure the objective of identify the best path based on travel time using minimum traffic flow information available. As an another option, program enables user to modify the link flow values with latest traffic data obtained from link flow counts and re-write the seed O-D Flow matrix with the updated values. When the program re-runs, it concludes the shortest path in travel time basis with the latest updates.

In conclusion, the estimation of link flows and modifying the O - D flows can be performed by two stages model and travel time is projected by the improved speed flow relationship. Projected travel time facilitates selecting the best path or the next alternative for the user destination. Furthermore, integrate a method which will automatically update the system data base with the latest traffic data corresponding to road links and give the most up-to-date best travel time path to the road user is proposed as a future development.

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Key Words: *Intelligent Transportation System, O – D Flow, Link Traffic Flow, Travel Time*

DEDICATION

To My Dear

Father, Mother, Brother, Wife & Son

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First and foremost I offer my sincerest gratitude to my supervisor, Professor J M S J Bandara, who has supported me throughout my thesis with his patience and knowledge whilst allowing me the room to work in my own way. I attribute the level of my Masters degree to his encouragement and effort and without him this thesis, too, would not have been completed or written. One simply could not wish for a better or friendlier supervisor.

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